STANDARDIZING DESKTOP PC'S: CONSISTENCY OR BUREAUCRAZY?

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ABSTRACT

The University of Connecticut was faced with a variety of desktop computing challenges ranging from staffing and operating budget reductions, to increasing demand for hardware, software, and network support. These issues were further complicated by a burgeoning population of unofficial and untrained departmental computer "experts". In order to deal with these concerns and serve user needs, the University has adopted two standard desktop computer configurations which include prompt delivery and installation, as well as onsite maintenance, in the purchase price. To fully understand the genesis of the University's original proposal, it is necessary to explain the computing environment which produced the need for this standard. Minimizing costs, increasing computing power, and eliminating low level support issues were all key factors. It will also be necessary to describe the processes by which the configurations were specified, and the vendors selected. The degree to which the goals and objectives were achieved during the first six months of the program are described along with an explanation of the secondary benefits and problems encountered. The paper addresses the full range of issues faced in formulating and implementing the process including community participation in decision making, funding restrictions, development of a maintenance strategy, and incorporation into the University network.
1. INTRODUCTION

On July 1, 1996, the University of Connecticut adopted desktop computer standards for academic and administrative use. The standards emerged from a six month process of debate and dialog among the faculty, professional staff, and administration. Further, there was a procurement process which included testing of vendors' systems by interested faculty and staff. The goals of the standardization program were threefold. The first purpose was to increase the power of computing at the desktop; the second was to provide a universally available mechanism for computer installation and repair. The third purpose was to shorten the order and delivery cycle; the outcome of this third objective would be to free computer support personnel for more technically sophisticated tasks.

This paper describes the problems in the computing environment which resulted in the desktop standards. In addition, it also examines the establishment of the specifications and the process (not wholly successful) of obtaining buy-in from the University community. The next aspects to be examined are the vendor selection methodology which encompassed technical and business analyses, the necessary culture changes, and the unexpected costs. The final portion of this paper will review the early (favorable) response to the program. The decision to develop desktop computing standards involved many classic tradeoffs:

... individual freedom and flexibility versus the common good and consistency,
... decentralized budget management versus a subsidized central service,
... bundling of services into a capital procurement versus spontaneous acquisitions,
... and access to network management resources versus highly secure control.

The administration concluded that a standard needed to be established early in the process. The details of the many processes necessary to implement that decision resulted from the efforts of several broad-based committees and administrative units.

Before describing these processes in detail, we must provide background on the environment which gave rise to the need for a desktop standard.

2. THE UCONN DESKTOP COMPUTING ENVIRONMENT

In terms of desktop devices, the UConn universe of approximately 5,000 machines is divided roughly 80-20 between Windows based systems and Macintoshes. However, within each class of machine, there is little consistency in terms of
hardware or software configuration. The lack of commonality complicates any maintenance task, as a diagnostician must first determine the nuances of each specific configuration. In addition, the University has a self-defining hierarchy of power users with CPU's ranging from Pentiums to 386's. The introduction of a standard does not alter the basic structure of that hierarchy as users who presently own the most powerful systems are likely to acquire powerful replacement systems with their old computers "trickling down" to users who require less computing power. The Computer Center provides an unofficial computer exchange to facilitate this process across the organization.

Software and related network issues were also a topic of significant concern. Basic office software is split between Microsoft Word and its supporting packages and WordPerfect and related components with Word holding a clear majority of users. Novell is the standard local area network environment with over 100 installations across the University. Virtually all office desktop workstations are connected to the network with standalone units appearing in some research and instructional laboratories. Many departments have technically competent network managers, but network support responsibilities lie with a small unit in the Computer Center. The University has a high speed fiber optics backbone, and all significant buildings on the main campus are wired for data. The five regional campuses are in various stages of implementing their networking plans for which full funding is present. All campuses should be fully networked by 1998.

The key problem facing the University with regard to desktop computing was the absence of a comprehensive maintenance approach. Some departments in engineering and the sciences have electronics technicians who perform hardware maintenance; others such as the Library and School of Business developed an in house capability out of necessity. However, the majority of academic and service units have no trained computer support capability, and thus rely upon the Computer Center, which has no budgeted staff, for the installation and maintenance of desktop computers.

The University's computing equipment budget exists within the capital equipment budget of UConn 2000 (a 10 year, 1 billion dollar capital project). In the first year of UConn 2000, the University's equipment budget, from all sources, increased from $13M the prior year to $17M. In the second year, the current fiscal year, operating budget reductions caused the equipment budget to decline to $15.5M. Equipment funds are allocated to deans and directors in a block grant fashion, so it is difficult to project computer spending during a given year. However, based upon requests, it
appears that $3M will be allocated to computer purchases. This total reflects only one half the amount needed for replacement and expansion.

3. THE BRIGHT IDEA

The University's use of personal computers and local area networks exploded over a three year period. As users demanded more complex systems on their desks in order to perform their daily responsibilities, they also expected painless installation and immediate service. The computing sophistication increased considerably, and for the most part, computers on the desks worked as advertised. However, the University's computer support infrastructure actually consisted of a few heroic individuals in the Computer Center and people across the University without "computer" in their job descriptions. Since its inception in 1990, the University Computing Committee documented the computer infrastructure staffing problems and has prepared budget requests to address the problem.

Unfortunately, the University was asking the wrong question. Instead of saying, "How can we get more people to support desktop computing?", we should have been asking, "How can we support desktop computing without more people?" The University will not be adding new staff for computer support, so we must follow an alternative path, i.e., obtaining computer support from the equipment vendor as part of the purchase.

The above reasoning led to the decision that the University would buy its desk top computers from two vendors, one offering Macintosh, the other "Windows" machines. The general parameters of the vendor requirements were as follows:

... Delivery to the desk and installation to the network
... Onsite service response time of two working days
... A suite of office software and University site licensed products installed
... A "high end" hardware configuration
... Three year onsite warranty

This approach drastically altered the University's personal computer purchasing procedures. Computers purchased for research remained outside this process, although researchers could take advantage of the price and service features if the standard system met their needs. Servers, lap tops, and Unix workstations remained outside of the standard because the University's volume in these categories is too low to yield substantial discounts. Large laboratory purchases of 10 or more computers were also exempted.
4. THE PLANNING PROCESS

The delivery of desktop computing resources has historically been a discussion issue within the University Computing Committee. The University Computing Committee consists of a cross section of University computer users who reflect, in general, the concerns and interests of the populations they represent. Overall, the one common attribute shared by this group is their interest in the area of desktop computing.

The problems relating to the service model then in place were raised in the fall of 1994. To help focus on this area the Chair created a Special Interest Group (SIG), known as the Standards Group: consisting of computer savvy individuals from several departments and representatives of the Computer Center's desktop support team. Their charge was to examine the area and, in particular, to examine the model in use. The contribution of the main committee was a clear expression based on anecdotal evidence that the delivery of desktop computing did not satisfy the general population.

The SIG developed a standard configuration for the PC and the Macintosh. These norms were based on a life cycle approach to computing where the criterion would be a state of the art machine with a corporate PC level of testing and standardization of components to facilitate long term maintenance. This model would be referred to as either the Husky PC or the Husky Mac. With the paradigm in place, we expect that desktop computers will be cycled from most demanding to less demanding users and applications over their life cycle. Further, we required machines, that can be upgraded economically if the using organization elects, to exercise that option. The SIG concluded that multimedia machines would be required to take advantage of current computing functionality particularly with regard to material being offered via the Internet. Three year onsite service and installation was included in the specification because, we concluded, that the quality of desktop computing related more closely to service and support issues than any other factors outside of the quality of the machine itself.

The Standards SIG was charged to deliver its recommendations to an AD HOC Committee created to evaluate the SIG's recommendation. The AD HOC committee consisted primarily of more senior managers. Their insight was generally more secular in that they were personally less involved in desktop computing but more involved in the general management of the University. Again this group represented various areas. The AD HOC Committee was charged to accept or reject the proposal put forth by the SIG, and if necessary, recommend additional processes or infrastructure to be sure the SIG proposal could be implemented.
The SIG concluded that desktop computing should be viewed as a life cycle purchase. We should buy equipment that was at least up to the current industry standard as the productive life for this equipment is so short. The SIG was concerned that if we acquired obsolescent or near obsolescent equipment we could have departments unable to take advantage of current technology. Further, as the cost and difficulty associated with upgrades makes that option usually unattractive, the SIG concluded that the standard would need to be reviewed periodically (at least once and more likely twice per year), and that hardware would be recycled internally within user departments. The first users of new equipment would be the most demanding. After it was no longer capable of satisfying the most demanding users, the computers could be assigned to less demanding users. The SIG concluded that multi-media capabilities should be part of the configuration given the developments occurring in training areas and the growth of multi-media via the Internet.

Based on the deliberations of the SIG a Request for Proposal (RFP) was created by the Purchasing Department. The RFP generated nine responses. The RFP required extensive information regarding the vendor including:

- financial information,
- customer references,
- teaming arrangements,
- Service/support resources and service staff experience

Given that reliability was a key criteria, we subjected the respondents to a financial review. Fiscal statements were a mandatory item in vendor responses. The review, performed by the University Controller, led the SIG to eliminate five vendors from consideration due to their individual financial circumstances.

In order to be sure the proposed units met the specification, the University Computer Center tested the samples provided by the vendors. Further they benchmarked the samples for performance. They also examined the robustness of construction and commented on the feel of the units.

To evaluate support our Purchasing Department spoke to other customer references, examined service personnel resumes, and relayed their own experience with vendors.

The RFP called for vendors to supply a user test unit in addition to the technical test unit. These units were placed in the faculty lab and made available for examination by the faculty and administrators. An evaluation sheet was provided to each individual participating in the test.

The SIG had already compiled a weighting system to judge and rank each area of importance. Now using the evaluation material described above, the SIG numerically scored the
responses, and a recommended vendor was identified.

5. INSTALLATION AND NETWORKING

The overriding mandate for the implementation team was to establish the credibility of the project. This directive was especially important in the minds of end users who were uncertain as to why such standards were necessary or what benefits would be achieved that would justify the machine cost. We sought to do this through an implementation process that concentrated on three major deliverables:

... a quality product,
... timely and competent implementation,
... and on-going quality service.

In selecting the manufacturer (Hewlett Packard for the Husky PC and Apple for the Husky Macintosh), the system supplier (CIC Systems for the PC, the UConn Co-op for the Macintosh), and the particular units (the HP VL4 120 and the Apple Macintosh 7500), we believed that we had provided for the first deliverable. Assuring the second deliverable meant providing an apparently “seamless flow” from the time that the purchase order was placed through the installation of the Husky Workstation on the University network. To achieve this, a working team was established between the University Purchasing Department, a technical team at the University Computer Center, and the system providers and their installation sub-contractor (Integrated Systems Analysts or ISA for the Husky PC). The objective of the working team was to establish and monitor a workflow sequence that would:

... acquire accurate information regarding the client’s computing and networking needs and environment,
... process the request efficiently,
... configure the system accurately,
... and deliver and install the computer promptly.

The standard software configuration developed for both the Husky PC and the Husky Macintosh included site licensed software (e.g., McAfee Viruscan) and supported “freeware” (e.g., Netscape), as well as the commercial standard Windows 95 and MS Office 95. Discussions between the Computer Center technical team and CIC Systems were designed to assure that a standard configuration would be installed as they assembled each machine. Updates to versions of the software would be made available to CIC Systems regularly by the Computer Center technical team. Integrated Systems Analysts’ (ISA) installation technicians were also trained by the Computer Center technical team to conduct a site survey with each individual user. The purpose of this survey was to verify order information, obtain necessary networking information, and identify special client needs. These needs varied from physical environment anomalies to file transfers from the computer to be replaced
if one existed. A form was developed which contained all information pertinent to each computer. This Husky Workstation Site Survey Form followed the order through the entire configuration and installation process. Upon installation, the technicians were instructed to demonstrate that the computer was working both as a standalone and as a network connected device and that the required software was loaded. Clients were instructed not to complete acceptance sign off on the machine until these requirements were satisfactorily demonstrated. Weekly meetings were established with the installation technicians and the Computer Center technical team to review and monitor each order through the entire process.

In planning for the implementation, it was recognized that technical team staffing at the Computer Center was inadequate to perform the site surveys or install the anticipated volume of systems in a timely manner, particularly considering the "bursts" of activity that occur at certain points during the fiscal year. In addition, it was recognized there would likely be problems identified with individual machine installations. Solutions to these difficulties, as well as additional value added work, would be required to insure customer satisfaction. The cost of the installation was incorporated into the system price and, therefore, was paid by the user. However, neither the cost of the site survey nor the cost of any individual implementation problems was part of the unit cost. A six-month budget was established to cover these additional costs based upon anticipated full-time use of one installation technician.

A major thrust in the entire activity was to increase the number of workstations on the University network. Hence, the implementation team membership included, and was closely coordinated with, the data communications function at the Computer Center. Central University funding for building-level hubs and concentrators had been exhausted. Individual departments, whose capacity had been exceeded or who were switching from token ring to ethernet networks, were required to fund the purchase of hubs and concentrators, thus delaying the network connection of some units.

Since the majority of requests were for a new system to replace an old one, a one-for-one replacement would result in a null increase in the number of workstations on the network. Hence, a second thrust was the re-installation of the "displaced computer" back onto the network with upgraded standard software (e.g., upgrading or installing Netscape or Viruscan). This cost was also absorbed by the pool of funds identified for installation support.

Finally, since approximately 3,000 workstations connect to
Novell departmental file servers, it was recognized as important to “plug in” both the Husky Workstation and the “displaced” machine on any existing Novell departmental network.

6. EARLY EXPERIENCE
The implementation phase of the project began in April. The accompanying chart (see insert) shows that the project got off to a slow start, but quickly accelerated towards the end of the fiscal year. In April, only 18 had been installed, but 133 were installed in July. As of September, a total of 359 had been installed (324 Husky PCs, 35 Husky Macs) with 327 successfully network connected. As the chart shows (see insert), network connected Husky workstations in most months have been in excess of 90%, a fact which is directly attributable to the close coordination between the University Computer Center’s data communications personnel and the installation technicians.

A Husky Workstation Customer Satisfaction Survey was recently distributed to individual client owners. The purpose of the survey was to assess how well we had done in the implementation process, as well as determining satisfaction with the workstation hardware and software. The results were largely positive with over 80% of respondents indicating a strong or moderately strong overall satisfaction rating with the standards concept, the choice of units, and the implementation process.

Performance of the vendors through the first few months has provided us with an excellent learning experience, and some interesting insights into a number of aspects of this process. One of the keys to the project's success has been the installation technicians. They have been competent, responsive, and unfailingly “user friendly” often working above and beyond to assure client satisfaction. Two problem areas were identified early on and have continued to some extent through these first months. The first of these concerned bench configuration problems resulting in machines delivered with inappropriate or missing hardware or software, a problem which is currently being addressed. The second is associated with calls to the warranty service number after a unit’s installation, and which have not resulted in the desired degree of client satisfaction. This problem is also currently being addressed.

7. BUMPS IN THE ROAD
Our sophisticated users by their nature were most likely to question the standard. When they did, it was most likely a single issue. For example, why select the particular operating system? Also, we found these same more capable users pointing out that they could get cheaper equipment by
mail order. The support and service issue tended to have less value for them, and in a few cases, they had developed sub-departments to do departmental support. These resources, we reasoned, could, indeed should, be devoted to the department's primary mission.

Certain of our users simply had a problem with the concept of a standard. They viewed any limit on their freedom to buy whatever they wanted as a violation of their autonomy. The SIG recognizes this tendency but believes the value gained more than compensates for the loss of this mostly theoretical right.

The single biggest problem encountered in the process has been communications within the University community:
... conveying the benefits of the new model;
... conveying the mechanics;
... managing a transition from the former model to the present;
... discovering the bottlenecks.

8. CONCLUSIONS

The standardization of desktop computers has radically altered the computer purchasing process at the University of Connecticut. Less sophisticated users are now seeing a higher level of service than previously experienced. In the past they had lacked their own computing support staff or volunteers to perform the installation and maintenance functions. The more technically sophisticated organizations are not yet ready to discontinue their support of intra-departmental technical personnel to rely upon the services of the vendor. If units continue to expend resources on desktop computer support instead of their department's primary mission, the program will not have achieved one of its goals. In addition to that objective, there are additional goals of standardization. Another is to increase reliability. As it is simply too early in the program to expect many system failures, the maintenance option has not been exercised in any measurable manner. The performance of the vendor on warranty work will be a determining factor in customer acceptance of the program.

While the overall reaction to the program has been positive, the more technically advanced departments would prefer a more liberal policy to accommodate exceptions. The possibility of moving to a "free market" situation exists. In this situation, some departments would be granted exceptions, and so would bear the full cost of installation and maintenance. Regardless of other issues, the concept of standardization appears to be an unavoidable necessity in the face of
continual escalating demands, changing technology with flat, or even reduced, staffing. Thus far, the general reaction has been positive, although not without some dissatisfaction. It is too early in the program to claim success or failure. With careful monitoring and tuning, however, the chances of maintaining a satisfied customer base are good.