The Asset Management for Computers Program at Portland Community College
March 2009

Abstract
The computing environment in higher education is very dynamic. The demand for IT services by students, staff and faculty is constantly on the rise. Computing is ubiquitous now and support is required across numerous locations. In order to meet this demand, IT teams in higher education are responsible for providing a robust desktop PC or Mac and a wide variety of software.

This paper presents the experience of Portland Community College in implementing an Asset Management Program for Computers. The paper highlights the initial phase of the project which addressed software licensing compliance, asset inventory, and remote user support. These goals were addressed with a combination of technology implementation and staff communication and training. Future enhancements to the asset management program and advanced functionality plans are covered at the end of the paper. A discussion of asset management programs in higher education will advance the development of best practices and provide guidance for institutions tackling these issues. The experience of Portland Community College is a valuable contribution to the overall discussion.

Introduction
Portland Community College (PCC) is a two (2) year college with several major campuses and a number of satellite locations. It offers programs in a metropolitan area covering 1,500 square miles. PCC enrolls approximately 80,000+ students annually. The College employs approximately 3,000 faculty, staff, and administrators. The curriculum includes vocational programs, community education, academic transfer courses, and classes in basic skills. Distance-delivered courses are increasing rapidly. The College has an open admissions policy. Credits from other institutions may be accepted toward degree requirements. PCC has grown substantially over the past decade and expects continued growth in enrollment over the next five (5) years.
The primary campuses, Sylvania, Cascade, and Rock Creek are interconnected by way of an optical fiber loop which provides the foundation for our WAN. Five additional locations are also on the WAN via fiber or other high-bandwidth connections. The computing platform for PCC is primarily comprised of servers running a variety of operating systems including Unix (HP UX & Solaris), Windows 2003, and Redhat Linux. The system is deployed to users on a Novell network. The data base environment consists of Oracle 10 and SQL server data bases among others. The desktop environment consists of approximately 5,000 workstations primarily comprised of Dell PCs running Windows XP and Vista along with a substantial number of Mac systems on OS X.

Problems and Goals
The IT department at PCC is relatively small with just 125 employees. Of these, about 25 directly support the PCs and Macs. Although the skill level of desktop support technicians was very good, they were struggling to provide support for the computing environment. We also had 5 individuals on the Help Desk. They were also seeing an increase in support demands and a decline in service levels.

The desktop computing environment at PCC is very dynamic. There are some 5,000 PCs and Macs throughout the college. We use a combination of leasing and purchasing to cover the replacements. We typically use the PCs and Macs for 3 to 4 years. So in any given year we are turning over about 1,500 machines. Most of the machines that come to the end of their lease were typically purchased by the college. The machines were reimaged and redeployed to a
different location. Tracking the location of any particular machine was very difficult and usually
involved dispatching a technician to find it.

These tactical support and asset tracking problems were not the only issues. We had no good
information to support our strategic decisions about PCs and Macs. We were unable to forecast
our replacement counts and costs for any upcoming year. This was true for our software as well.
We did not have any multi-year estimates for software costs. There was also no information
about computer usage. Some excellent best practices for lifecycle funding of IT resources were
developed by the University of Texas – Austin. Their Long Range Planning Steering Committee
advises “The basic lifecycle equation converts the hardware/software expense of the resource
into a reasonably stable long term perpetuity. The financial strategy is to identify the perpetuity
and manage it over time. Most of the current professional literature relating to financial
management of IT resources concludes that the use of lifecycle funding models…is essential to
both minimize costs and ensure the effective ongoing performance of a complex distributed
computing environment.” The overall lack of information made it very difficult to develop
budgeting and support staffing models.

There is also a lot of software at PCC. Each academic program and class has specific software
related to the program of study. Many textbooks now also contain a CD with some desktop
application. These packages are updated or completely replaced every academic term. The
administrative departments have productivity and data management software packages for the
normal business of the college. Additionally, there are numerous software packages in use by
student services to support student assessment and testing. All in all, there are a couple of
thousand different software packages running in production at any given time. Tracking all of
this software manually was impossible.

This made documenting our software licensing compliance a struggle. We were uncertain about
our actual compliance. According to a survey of 323 IT professionals conducted by King
Research, many companies are in a similar situation (Figure 1). A large number of respondents,
69%, reported that they were not confident about being fully compliant. Confidently documenting
our licensing compliance was a priority for the college. We really needed to do something.

Figure 1

A variety of 343 IT professionals completed the survey.

- 69% not confident they are fully in compliance.
- Prevalent issue is lack of information

Q: Is your organization fully compliant with software licensing agreements?

<table>
<thead>
<tr>
<th>Hands-on IT Professionals</th>
<th>42%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Managers</td>
<td>28%</td>
</tr>
<tr>
<td>IT Executives</td>
<td>24%</td>
</tr>
<tr>
<td>Others</td>
<td>12%</td>
</tr>
</tbody>
</table>

Added to this ever-changing mix of software, PCs and Macs is a vast array of user needs. Staff,
students, faculty, and visitors all have very specific computing needs. Whenever any user
experiences some computing problems they contact the Computer Help Desk for support. The
Help Desk could solve many of the problems over the phone but a large percentage resulted in a service order for a desktop support technician. The technician would go visit the impacted user, get the issue resolved, head back to their cubicle, and then head out to support the next user. This process was very time consuming and our service levels were declining due to the explosion in computing needs. We needed to get better tools to support our users.

We convened a group of IT managers and discussed our goals for the program. It did not take long to determine that we would be purchasing a vendor package and not developing our own system. This is a common topic for IT managers. “An existing application from a vendor can be less expensive and be implemented in a shorter time” (Rasdorf et. al. 2006). Even though most vendor packages had a lot of functionality, we were able to limit the scope of the project to three specific items; asset tracking, software licensing compliance, and remote administration. If we achieved the goals, we would be able to track our PCs and Macs, document our software licensing usage, and manage machines remotely to provide screen-sharing support to users.

Sponsorship
The asset management program really got excellent executive sponsorship. The AVP of IT, Leslie Riester, was the sponsor for the initiative. It was included as a component of the IT Strategic Plan and given top priority for resources. She had excellent support from the Executive Cabinet and had been given approval to spend over $100k for a solution. Any project at PCC that is over $100k requires a formal RFP process and Board of Directors approval. This was very beneficial because all levels of leadership at the college were involved in the sponsorship. There are two critical steps to take when creating technology plans. First, find the real IT decision makers in the organization and schedule meetings with them. Second, do a technology inventory to figure out what hardware, software, and networking equipment is owned (Peters 2008). The strong support and efforts of our AVP turned out to be one of the more important factors in achieving the first step.

Approach RFP
The RFP process used by PCC is fairly formal. For most large projects, such as the asset management program, the RFP process is led by the Purchasing department. For our RFP, a project coordinator was appointed to oversee all of the steps in the process. All communication between PCC and the vendors was funneled through our point of contact in Purchasing. Their role had three primary activities; documenting requirements, managing vendor responses, and documenting the final selection. There was a lot of planning by the TSS department prior to publishing the RFP. We had to document the requirements for the system and looked to some industry best practices for guidance. Our needs closely matched those outlined by Rasdor (2006) “These IT problems include asset identification, asset location, data availability, data fragmentation, automated data collection, software selection, and system size and resources.” Our requirements were developed to address these elements. Once that was done we identified a committee to complete the scoring, develop the evaluation criteria and score sheet, create use cases for system testing, and track down our available budget. From there, we were able to develop a calendar for all RFP activities culminating in a formal budget request to the Board of Directors.

Scoring and Committee
The committee responsible for scoring the vendor proposals was made up of people from across the TSS department. We had representation from the management team, desktop support, network administration, server administration, user support, and our project coordinator from Purchasing. We setup a series of meetings to discuss the scoring process, review the
responses to the RFP, and select some vendor finalists. We developed a score sheet of system functions (Figure 2) that matched the requirements in the RFP.

### Figure 2

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
<th>Possible</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Asset Management</td>
<td>40</td>
<td>40</td>
<td>27%</td>
</tr>
<tr>
<td>System Architecture</td>
<td>80</td>
<td>80</td>
<td>14%</td>
</tr>
<tr>
<td>Implementation</td>
<td>110</td>
<td>110</td>
<td>14%</td>
</tr>
<tr>
<td>Services and Documentation</td>
<td>40</td>
<td>40</td>
<td>12%</td>
</tr>
<tr>
<td>System Maintenance</td>
<td>50</td>
<td>50</td>
<td>5%</td>
</tr>
<tr>
<td>References</td>
<td>40</td>
<td>40</td>
<td>5%</td>
</tr>
<tr>
<td>Price</td>
<td>10</td>
<td>10</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>370</td>
<td>370</td>
<td>100%</td>
</tr>
</tbody>
</table>

Selection

The selection process was arduous. We received about a dozen vendor responses and some were over a hundred pages. Committee members had to read the responses and fill out a score sheet for each vendor. We also spent a lot of time adding comments regarding our rationale for the score or additional information that we needed. We were able to eliminate several of the proposals and came up with five finalists.

The final five vendors were notified and informed about the next steps. They were required to come to our facilities, install a test server with the application on our network, and give us a real-life demo on our own network. Once their system was installed, they were to execute ten test cases that we had developed (Figure 3). This involved pushing out the client to specified machines, performing a discovery of machines on certain subnets, and to do a baseline inventory data capture. We provided the necessary support from our network and server teams and each vendor was able to demonstrate their functionality. After we completed the demonstrations and worked through the test scenarios, we made some observations about all of the systems. Each system had excellent functionality and would likely meet our requirements.

Our focus, asset tracking and licensing compliance, was core functionality for all of the systems. The real differentiator was in the size of the footprint for some of the systems. Many systems required one or more servers with an expensive OS and a high-maintenance back end.
Adding an asset management system like this would have required us to add server and DBA staff and that just was not an option for us.

Figure 3

These systems were also very expensive and the most difficult to implement. We were very fortunate to have done demos for a couple of systems that were appliance based. This was very appealing because the application, OS, and data base were all contained on the appliance. This appeared to be a low-maintenance alternative that would work. The two appliance based vendors, Kace and Secure Elements, had excellent functionality at a great price. We had some follow-up questions and checked their references. The scoring was extremely close and the committee selected Kace. The Kace KBox solution used a service and management model that met all of the requirements.

Pre-implementation planning
As soon as we selected the vendor we started the implementation planning process. At this point in time, project management shifted from the project coordinator in the Purchasing department to an IT project manager. Kace also designated an implementation manager to oversee the installation and rollout and to give us an understanding of their service delivery model (Figure 4). We completed a site-planning checklist that captured the IP address for the appliance, dns entries, SMTP connectivity, firewall port settings, and vlan requirements. We identified roles and responsibilities on the PCC team related to the implementation, system administration, and system governance. The team from Kace used a jump-start training model that involved hands-on use of the production system to perform actual configuration. They also provided us a lot of documentation about system performance, client installation procedures for
We scheduled the jump-start training and waited for the KB1200 appliance to arrive.

We also had to address some scope issues. Our focus was on PCs and Macs but the system also had the ability to track other assets.

Figure 4

We discussed adding other equipment to the inventory including servers, network switching infrastructure, and smart phones. We were fortunate to have an accurate asset depreciation spreadsheet for this equipment which had a complete inventory of the equipment. We decided to defer servers and switching infrastructure equipment to a later phase of the project.

**Install**

The actual installation of the appliance was very quick. We racked the appliance, connected it to a terminal, and cabled the nic to our switch. The Kace appliance uses FreeBSD as the OS and MySQL as the back end database. The UI displayed a Unix command-line type of interface for the initial configuration. We entered the values from the site-planning checklist and the configuration was complete. We were able to enter a few users and run a system backup. The complete process took just a couple of hours. Everything was ready for us to start rolling out the KBox client software to all of the PCs and Macs.

The KBox client installation on the PCs and Macs was our biggest challenge. This was due to two reasons. First, we had a lot of machines. Second, the support technicians preferred doing all installations, including the KBox client, manually. This is not a so-called best practice. The client can be pushed out across the network in a fully automated manner. We used this for some of installations. Many other client installations were done at the time of machine replacement, whenever a technician did a field support call, or when machines were reimaged. It took several months for us to get the client rollout completed but this was reasonable given our environment.

**Communication and Training**

We quickly realized that the rollout of the client software to all of the PCs and Macs would have an impact on every user at PCC. The Management team was understandably concerned about some of the implications. Academic freedom, as well as computing freedom, is highly valued at PCC. In order to be successful, our project had to address the technology acceptance issue for users. We referred to a technology acceptance model (Figure 5) by Davis which was covered by
Ahmed (2007). “This model defines perceived ease of use and perceived usefulness as two determinants of attitude toward behavioral intention and usage.” One of our ideas on ease-of-use was to get the support technicians to try the system right away as part of the training. This hands-on approach was a great success. All users quickly realized that the system was easy to use and the information was extremely valuable. These were the areas that we highlighted in communication materials.

Figure 5

We conducted a communication outreach program to get everybody on board with the project. The biggest event in the outreach plan was a 2-hour information session about the asset management program for all managers at PCC. The managers were given a 1-hour overview presentation of the asset management program. They then broke into smaller groups to answer specific questions about what information they needed to make good decisions about PC and Mac replacements and software expenditures. They also developed questions for our FAQs. The project team consolidated all of the feedback from the managers, summarized it, and reported back to all managers. This really served to establish buy-in and excitement about the system.

The management team was not the only group concerned about the impact of implementing the system. The IT technicians were also concerned. We addressed this by providing widespread training on the system. Basic procedures for querying the system (filters and labels), developing reports, and viewing software and hardware information were developed. All technicians were given admin privileges to start. Technicians from all areas of the college were invited to the jump-start training provided by the vendor. The easy access to the system and the intuitive functionality gave us some positive momentum with the technicians. We also started using the remote administration screen-sharing tool to support users. It did not take long for the technician’s concerns to turn into excitement as well.

**Implementation**

The system implementation was very quick. Our implementation scope included only the asset tracking, licensing compliance, and remote screen sharing functions. Because of this limited scope for phase one, we were in production as soon as the jump-start training was completed. We slowly rolled out the KBox client installations across all of our PCs and Macs. During the KBox client rollout phase, we got some practice with the system and used the inventory information to produce standard reports.

The Help Desk took advantage of the system by utilizing UltraVNC with the KBox to support users via the screen sharing function. This was very beneficial to our support team because
they could actually see what the user was looking at. The process was very simple. Users could initiate a screen sharing session by going to the Help Desk intranet page and clicking a link. The user would then get an “approval” popup window (Figure 6) which gave the Help Desk permission to share the screen. Approvals were logged along with all of the events in the session. When screen sharing was completed the user would exit the session. We estimated that this capability saved us 500 field technician calls in just the first year of use. It also greatly increased user satisfaction with the Help Desk.

It only took a few months for us to achieve our goals for the system. We had a baseline inventory of all machines, comprehensive reporting about all of our software, and a robust toolset for managing machines and assisting users.

Figure 6

Policies
Having all of the information about software and was extremely valuable. Once we could see the data about our environment we were faced with some questions. What does the data mean? How will we use it to improve our processes? We quickly identified the need for policies and procedures. We started by looking at the standard reports that the asset management system provided. We identified a set of reports that helped us document progress related to our goals for the system. These reports covered the client rollout log, the software inventory by vendor, and the computer inventory detail. Having this data available was very useful in developing our Software Licensing Compliance policy. This document provided a blueprint for how we would document our compliance, procedures for dealing with out-of-compliance situations, and communication guidelines for our software vendor partners. We clearly realized that our implementation success was dependent on quality policies, procedures, and guidelines.

Asset Tracking
The asset tracking feature of the system quickly provided value. We could find any machine on the network or use the query feature (filters and labels) to find groups of machines based on specific criteria. We identified machines covered by leasing and loaded in the PO information and the end-of-lease dates. PCC has a strong relationship with Dell and they are our PC provider. The Dell service tag is automatically integrated into the asset management system and provides a direct link to the Dell site. This feature allowed us to the access the Dell service history and review any technical bulletins. Dell also provided us with a data file containing records for all of the machines provided to PCC. The file contained all of our PCs for a six year
period. We had a comprehensive view of all of our machines and could analyze the data to make strategic machine replacement decisions.

Software Licensing Compliance
One of the most valuable reports from the system was in the software installed report. This report was used to support our internal compliance tracking activities. We reviewed the reports and identified all software packages that were purchased outside of IT. We then contacted the departments and requested copies of the licenses and the purchase orders. “The trend of buying software online and receiving the product as a download definitely helped our licensing compliance efforts. In the modern consumer driven world that gave rise to the mass marketed licenses, users increasingly prefer to complete transactions for software online...this eliminates much of the ambiguity surrounding the traditional shrink wrap license” (Heath 2005). Although Heath highlights the licensing implications of online purchases, the real benefit to us was the ability to control access to the software payload and track all of the installations. Once we had the reports for software installations (Figure 7), we contacted the departments and requested copies of the licenses and the purchase orders.

Figure 7

<table>
<thead>
<tr>
<th>#</th>
<th>DISPLAY_NAME</th>
<th>DEPLOYED_COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abacast Client</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>AccessDirect</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Active Disk</td>
<td>454</td>
</tr>
<tr>
<td>4</td>
<td>Adobe Atmosphere Player for Acrobat and Adobe Reader</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Adobe Download Manager 1.2 (Remove Only)</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Adobe Download Manager 2.0 (Remove Only)</td>
<td>562</td>
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<tr>
<td>7</td>
<td>Adobe Reader</td>
<td>777</td>
</tr>
<tr>
<td>8</td>
<td>Adobe Type Manager 4.1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>ADRIPT</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Advanced Port Scanner v1.2</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>ALFS Touch Pad Driver</td>
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</tr>
<tr>
<td>12</td>
<td>Andersen Software - Easypass</td>
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<tr>
<td>13</td>
<td>ArcSoft PhotoImpression</td>
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<tr>
<td>14</td>
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</tr>
<tr>
<td>15</td>
<td>Atheros Client Utility</td>
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</tr>
<tr>
<td>16</td>
<td>Atheros Wireless LAN MiniPCI card Driver</td>
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<tr>
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<td>19</td>
<td>ATI Display Driver</td>
<td>133</td>
</tr>
<tr>
<td>20</td>
<td>Brio Insight</td>
<td>5</td>
</tr>
</tbody>
</table>

When this was completed, we started sharing information with our software vendors. We proactively contacted software vendors and asked them to verify their licensing records and certify that we were compliant or help us develop an action plan. We were surprised to find that our records were often better than those of the vendors. As part of any action plan, we would either uninstall copies of the software, do a true-up and purchase more licenses, convert the licensing agreement to enterprise or concurrent coverage, or discontinue use of the software. It only took a few months to document our full compliance for the majority of our software.

Remote Control
Many of the features that were implemented provided technical tools for our support staff but nothing for users. One of the exceptions was the UltraVNC remote control functionality. With this tool our Help Desk staff was able to do screen-sharing sessions with users. The implementation was fairly straightforward. We assigned static IP addresses to the Help Desk machines and installed the UltraVNC plugin. In order for users to take advantage of the system, they only needed an internet connection. The Help Desk added a hyperlink URL for the remote control feature. In order for a session to be initiated, the user clicks an approval link. At that time all activities are logged until the session is complete. This feature was very popular with users and the Help Desk. In just the first year of production we conducted some 500 remote sessions and handled 350 calls that would have previously generated a work order for the field technicians.

End of Phase 1
It took just a year for the team to complete our phase 1 objectives. We had developed our baseline inventory of PCs and Macs for the majority of the college. We spent a lot of time rolling out the KBox client and still had about ten percent of our machines unaccounted for at the end of the phase. Eventually we got all of the machines in the inventory and also loaded our complete purchasing history from Dell.

The baseline inventory also gave us the data necessary to document our licensing compliance. Our licensing reports and compliance collaboration efforts with software vendors put us in great shape. Our licensing compliance program followed the principals of any basic IT audit. We had easy access to licensing information and good standard reports to articulate our compliance. The best feature for users was the remote control tool. This really allowed our Help Desk to provide improved service to users. This feature also had the effect of developing staff support for the asset management program. People at the college started to refer to the KBox and generate questions about how it might be used to improve our capabilities. This provided great input into our strategy as we defined the later phases of the program.

Phase 2
Our second phase of the program consisted of implementing advanced features from the KBox and an expansion of the architecture. We purchased another KBox (KB1100) and installed at an alternate campus. This gave us the ability to structure some redundancy and load sharing across the two appliances. We subsequently purchased a virtual KBox1000 and a virtual KBox2000 that were loaded onto our ESX platform. This gave us a very robust, scalable architecture with high availability and rich features.

In Phase 2 we really started using the software deployment feature. This gave us the ability to provide software to users without visiting their machines. It also became very valuable in our system upgrade projects. We could instantly update client versions of software packages in conjunction with the server side upgrade for the applications. A typical client upgrade went from a process involving 4 or more technicians in several locations to a single Help Desk analyst completing the upgrade remotely.

Part of Phase 2 also involved extended functionality developed by our team. We used the processing capability of the KBox to support some of our custom extensions. The most valuable of these were software metering and utilization reporting. Our metering process allowed us to pool software licenses and deploy across machines based on concurrent sessions. With this functionality we could make software available to a large number of machines in classrooms and labs in a very cost-effective manner.
The utilization reporting process was developed to capture all information about machine and software usage. It generates reports that show which software was used, when, and for how long. Easy access to this data really allowed us to analyze the usage patterns of our PCs and Macs and make good decisions about where to provide computers.

The saprogram continues to expand. There is a Phase 3 defined involving server patching and desktop hardening. Extended features may also involve modularizing applications and providing data protection. The possibilities are endless with our KBox architecture.

Lessons Learned
The implementation team for the asset management program at PCC was able to work together for a long time. This turned out to be very valuable given that we were completing a multi-year enterprise project. We learned a few important lessons along the way. First, spend a lot of time on communication and dialogue with the users. Their support is critical to the success of any asset management program. Second, start with the basics. We really focused on getting a comprehensive baseline inventory before we started adding features. In our case, this took a long time but was worth the wait. We also prioritized the development of policies, procedures and guidelines for the asset management program. Third, proactively engage in discussions with PC or Mac suppliers and software vendors. This is especially useful in documenting licensing compliance activities.

Asset Management in Higher Education
Each institution will face unique challenges in providing a comprehensive asset management program for computers. The varied needs of staff, faculty, and students require special considerations in formulating a program for an academic institution. The need to manage a wide variety of software packages and a dispersed set of computers requires a robust system and sound procedures. PCC has made some great progress in this area over the past two years. This overview of our experience is intended to provide a little guidance for other institutions addressing asset management.
References


