

STRATEGIC CHOICES FOR  
ADMINISTRATIVE COMPUTING  
AT THE  
UNIVERSITY OF WASHINGTON

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COMPUTING & COMMUNICATIONS  
UNIVERSITY OF WASHINGTON

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## INTRODUCTION

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In a letter dated December 20, 2002, Acting Provost David Thorud requested a proposal that would identify the choices for administrative computing at the University of Washington, outline options and risks, and make a recommendation. The letter, addressed to Ed Lightfoot, Director of Information Systems for Computing & Communications, said, “We are looking to you and your colleagues for expanded leadership in defining the choices for the UW regarding administrative computing. This is essential for any continued investment.”

This document has been prepared in response to that request. It is our analysis of the strategic choices and their risks and benefits, based upon independent studies as well as our own experiences and those of our peer institutions.

The University of Washington is faced with a choice between two different strategies for the future of its core administrative computer systems, including student, human resources/payroll, and financial:

- **The ERP approach:** Implement Enterprise Resource Planning (ERP) systems, using vendor supplied software to provide enterprise-wide systems for student, human resources/payroll, and finance.
- **The non-ERP approach:** Continue with the university’s current approach of renewing and extending the institution’s existing applications software (or *legacy* systems). Some at the UW have termed this the *heritage* approach.

Is continuing with the university’s current strategy the right choice for the future? If the UW abandons this strategy in favor of an ERP approach, what are the risks and consequences? If the university stays with its current strategy, what are the risks and what are the investments and actions necessary to sustain and extend the non-ERP approach?

This document attempts to answer these questions. It outlines the benefits and risks of the two choices, including lessons learned from the experiences of other higher education institutions. It also outlines the investments that the UW will need to make to sustain its current approach. Further details are included in Appendix I, Current Staffing Allocations and Additional Investments Required for UW Administrative Systems.

While some general costs for the ERP alternative are also included, this document does not pretend to provide accurate estimates for an ERP implementation at the University of Washington. That would require an in-depth analysis, including detailed proposals from vendors and participation from business owners and the entire UW community. However, even with the most detailed analysis, it would be difficult to reliably project the costs of such a large project.

To compare the ERP and non-ERP approaches, this document relies on two studies recently completed by the EDUCAUSE Center for Applied Research (ECAR):

- ***The Promise and Performance of Enterprise Systems in Higher Education***, an ECAR research study by Robert B. Kvavik, University of Minnesota, and Richard N. Katz, ECAR.

This study queried both ERP and non-ERP institutions about their administrative systems strategies. This research study is attached in Appendix II.

- ***A Different Kind of ERP: Extending and Renewing Legacy Systems***, an ECAR research bulletin by Ed Lightfoot, University of Washington, and Gail Salaway, ECAR.

This bulletin takes a closer look at several institutions pursuing the non-ERP approach to gain a more in-depth understanding of why those institutions explicitly decided to renew their existing systems instead of implementing ERP packages. Institutions studied include the University of Washington, University of California at San Diego, University of Texas at Austin, University of Indiana, and Washington State Community and Technical Colleges. This research bulletin is attached in Appendix III.

As the ECAR research study, *The Promise and Performance of Enterprise Systems in Higher Education*, points out, financial, human resources, student, and other information systems are critical to an institution's mission. These systems, "provide the foundation on which the business of the higher education enterprise sits," according to the report. They supply information for key institutional decisions and policies, implement business practices and processes, and enable the myriad of transactions required to keep the enterprise running. Choosing the right strategy for these systems, and ensuring that they work effectively, is vitally important to this institution's future.

## ERP AND LEGACY DEFINED

Before examining the benefits and risks of each approach, it is important to have a common understanding of what is meant by *ERP* versus *legacy*.

- **Enterprise Resource Planning, or ERP**, refers to the current generation of vendor-supplied packages that provide human resources/payroll, student, financial, and other information systems. ERP systems also implement vendor-defined business practices for university business processes. Many universities are following an ERP approach, which involves procuring, installing, and implementing these packages to replace their older *legacy* administrative systems.
- **Legacy systems** are those human resources/payroll, student, financial, and other information systems that were developed in-house or that are based on packages purchased years ago that have since been modified, often extensively, to meet the institution's needs.

## A NEW LOOK AT LEGACY SYSTEMS

In some circles, the term *legacy* has developed negative connotations, carrying an assumption of a history of neglect and deferred maintenance. However, embedded in these legacy systems is a rich heritage of business practices that reflects years of decisions about how to do business within an institution's particular regulatory environment, markets, and culture. These systems are a valuable source, and frequently the only reliable storehouse, of institutional business rules. At a large research university, these systems not only store thousands of rules about the way an institution does business, they implement them through the processing of hundreds of thousands of critical transactions every day.

In recognition of this more positive view, the term *heritage* recently has been coined at the UW to reflect the rich heritage of critical business practices that these older systems embody. Instead of replacing their legacy systems with ERP packages, many colleges and universities have chosen to follow a non-ERP approach by reinvesting in their existing heritage systems. These institutions believe that this strategy involves less risk and cost than an ERP implementation and is better aligned with campus goals, culture, and directions.

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## THE ERP APPROACH: BENEFITS AND RISKS

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This section looks at the benefits, risks, and costs of an ERP approach. It does not attempt to offer an in-depth analysis of the ERP approach, but rather a brief discussion based upon information published in EDUCAUSE Center for Applied Research (ECAR) studies and from peer institutions.

### BENEFITS

In the ECAR study, *The Promise and Performance of Enterprise Systems in Higher Education*, institutions gave many reasons for implementing ERP systems, including:

- **To replace aging legacy systems** that they believed were not meeting current business needs or were no longer technically viable.
- **To upgrade these systems to meet Y2K date-handling requirements.**
- **To improve customer service.**
- **To transform institutional business practices.** The study showed that many institutions believed that implementing the business practices included in the ERP software would force beneficial changes in institutional business practices that would otherwise be very difficult or impossible to accomplish.

About half of the institutions reported that the ERP system had achieved what they had intended, and most of the rest said the system had at least partially met their goals.

Another perceived benefit of the ERP approach is that, once installation is complete, the vendor supplies ongoing maintenance and support for the system. However, it is important to remember that the institution pays for this service. In addition, the institution must continue to invest in its own technical staff to integrate the ERP system into the rest of the computing environment and to test and maintain ongoing system modifications and vendor-mandated upgrades to hardware and software.

ERP implementations can be successful for some institutions, especially smaller institutions with less complex academic, administrative, and computing environments.

## RISKS

The ERP approach also entails many risks that have been clearly documented in ECAR studies, ERP literature, and discussions with our peer institutions. These include:

### *High Costs*

ERP projects are extremely costly, with initial installations running into tens of millions of dollars at UW's peer institutions. In addition, according to the ECAR study:

- Costs were greater than institutions originally planned.
- Efficiencies did not translate into cost savings.
- The larger the institution, the less likely it was to finish on time and on budget, regardless of the vendor.
- Workloads in departments and colleges actually increased in the short-term for 69 percent of the ECAR study respondents. Those institutions also reported a need for higher levels of technical skills and increased training for staff members.
- Mandatory updates of vendor software were expensive and time consuming.

### *Other Costs*

There are two additional considerations to take into account when weighing the costs of an ERP approach.

- **Continued investment in non-ERP elements.** Even universities implementing ERP systems have found they needed to invest in some of the elements of a non-ERP approach, including data-warehousing techniques, best-of-breed applications, and middleware infrastructure.
- **Many higher education institutions continue to rely on legacy systems.** For example, nearly half of the institutions that participated in the ECAR ERP survey were still using legacy systems that were implemented before 1995, and two-thirds of the ERP institutions were continuing to use legacy systems for one or two of the three core business areas (student, financial, human resources/payroll).

### *Other Risks*

- **Postponing other information technology improvements.** Most institutions have found they could not focus on much besides the core systems replacement, especially in the initial phases of an ERP project, and have postponed other potentially high-payoff information technology projects, sometimes for years.
- **Institutional commitment.** Institutions have found that an ERP implementation requires a high level of commitment from the university's senior executives and a substantial investment of time and energy from the institution's central support organizations and college and department business offices. Implementing these systems can be extremely disruptive to an institution.

- **Vendor-driven business practices.** The ERP approach requires institutions to adopt business practices dictated by ERP software.
- **Difficulty of modifications.** The ECAR study found a direct correlation between user satisfaction and the number of modifications made to ERP software to meet local business needs. The more modifications that were made, the higher the user satisfaction. Yet the study clearly found that such modifications increased the cost, time, and risk of successfully implementing ERP systems.

In addition, it is important to note that modifications need to be re-implemented and re-tested every time software upgrades are required by the vendor. If these vendor upgrades are not implemented, then eventually the software will no longer be supported by the vendor, and one of the advantages of ERP implementation will be lost.

- **All-or-nothing.** Once an institution decides to move ahead with an ERP approach for one of its core administrative systems, that entire system must be replaced.
- **Dependence on vendor.** The ERP strategy creates an institutional dependency on the support received from the providing vendor. Once dependent on a vendor, the institution has very little leverage against non-competitive price increases for support.

## HOW MUCH WOULD IT COST THE UW?

The ECAR study found that there were enormous differences in costs for an ERP implementation depending on the size of an institution and its Carnegie Class. Implementations at BA institutions were least expensive, followed by AA and MA institutions, which were usually double the cost of a BA implementation. Doctoral institution implementations ran anywhere from 10 to 20 times the cost of AA/BA/MA implementations.

Although it is impossible to gauge the cost of a UW ERP implementation without a detailed study, an optimistic estimate based upon the experience of universities of the UW's size and complexity suggests that it would cost at least \$25 million for each of the three modules (human resources/payroll, financial, and student systems), with acquisition and implementation taking approximately three years per module. **The total cost for implementing all three modules would likely run upwards of \$75 million or higher, and take six years, or longer.**

At the same time, the university would need to support and maintain its existing legacy systems in parallel with any ERP implementation. The UW would also need to continue to invest in its own technical staff to integrate the ERP system into the rest of the computing environment, and to test and maintain ongoing system modifications and vendor-mandated upgrades to hardware and software.

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## NON-ERP APPROACH: BENEFITS AND SUCCESS FACTORS

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This section briefly discusses the general benefits of a non-ERP approach and key success factors, based upon information published in EDUCAUSE Center for Applied Research (ECAR) studies and from peer institutions.

### BENEFITS

Despite their diversity, the non-ERP institutions studied in the ECAR research bulletin, *A Different Kind of ERP: Extending and Renewing Legacy Systems*, chose to retain their legacy systems for some common reasons. These include:

- **Cost.** Cost was a driving factor. Each institution had invested substantial resources over the years to modify its existing systems to fit its unique business environment. Buying a new system and attempting either to reconstruct that functionality or to modify business practices to fit the new ERP environment would have been an expensive and time-consuming undertaking, diverting resources that could have been focused on higher priority projects.

These institutions concluded that **renewing their legacy systems would cost less than installing an ERP package, even if modernizing those systems would require a significant investment.**

- **No need to replace existing systems.** The institutions found that they could address the deficiencies in their administrative applications by improving user interfaces and the access to information. The underlying business functionality was meeting the basic business needs of the institutions and did not need to be replaced.
- **Value of customized business practices.** The institutions concluded that the business practices contained within their existing applications software had sufficient value that retaining the applications software was less risky and more economical than replacing it.
- **Ability to focus on IT enhancements.** Choosing a non-ERP approach has allowed these institutions to leverage their previous technology investments and focus their resources on next-generation technology enhancements while avoiding an upheaval in campus operations.
- **User driven.** This approach has allowed institutions to decide how best to improve the efficiency of their business processes, rather than requiring them to conform to practices dictated by ERP technology.
- **Ability to invest incrementally.** The non-ERP approach has allowed institutions to make improvements incrementally, according to their own needs, priorities, and resources.

- **Less vendor dependency.** The non-ERP strategy involves less dependency on a single-source vendor than does the ERP approach.

## KEY SUCCESS FACTORS

The institutions studied in the ECAR research bulletin have found certain factors are critical to making the non-ERP approach successful.

- **Providing adequate staffing and staff development.** This commitment is particularly critical in a non-ERP approach, where an institution's technology managers and staff are responsible for maintaining and upgrading the infrastructure and applications and providing direction on technical, business, and management decisions.
- **Maintaining the currency of the technical infrastructure.** Institutions choosing a non-ERP approach must allocate resources for the ongoing technical upgrades necessary to keep the system technically current, stable, secure, and reliable.
- **Maintaining functional currency of the applications.** Institutions must commit to providing the resources necessary to integrate new external and internal requirements into both systems and business operations. Making these changes can be labor intensive and complex. Recent examples at the UW include the following: adding flexible spending accounts for employees; eliminating Social Security numbers as employee identification numbers; and implementing new regulations such as IRS changes in deduction rules, ongoing changes in financial aid rules, and the Student and Exchange Visitor Information System (SEVIS) requirements for student systems.

These institutions also recognize that they eventually may need to replace their legacy systems with newer technologies, possibly a future version of an ERP. They are hoping that time will work in their favor and that future options for upgrading administrative systems will be less monolithic and expensive. They see the possibility of smaller modules becoming available—perhaps from ERP vendors, smaller companies, or from collaborative development with peer institutions—that can be integrated with existing software.

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## THE UW'S NON-ERP APPROACH

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This section considers the UW's specific non-ERP strategy: its evolution, benefits, and risks.

### EVOLUTION

The University of Washington's non-ERP approach reflects the history of this institution's information technology decisions and directions over the past 30 years. What follows is a brief overview of the history of administrative computing at the UW. More detail is provided in Appendix IV, History and Context of Administrative Computing at the University of Washington.

The University of Washington has made substantial investments over the past 30 years in purchasing and developing core support systems that work in its highly complex environment. These systems include:

- **Financial Systems:** financial accounting, budgeting, procurement (purchasing and stores), payables, receivables, and equipment/asset management
- **Human Resources/Payroll Systems:** payroll, benefits administration (insurance, retirement, etc.), salary administration, labor relations, personnel, staff recruitment, and development functions
- **Student Systems:** admissions, registration, financial aid, student loans, and class management

Together these systems support a payroll that totaled 1.4 billion dollars in 2002; process over 500,000 transactions daily; handle student services including admissions, registration, grade reporting, tuition billing, and financial aid; and help manage the institution's finances and budgets. They also contain and implement the university's business rules and practices.

Over the years, the university has made the minimal investments necessary to keep pace with mandatory regulatory requirements and critical business needs. In addition, the university has periodically diverted staff resources to make major technical upgrades to these systems, including the Y2K date handling modifications of the late 1990s and the current conversion to more modern versions of COBOL. As a result, many of the underlying processes are still meeting the university's business needs. However, lean staffing has also meant that when major upgrades are undertaken, other important work must be set aside, which has resulted in a substantial backlog of deferred maintenance.

In the late 1990s, the university made a key decision to fund and support the University Services Renewal Project (USER), which established a firm foundation for the UW's non-ERP approach. The funding provided resources to build user-friendly, Web-based interfaces to mainframe legacy administrative systems and to develop transactional

services, such as the Online Payroll Update System (OPUS), that have streamlined administrative processes. The USER project also has involved members of the UW community in identifying the best ways to make administrative processes more efficient and in developing the new Web-based systems. The combination of these efforts has resulted in significant improvements to administrative systems and services.

During the past decade, the university has made investments in other approaches such as best-of-breed systems, data warehousing, and middleware (described in the following section) that have become essential parts of the UW's non-ERP strategy.

## KEY ELEMENTS

The UW's non-ERP strategy contains the following five interdependent elements, each critical to the ongoing success of this approach:

- **Provide ongoing maintenance, upgrades, and support for core administrative systems** including student, financial, human resources/payroll, and associated hardware and systems infrastructure.
- **Develop Web-based applications and interfaces** that allow users to interact easily with the core administrative systems. The UW has also created a common infrastructure to support these applications. Many of these improvements are currently being implemented through the University Services Renewal (USER) project.
- **Develop data warehousing systems and infrastructure** to facilitate access to university management information and provide timely, accurate, and meaningful data analysis and reports.
- **Invest in best-of-breed systems to meet the administrative computing needs of specific functional areas.** *Best-of-breed* refers to systems that are tailored for a particular business segment and offer the best functionality for that specific area. These systems must also be integrated with core administrative applications and with the UW's middleware infrastructure.
- **Develop middleware that is critical to creating user friendly Web-based resources and services that offer a consistent user experience.** *Middleware* refers to the technology infrastructure that provides the following:
  - **Authentication**, the process of verifying a user's identity. The UW has been working to establish a **single ID and password (the UW NetID) that allows users to log on once to access most administrative services**, eliminating the need for multiple user IDs and passwords.
  - **Authorization**, a process that determines what specific resources an individual is permitted to use. The UW has been working to implement a **university-wide Web-based authorization process that will allow**

**quick and easy access to appropriate resources** and will enable managers to easily authorize access for their staff to appropriate systems.

- **Personalization, a common portal (MyUW) that delivers information, services, and resources tailored to each individual** according to that person's roles and associations with the university.

More details about middleware can be found in the *University of Washington Information Services Strategy*, in Appendix V of this document. A discussion of the importance of middleware as a component of a campus computing strategy can be found in Appendix VI, *The Next-Generation Infrastructure*, an ECAR research bulletin by Ed Lightfoot and Weldon Ihrig.

## A STRATEGY THAT IS WORKING

Through these and other investments, the university already has demonstrated the value and viability of its non-ERP approach and shown that this strategy can work. Each one of these investments has contributed to improving UW business operations and services. The following are a few examples:

### *USER Projects in Human Resources/Payroll Processing*

USER projects in HR/payroll such as the Online Payroll Update System (OPUS) and Employee Self-Service (ESS) have shown that it is possible to provide excellent business support services by enhancing existing systems without the risks and significant investments associated with ERPs. With OPUS, payroll coordinators can now enter information online, rather than submitting paper forms that must be keyed into the system by another employee. Employee Self-Service allows employees to review their payroll, tax, and benefit information online.

The USER approach has also allowed the UW to leverage the talents of its staff in developing processes and systems that work within this institution's environment, rather than having those practices dictated by ERP technology. The USER project is continuing this successful approach with the Grant and Contract Proposal System and Financial Desktop initiatives.

### *USER Project Infrastructure*

Technical infrastructure developed to support the USER project has enabled a full range of Web-based services. For example, students now can go online to register for classes, view their grades and class schedules, pay tuition, access course Web sites and materials, take quizzes, and evaluate progress toward their degree.

### *Best-of-Breed Approach*

The best-of-breed approach has allowed the UW to achieve significant efficiencies and improve customer service in areas such as facilities management, development, equipment inventory, and acquisition of supplies and equipment from University Stores. The best-of-breed approach is continuing to address specific needs in the areas of recruitment and grant and contract receivables management.

### *Middleware*

The UW's investments in middleware have enabled this institution to become a national leader in providing personalized Web services. Continued investments in middleware will allow the UW to expand the number of online services it offers and make its computing systems more user friendly. The goal is eventually to provide the UW community with around-the-clock access to the university's rich array of information, resources, and services through MyUW.

### *Data Warehousing*

Through the work of the University Strategic Analysis Group (USAG), the UW has demonstrated that data warehousing techniques have the potential to meet the critical management information needs of university decision makers. Building on USAG efforts, the university has initiated a project to develop the infrastructure for a comprehensive data warehouse for the human resources, student, and financial areas. This is a multi-organizational collaboration with start-up funding and support from the offices of the Provost and Executive Vice President. Continued investment in this initiative will allow the UW to meet the need for accurate, timely, and meaningful management information in the coming decade.

## **RISKS**

The biggest risk of the UW's non-ERP approach is failure to make the technology and human resources investments necessary to keep the existing applications software responsive to ever-changing and growing university business requirements and to keep the complex supporting computing environment technologically viable. Specifically the risks of the non-ERP approach include:

### *Maintaining Technical Currency*

Maintaining technical currency means keeping up with the modifications necessary to ensure that the university's systems are technologically current, stable, reliable, and secure. This has become more critical as the university's computing environment grows increasingly complex and interdependent.

Many new technologies have been added to the university's computing environment over the past five years, including Web interfaces to legacy systems, data warehousing, best-of-breed vendor applications, the MyUW portal, middleware, and new levels of security. As a result, the comparatively simple mainframe environment of past decades, with limited numbers of vendors, operating systems, and development environments, is gone. The university now must manage a heterogeneous technology environment that is highly integrated and interdependent. This environment also needs to be increasingly robust and disaster resistant to meet rising user demand for around-the-clock access to responsive systems.

At the same time, this environment needs to be periodically upgraded with newer hardware, systems software, database software, security software, development languages, and applications software. For example, the current Microsoft NT platform used as a common infrastructure for Web development will need to be upgraded to support the new Microsoft .NET Web development environment.

Although the UW has been making incremental investments in new administrative applications, the underlying support for administrative applications staffing, and for the technical infrastructure that supports these applications, including hardware, software and associated staffing, is lacking. The environment has now reached a size and level of complexity where its overall stability, responsiveness, and sustainability are at risk. This risk can be managed, but it will require a commitment to the effort necessary to stabilize the infrastructure and additional investment in human, software, and hardware resources. If this investment is not made, these systems will become increasingly fragile and eventually will fail.

### *Maintaining Functional Currency*

Maintaining functional currency means continually integrating new externally and internally mandated requirements into both systems and business operations and making other adjustments necessary to meet evolving UW business needs.

For example, the UW currently has a large backlog of maintenance requests that must be completed in order for the administrative systems to continue to be responsive to institutional business needs. In addition, these systems must be restructured in order to improve the ability to maintain them into the future.

There is significant risk that these systems will not be able to respond to the UW's business needs if ongoing restructuring, documentation, and maintenance continue to be deferred. Just as deferring maintenance on buildings eventually will lead to the need for an even more significant investment to completely remodel or replace them; deferring maintenance on these applications systems will result in the need to spend even greater resources on an ERP system to replace or supplement them.

### *Recruiting and Retaining Skilled Staff*

The key investment required to keep the infrastructure technically current and the business functionality of these systems up-to-date is to ensure adequate levels of experienced technical staff. The UW has not made the investments necessary to provide adequate staffing to support its administrative infrastructure and business systems. This creates a high risk to the institution, especially when key staff members leave or retire. The institution needs to ensure adequate staffing levels so that there is backup for critical business applications. This will require an ongoing investment in staffing resources as well as staff training and professional development.

### *The Viability of Unisys*

Both ERP and non-ERP strategies depend upon the market viability and continued support of commercial vendors. The University of Washington currently depends upon a

number of vendors and their products for its administrative computing requirements. Of these, arguably the most critical is Unisys, which has provided mainframe hardware and systems software to the university since the late 1960s. Major corporations and public agencies involved in transportation, government, and banking rely on Unisys and its mainframe product.

On several occasions during the past 25 years, various decision makers within the university, including the Board of Regents, have raised concerns about the viability of Unisys. In anticipation of renewed interest in this topic, commentary from Gartner, Inc. is included in Appendix VII of this document. The commentary, *Unisys Mainframes: Sustainable Business for the Decade*, dated March 13, 2003, advises, "Customers using OS2200 or MCP systems should consider further investments in these product lines to be sound, particularly when extending existing applications or adding capacity. We anticipate a long life and continued improvements for Unisys mainframe customers."

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## RECOMMENDATION

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The UW either can continue to allocate the incremental resources necessary to support the non-ERP approach or commit to the considerable investments required to implement ERP systems. Either choice will require investment. Failure to invest adequately in the current non-ERP strategy will eventually cause the UW's administrative systems to deteriorate to such a point that the university will be forced into an ERP approach.

Implementing an ERP system would be an extremely challenging, costly, and disruptive undertaking for the UW, particularly in light of the current bleak funding environment. It is our belief that continuing the non-ERP approach will be more economical, involve less risk to the institution, and meet the UW's administrative computing needs into the future. Even if sufficient funding were available, it is very unlikely that an ERP implementation would offer better functionality sooner than the UW's non-ERP approach.

I and my colleagues in C&C therefore continue to recommend the non-ERP approach for UW administrative systems and encourage the UW to make the necessary investments outlined below to ensure that this strategy will be viable. In addition, C&C will continue to monitor the current technical environment and to evaluate other alternatives.

The UW already has shown that this strategy can work. Instead of turning to an expensive one-size-fits-all ERP approach, the university has harnessed the knowledge and abilities of its administrative and technical staff to develop processes and systems that work within this institution's environment. Through this approach, the university has substantially improved many of its support services. Now the UW must make the investments necessary to continue and extend these improvements in order to fully realize the potential of the non-ERP approach to meet the needs of the university into the future.

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## REQUIRED INVESTMENTS

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The following section describes the near-term investments and other actions necessary to meet the university's business needs and to sustain the non-ERP approach. More details are available in Appendix I, Current Staffing Allocations and Additional Investments Required for UW Administrative Systems.

These near-term investments represent support needed for systems currently being maintained or developed. Additional funding would be required to support new systems, projects, or major enhancements. Any additional funding for new systems should include resources for adequate staffing, not only for development and implementation of new systems, but also for ongoing maintenance and necessary upgrades. Such funding should also take into account the additional technical infrastructure necessary to sustain the new systems, including hardware and associated software, staffing support, and ongoing lifecycle and software costs.

There are three top priorities for near-term investments.

### **PRIORITY 1**

#### **Freeze new development projects for FY 2004 and reallocate resources to stabilize systems and infrastructure in current high-risk areas.**

As noted earlier, the UW's technology environment has reached a level of complexity where its stability, responsiveness, and sustainability are at risk. This risk can be managed in the short term through system restructuring and upgrades. However, staffing levels are currently insufficient to allow this work to be accomplished and at the same time allow any new project commitments to be met.

We recommended a moratorium on new development to the extent possible to allow the following:

- Completion of existing projects, such as the conversion of the payroll system to a more modern version of COBOL
- Stabilization of the complex infrastructure that supports the MCP and Windows computing environments
- Implementation of internal tools for source code management
- Preparation for the conversion to Microsoft .NET
- Implementation of consistent project management and costing tools
- Other internal improvements necessary to stabilize administrative services, such as quality control

## PRIORITY 2

### **Increase investment in technical infrastructure hardware, software, and support staff.**

The following is a look at the near-term investments needed in the technical infrastructure area that supports the UW's administrative systems. This infrastructure includes hardware such as servers and storage, associated software, such as operating systems and database management systems, and support staff. More details about staffing levels are available in Appendix I, Current Staffing Allocations and Additional Investments Required for UW Administrative Systems.

#### *Hardware and Software Deficiencies*

Over the past few years, funding the major hardware and software upgrades necessary to keep up with rising demand and to avoid technological obsolescence has become an increasing challenge. The erosion of C&C's operating budget has meant that these projects have had to be funded on an emergency basis. This type of funding model makes it difficult to achieve the benefits of long-term strategic planning and restricts the university's ability to fully leverage relationships with its vendors to secure greater discounts on their products.

The following summarizes how operations dollars are currently allocated per biennium (in millions) to support the hardware and software infrastructure used by the university's administrative systems, excluding staffing:

<b>Infrastructure</b>	<b>Amount (in millions)</b>
UNISYS mainframe	\$ 3.6
Enterprise disk storage	1.9
Enterprise tape management	1.7
Printing, "hotsite", SecurID, etc.	1.5
Windows computing	0.6
UNIX computing	0.6
Middleware	0.3
<b>Total</b>	<b>\$10.2</b>

UW Medicine provides \$1.8 million of this funding to support its continued use of UNISYS mainframe services.

In light of the continuing growth in demand, an analysis of the university's hardware and software needs for the next biennium shows that an **additional investment of \$3.2 million per biennium is required if the university is to prevent serious degradation of service and response levels**. This includes \$1.5 million for UNISYS mainframe and enterprise disk storage and \$1.2 million to support the Windows and UNIX computing environments.

### *Staffing Deficiencies*

The growing complexity of the UW's administrative computing environment and rising demands for new administrative applications have placed an increased load on the technical infrastructure that supports these systems and on the staff that must handle progressively more complicated integration and system management issues. Unfortunately, staffing in this area (including system administrators, operating system software experts, database administrators, etc.) has not kept pace.

The university has now reached a point where it is extremely critical to address staffing deficiencies in this area. **An additional three to four FTEs** would contribute significantly to the ability of the technical infrastructure support team to meet current and planned demands for services that are vital to sustaining a reliable and secure administrative computing environment.

## **PRIORITY 3**

### **Increase investment in administrative systems applications support staff.**

The highest priority for investment in the administrative applications area is to build sufficient staffing levels necessary to:

- **Support the daily operations and maintenance of these systems.**
- **Ensure ongoing, timely maintenance of these systems** to meet changing technical requirements and keep the systems technically current. Examples include COBOL upgrades, operating system and hardware upgrades, and conversion to the Microsoft .NET Web development environment.
- **Ensure that critical application areas have more than one staff member with the skills and institutional knowledge required to run and maintain them.** It takes two to three years for staff members to develop expertise in these complex systems.
- **Ensure adequate quality control** to avoid operational errors that can result from insufficient operational, performance, and user testing.
- **Allow progress on the backlog of maintenance requests** necessary to keep these systems responsive to changing external requirements and customer needs and to provide improved operational efficiencies.

Currently, insufficient staffing levels across all administrative applications teams are making it increasingly difficult to achieve the goals listed above. Instead, many teams have only one staff member with the depth of skills and institutional knowledge necessary to run critical administrative systems.

Inadequate staffing, combined with externally imposed deadlines, often creates situations where sufficient quality control and performance testing is not possible, which can result in serious operational errors. Staffing deficiencies also make it extremely difficult to undertake any significant maintenance or enhancement work to maintain the technical and functional currency of these systems. In addition, limited staffing means that progress on a rising backlog of requested projects to improve business efficiency is painstakingly slow. To understand these issues in more depth, please read Appendix I, Current Staffing Allocations and Additional Investments Required for UW Administrative Systems.

An analysis of current staffing levels shows that in order to reduce risk, improve quality, and continue to meet the university's business requirements, **an additional 21 FTEs** are needed in the administrative applications area. The following shows a breakdown of additional staffing needs for each functional area:

<b>Functional Area</b>	<b>Needed FTEs</b>
Financial and Budget	3
HR/Payroll	5
Student	4
Procurement, Receivables, and Payables (ePrep)	3
Data Warehousing	3
Middleware	2
Project Management	1
<b>Total</b>	<b>21 FTEs</b>

These numbers reflect the total increase necessary to address staffing deficiencies across the board. Actual investments can be made selectively, based upon institutional priorities. For example, it may be acceptable for the institution to assume a higher level of risk in some application areas. Additionally, in some cases, the university may choose to allocate funding to replace a system in the near term, and therefore defer maintenance on that existing system. However, deferring maintenance on critical core systems will eventually cause them to deteriorate to such a degree that they are error prone, cannot be kept technically current, and no longer meet customer or legal requirements.