I. INTRODUCTION

The College of Engineering, Computer Science, and Construction Management (ECC) houses a “large site”1 to support its computing and technology needs. Currently, the College manages 19 labs2 with a combined total of more than 300 machines (not including machines in faculty and department offices), 16 servers3, multiple operating systems, supporting approximately 20,000 users on the Unix servers4, using about 90GB of file usage5, spanned over 350GB of disk space6.7. Of the 19 labs in the College, five are Computer Science labs8. The labs are all managed by one (1) system administrator; hence, it is important that faculty needs are addressed so as to maximize the utility of our available resources.

One of the charges of the Department of Computer Science’s Laboratory Committee is to solicit faculty computing needs to support their teaching, research, and service activities. This information is collected annually so that the appropriate entities are informed of the status of the Department’s computing infrastructure as well as any perceived deficiencies that need to be addressed.

This document presents Computer Science faculty computing needs organized into three categories: high priority, medium priority, and low priority. Items listed and detailed within each category are ordered in descending urgency as determined by the faculty.

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1 According to SAGE (http://www.sage.org/, a Special Interest Group of the USENIX Association) a “large site” is characterized by “100 or more computers, potentially running more than one operating system, and 100 or more users.”
2 See Table 1 on page 2.
3 College of ECC servers include tiglon (Unix), jaguar (Linux), a file server, a web server, a mail server, an authentication server, one DNS server, five MS Windows servers, a license server (for SolidWorks), and an admin/backend support server.
4 Approximately half of these users are also active on the Windows Domain.
5 Not including (operating) system files.
6 Not including spare partitions in case of emergencies.
7 There is not a permanent storage solution for each user on the Windows Domain. However, there is a “permanent” Faculty storage location for students to turn in homework, and a temporary storage location for everyone. The Faculty storage is roughly 5Gb, and the Temp Space is roughly 10Gb.
8 See Table 2 on page 2.
Table 1. Computer laboratories and server rooms managed and maintained by the College of Engineering, Computer Science, and Construction Management.

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of Comprts</th>
<th>Supported O.S.</th>
<th>Printer(s)</th>
<th>Location</th>
<th>No. of Comprts</th>
<th>Supported O.S.</th>
<th>Printer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCNL 124</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 131</td>
<td>25</td>
<td></td>
<td></td>
<td>OCNL 340</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 133</td>
<td>30</td>
<td></td>
<td></td>
<td>OCNL 341</td>
<td>14</td>
<td></td>
<td>Dell Laser Prntr</td>
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<tr>
<td>OCNL 136</td>
<td>36</td>
<td></td>
<td></td>
<td>OCNL 342</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 241</td>
<td>26</td>
<td></td>
<td></td>
<td>OCNL 343</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 244</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>OCNL 246</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 251</td>
<td>29</td>
<td>HP LJ2200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 255</td>
<td>14</td>
<td>HP LJ2200</td>
<td>HP LJ5000</td>
<td>OCNL 438</td>
<td>28</td>
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<tr>
<td>OCNL 334</td>
<td>30</td>
<td>HP LJ4000</td>
<td>HP LJ4050</td>
<td>LANG 118</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 337</td>
<td>14</td>
<td>HP LJ2300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNL 339</td>
<td>13</td>
<td></td>
<td></td>
<td>LANG 201</td>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Laboratories under the Department of Computer Science

<table>
<thead>
<tr>
<th>Location</th>
<th>Name</th>
<th>Number of Computers</th>
<th>Overhead Projector?</th>
<th>O.S. Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCNL 241</td>
<td>Graphics / Database Lab</td>
<td>26</td>
<td>Y</td>
<td></td>
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<tr>
<td>OCNL 244</td>
<td>Majors (Thin-Client) Lab</td>
<td>30</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>OCNL 246</td>
<td>Projects / M.S. Defense Lab</td>
<td>15</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>OCNL 251</td>
<td>Graphics and Animation Lab</td>
<td>29</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>OCNL 340</td>
<td>Networks and Security Lab</td>
<td>30</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>

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9 This computer laboratories are independently maintained by the Department of Construction Management – they are not managed by Mr. Elbert Chan.
10 University Life computer laboratory.
11 This is the EECE Cisco Networks lab, housing 3 servers, and several routers and switches.
12 Open University computer laboratory.
13 This is a server room that has restricted, system administration access.
II. HIGH PRIORITY NEEDS

A. Secure Additional System Administration Personnel to Support Elbert Chan

i. Rationale: The College has a computing system with a fairly complex configuration requiring more than one system administrator to oversee. The department believes that most, if not all, of its ongoing laboratory/computing needs will be addressed if the College’s system administration group, currently consisting of just one “Intermediate/Advanced” system administrator, were modified with additional personnel – at least at the “Junior,” but preferably at the “Intermediate/Advanced” or “Senior” level, with Unix/Linux multi-platform configuration experience and investigative computing lab planning potential.

ii. Previous solutions providing additional support personnel for Mr. Chan through work study students with roughly an equivalent of “Novice” level experience provide only temporary relief for the daunting task of managing the College computing systems.

B. Address Various Issues with OCNL Labs

i. Rationale: The OCNL Labs are the primary on-campus computing resource students use within our College. The level of quality we maintain our labs is a clear indication of our level of commitment to deliver quality education to our students. We need to recognize and emphasize the fact that we need 100/1000 Mbps network connectivity in the OCNL building.

ii. Regularly review the status of OCNL’s place on the Campus Technology Infrastructure Initiative (TII) list. Upgrade of network connectivity in the building is supposedly either Fall 2006 or Spring 2007.

iii. Increase/Improve OCNL security by adding all laboratory doors to the University card key system and installing phones in the labs to facilitate requests for (Campus Police) escort services during off-work hours.

iv. Network issues in computer labs in OCNL – potential solutions:
   a) use an authentication server for domain control
   b) use a proxy server for caching

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c) additional recommendations (from Clarke Steinback, Fall 2005):

- for OCNL 241:
  
  - Single 48 port 10/100/1000 switch. Approximate cost $600 – 800.
  - Two (2) 24 port 10/100/1000 switches. Approximate cost $120 – 140 each for unmanaged totaling ~$250 or $140 – 250 each for managed totaling ~$400.
  - Two (2) 16 port 10/100/1000 switches. Approximate cost $200 – 250 each for unmanaged totaling ~$400 or $300 each for managed totaling ~$600.
  - Four (4) 8 port 10/100/1000 switches. As low as $55 each, though commonly $80 – 100 each for unmanaged totaling ~$220 to 320.
  
  - Note: When printers and print server are added, then an additional switch would be needed. If any cable is being run for the current solution, it would be best to consider running a CAT 6 to the interior wall that the printers would be against.

- OCNL 251:
  
  - Single 48 port 10/100/1000 switch. Approximate cost $600 – 800.
  - Two (2) 24 port 10/100/1000 switches. Approximate cost $120 – 140 each for unmanaged totaling ~$250 or $140 – 250 each for managed totaling ~$400.
  - Three (3) 16 port 10/100/1000 switches. Approximate cost $200 – 250 each for unmanaged totaling ~$600 or $300 each for managed totaling ~$900.
  - Six (6) 8 port 10/100/1000 switches. As low as $55 each, though commonly $80 – 100 each for unmanaged totaling ~$330 to 480.
  
  - Note: With the instructor station in this lab on a different wall than the other computers, we would either need a separate cable run from the switch room or a cable run from the front wall to the back wall where the local switch would be. Alternatively, we could ‘live’ with the poor connectivity on the instructor workstation if all the other workstations are improved.

- d) Ensure all PC-based machines in labs do not have Intel Celeron processors with low memory (e.g. as currently in OCNL 133). Contact the University unit (perhaps the Provost’s Office?) regarding the possibility of upgrading the computers in OCNL 133 (University Life computer lab) and OCNL 136 (Open University computer lab).
v. Software:

a) Upgrade all Windows-based machines to run MS WinXP and ensure labs have the latest version of MS Office, Visual Basic, and MS Project

b) Make it standard procedure to verify with faculty that the configuration of the ghost image to use at the start of each semester actually works.

c) guarantee uniform software setup/availability between labs (e.g. Adobe Acrobat Reader, MS-based compilers, other support software)

d) Upgrade Newtek Lightwave 3D (http://www.newtek.com/lightwave) to v.9.0 in OCNL 241 and OCNL 251. This is the main modeling and animation software used in the APCG program. OCNL 241 and 251 currently have v.7.5 with students using v.8.0 on their home computers. Approximate cost: $200/seat.

C. Upgrade Majors / Thin-Clients Lab (OCNL 244)

i. Rationale: OCNL 244 was converted to a thin client lab at the end of Summer 2005 with the intention of providing our majors with Unix-Linux-Windows access/services in a setup requiring minimal maintenance (desktop issues are isolated to the respective server) while providing configuration consistency across client desktops. OCNL 244 was also getting transitioned to accommodate the needs of the Intelligent Systems Laboratory (ISL) which currently uses OCNL 431\(^{18}\) for its robotics instruction and outreach needs, and the Artificial Intelligence classes offered by the Department. Although our majors seem to have no problems with OCNL 244 since it opened as a thin client lab in Fall 2005, the MS Windows side has not been in great demand due to the Windows server connection getting terminated whenever a browser is started. Additionally, USB connectivity could not be established on any of the available server connections. The Lab Committee consulted with John Bush (Advanced Management Systems) regarding these issues. Mr. Bush’s recommendation (see attachment) is to slowly transform OCNL 244 to a hybrid client lab that defaults to RDP and X11 access to a Linux server, with MS Windows available locally.

ii. Hardware:

a) Switch the roles of the Sun Fire V20z and the Dell 1850 so that the V20z becomes the Linux server and the 1850 becomes the Windows server.
   - current configuration: thin clients can connect to tiglon (Sun Enterprise 3500 server running Solaris 2.8), leopard (Sun Fire V20z running MS Windows

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\(^{18}\) The department has minimal to no control over this lab and its resources. Most of the machines are old and require continual testing and software installation. System software installation seems to be inconsistent between machines and between semesters.
server 2003), or \textit{jaguar} (Dell 1850 dual Intel Xeon running Slackware 10.0)
Mr. Bush points out in his report that MS Windows 2003 server is known to have
a number of issues and the use of (the more stable) MS Windows 2000 server
may be a solution. Since back-porting the current installation is not possible on
the 64-bit Sun Fire V20z, it may be feasible to switch the roles of the V20z and
1850.

b) Slowly phase out \textit{Blue Shark Apriza} thin client terminals with hybrid clients.

iii. Software:

a) need multiple \textit{Mathworks MATLAB} licenses to run on the Linux server – currently
have multiple licenses for the Windows server and only 1 for the Linux server

b) install \textit{Cyberbotics Webots} robotics simulation software on both the Windows and
Linux servers

c) install all \textit{LEGO Mindstorms} programming tools (\textit{e.g.} Robotics Invention System
2.0, NQC 3.1 r4, BricxCC 3.3) on the Windows server

D. Provide current instructional technology in classrooms and labs:

i. Goal: setup projection systems in all CSCI teaching classrooms and labs in OCNL (HP
Digital Projection Systems, see \url{http://www.shopping.hp.com}; InFocus Projection
Systems, see \url{http://www.infocus.com}) Currently, only OCNL 241 and OCNL 251 have
permanent overhead projectors installed (see Table 2 on page 2). Priority installation
would be for OCNL 244 and then OCNL 340.

ii. Install SMART Technologies “smart board” \textit{interactive whiteboards} in OCNL
classrooms (see \url{http://www.smarttech.com})

iii. Interactive classroom feedback system (GTCO CalComp Peripherals’ \textit{InterWrite PRS},
see \url{http://www.gtcocalcomp.com/interwriteprs.htm}).

E. Setup a web-based turn-in application for submitting programming assignments ...

F. Setup an e-mail list management software (L-Soft’s \textit{LISTSERV}, \url{http://www.lsoft.com/}
for the College.
III. MEDIUM PRIORITY NEEDS

A. Provide a means for maintaining an updated computing resources page that details hardware and software availability in all labs. Develop a protocol/procedure for reporting and immediate notification of problems, fixes, and updates.

B. Acquire department license(s) for Adobe Acrobat Professional for faculty to create, control, and deliver Adobe PDF documents (see http://www.adobe.com/products/acrobatpro/)


   ■ The College of ECC has previously maintained MATLAB licenses which are renewed on a semester basis.

D. APCG Software for OCNL 241 and OCNL 251

   i. Install Adobe Premiere Elements (see http://www.adobe.com/products/premiereel/). Approximate cost: $62.95/seat

   ii. Install Autodesk Maya (see http://www.autodesk.com/maya). Approximate cost: $297.95/seat

   iii. Install Pixologic Zbrush (see http://www.pixologic.com/zbrush/). Approximate cost: $254.95/seat

E. Set up a Windows server to support CSCI 465, Web Programming Fundamentals, and other .NET or security-related classes

   ■ the potential for intrusion is a major concern; perhaps the firewall would be sufficient for security, or this machine could be configured on an isolated subnet

F. Acquire department license(s) for Macromedia Dream Weaver, web development tool for faculty to efficiently design, develop and maintain websites and applications (see http://www.macromedia.com/software/dreamweaver/)
IV. LOW PRIORITY NEEDS

A. Hardware

i. Provide faculty access to a networked color laser printer.
ii. Update laser printers in all full-time faculty offices.
iii. Keep faculty station in OCNL 214, department conference room, up-to-date.
iv. Install Wacom tablets (see http://www.wacom.com) in OCNL 241 and OCNL 251.

B. Software support for classes in upcoming semesters

■ Formulate submission procedure of software list/request to Elbert Chan before the next semester begins.

CSCI LABORATORY COMMITTEE, 2006-2007

Moaty Fayek
Seung-Bae Im
Ben Juliano (Chair)
Ralph Hilzer (ex-officio)