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IMPLEMENTING SAP R/3 AT THE UNIVERSITY OF NEBRASKA

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Date: May 1996

To: University of Nebraska Faculty and Staff
From: University of Nebraska President L. Dennis Smith

In April 1995, I asked four Nebraskans from the private sector and four senior people of the University to review the administrative processes of the University of Nebraska. In the appointment letter for this Task Force, I noted that many current administrative processes need to be examined to improve quality and productivity.

The Task Force completed their work in August 1995 and made several recommendations. One of these recommendations addresses administrative systems directly:

- Unify the management of computing and information technology through integrated networking, articulating an enterprise information architecture formation for one administrative systems network, and the implementation of state-of-the-art administrative systems.

The University's Strategic Framework incorporates this recommendation as one of several objectives:

- Improve management information systems for the benefit of students, faculty and the public; continuously improve technological capacities.

In response to these initiatives, the Financial System Task Force (FSTF), under the direction of the Chief Business Officers, is exploring opportunities for a new quality administrative system. The team's Vision Statement and Guiding Principles express the goals for this effort. The FSTF has established several other teams to identify the necessary requirements of an administrative system and to develop a business analysis of alternative solutions. This phase of the project is to be completed by August 1996. In this information, you will find information on all of the teams and the project phases. Each team's members and their e-mail addresses are identified.

I encourage your participation in this project. Comments and questions can be directed to any team member. The success of this project is important in meeting the administrative needs of the University.

Source: <http://asp.uneb.edu/PhaseI/aspsmith.htm>

On a Monday morning in August 1998, Jim Buckler, project manager of the University of Nebraska's Administrative System Project (ASP), was at his office in Lincoln, Nebraska, preparing for his weekly meeting with the project's steering committee, the Financial System Task Force (FSTF). The ASP is an effort charged with implementing SAP's R/3 client-server enterprise resource planning (ERP) product for the University of Nebraska's multi-campus system.

On this particular morning, Buckler and the steering committee were going to discuss a challenging issue that would impact the future of the project. This issue would also affect the potential future of the University of Nebraska's business and finance functions as well as its human resource functions. As a result of mapping the University's future business processes to the SAP R/3 system, several gaps have been identified between these processes and those offered by the SAP R/3 system. These critical gaps have been tracked as one of the project's critical success factors.

With the assistance of SAP and IBM, the University's implementation partner, a decision needs to be made regarding how these gaps will be resolved. Several options have been developed for consideration. The FSTF, along with Buckler and his consulting project manager counterpart, must consider the impact of each option on factors such as the project's timeline, scope, and budget, to name a few.

THE UNIVERSITY OF NEBRASKA

The University of Nebraska was founded on February 15, 1869, less than two years after Nebraska became the nation's 37th state. The original goal of this new land-grant university was "To afford the inhabitants of this state with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts." This goal has stood the test of time, inspiring the University's dedication to the education of students, research in a broad range of disciplines, and service to the state's citizens.

The University of Nebraska is the state's only public university. It became the first institution west of the Mississippi River to offer graduate education in 1903 and joined the prestigious Association of American Universities in 1909. Founded in Lincoln, the University included a medical center in Omaha beginning in 1902.

The University was reorganized under a 1968 act of the Nebraska Legislature. The legislation provided for the addition of the University of Nebraska at Omaha (formerly the municipal University of Omaha) and designated the University of Nebraska-Lincoln and the University of Nebraska Medical Center as separate campuses. In 1991 the University of Nebraska at Kearney (formerly Kearney State College) became a campus of the University. The Nebraska College of Technical Agriculture, which provides instruction relating to food and agriculture at less than a baccalaureate degree, falls under the University of Nebraska-Lincoln administration. The University also includes many research, extension, and service facilities statewide.

The University is governed by a Board of Regents made up of eight voting members elected by district and four non-voting student members (who serve by virtue of being student body presidents on the respective campuses). The President is the chief executive officer (CEO) of the University and reports to the Regents. Each campus is administered by a Vice President-Chancellor. (See Exhibit 1.)

The 1998-1999 University of Nebraska budget was almost \$1.1 billion with 33% of the total being Nebraska state tax revenue allocated to the University. Additional information regarding the University's estimated revenues and expenses can be found in Exhibits 2 and 3. Student enrollment and number of full-time faculty and staff employed by the University are presented in Exhibits 4 and 5.

There are over 400 departments and auxiliary operations in the University of Nebraska system and almost 1,000 users currently access information systems online. Approximately 150,000 orders/invoices and 360,000 paychecks or electronic deposit transactions are conducted on an annual basis. Over 42,000 employee records are stored in the human resource management system.

STRATEGIC FRAMEWORK

In April 1995, University of Nebraska President L. Dennis Smith formed a taskforce to study the best practices of the business community and public agencies and to recommend adoption and implementation of those practices that were most applicable to

the University of Nebraska. The document presented to the President, more commonly referred to as the Angle Report, has been used as the foundation for the University's decision to improve its administrative processes by the implementation of an enterprise resource planning (ERP) system solution.

As a result of this and other related initiatives, the Administrative System Project (ASP) was started under the direction of the Chief Information Officer (CIO), Walter Weir, and the Chief Business Officers (CBOs). The CBOs consist of the University's Vice President for Business and Finance and the Vice Chancellor for Business and Finance from each campus. Weir states, "The implementation of enterprise-wide software systems will transform the operational business infrastructure of the University of Nebraska, for the first time, into one integrated enterprise solution in the areas of financial management, budgeting, human resources, payroll systems, and related business activities."

A steering committee, known as the Financial System Task Force (FSTF), was quickly formed. Guiding principles and a vision statement were adopted by the FSTF. The vision statement read as follows:

The University community will have access to information, including human, physical, and financial, through an integrated administrative system. The system will be user-driven and flexible in a seamless and distributed environment to support efficient and effective business processes necessary to accommodate the mission of the University of Nebraska and its campuses.

The next step toward the new integrated administrative system was a needs assessment, completed in August 1996. The resulting recommendation of this activity was to (1) solicit proposals to replace the financial management system and (2) upgrade the current human resource system to be Year 2000 compliant and evaluate if additional products available from the University's current vendor will meet the University's needs. This recommendation was presented to the CBOs and shared with each of the campus Chancellors and their cabinets.

CURRENT SYSTEM DEFICIENCIES

Currently, the University of Nebraska system operates several disparate information systems for its administrative processes. These legacy systems have limited functionality and do not provide the openness and operability needed to meet the administrative requirements set forth by the University. Not all of the systems are Year 2000 compliant. Weir describes the current information technology environment:

Our current University automated environment is faced with several significant problems that this new system will resolve. These include (1) not being Year 2000 compliant, (2) not allowing the needed level of integration between systems required by the University, (3) not being responsive to the level of executive information needs of the University, (4) a software platform that is outdated and user unfriendly, and (5) multiple shadow systems that are costly to operate and are non-integrated and must be reduced.

The University understands the need for improving its administrative processes in order to stay competitive in higher education. Alan Moeller, Assistant Vice Chancellor for the Institute of Agriculture and Natural Resources (IANR) and member of the FSTF, provided the following remarks at the project kickoff event.

This is a system that has been needed for a long time and is essential for the University to remain viable. A report by the Commission on National Investment in Higher Education given recently to the Board of Regents states: "Unless the higher education sector changes the way it operates by undergoing the kind of restructuring and streamlining that successful businesses have implemented, it will be difficult to garner the increases in public funding needed to meet future demands." This enterprise-wide solution will provide the university the tools to substantially improve how we conduct our business—to enhance our effectiveness and to do so with increased efficiency.

SAP LAUNCHES PUBLIC SECTOR SUBSIDIARY

On August 4, 1997, SAP America Inc. publicly announced the start of a new subsidiary called SAP America Public Sector Inc. to help support its U.S. public sector customers. Dedicated consulting, implementation and training services specifically for public sector customers are a few of the solutions SAP industry experts will be looking to provide to the U.S. government and other public sector entities throughout the country.

The related press release from SAP America Inc., dated August 4, 1997, states:

Government, education and nonprofit organizations are finding they need to streamline and improve upon outdated processes that no longer meet the needs of today's rapidly changing society. To accomplish this, many public sector organizations are looking to the best business practices that have helped their private sector counterparts succeed. SAP Public Sector will tailor these best business practices to help public sector organizations establish more effective long-term planning, update programs, more rapidly accomplish their missions, and better serve the needs of society.

The SAP Public Sector solution will tailor R/3 to meet the numerous functional and technological demands required by public sector organizations. In addition to utilizing more than 1,000 standard business processes within the R/3 integrated system, the SAP Public Sector solution will provide industry-specific enhancements, expertise, dedicated consulting, implementation and training services for public sector customers.

UNIVERSITY OF NEBRASKA SELECTS SAP

Based upon feedback from each campus during the needs assessment activity, the team moved forward to the next task of technology selection. This phase resulted in a recommendation regarding the replacement of the current financial system software and the human resource management system. Moeller continued in his remarks at the project kickoff:

The Administrative System Project may be the most significant endeavor in terms of overall impact to the business operation of the university that any of us have seen during our association with the University. Yes, we have implemented other accounting, budgeting, payroll, and personnel systems, but nothing as integrated, sophisticated, and complex as what we are doing here, nothing that has had the potential impact in terms of how work is performed and how decisions are made.

On September 5, 1997, the Board of Regents approved \$2,591,935 for the purchase of an enterprise-wide software system for the University's financial management, budgeting, human resources, and payroll systems. Approval was given to purchase the R/3 client-server software system from SAP (Systems, Applications, Products in Data Processing). Additional approval was granted for IBM Global Consulting to serve as the implementation provider for this software with services to be provided over a two-year period at a cost not to exceed \$7.6 million. The Regents also authorized the use of lease-purchase financing and for the President to execute contracts as necessary to complete these transactions.

A few benefits of the new administrative system from SAP would include:

- University of Nebraska will operate as one integrated business system
- Faster access to new and better information
- Solve Year 2000 problems
- Cost effective
- Empower users
- Facilitate process redesign
- Implementation of best business practices

PROJECT ORGANIZATION AND TIMELINE

After approval of the project by the Board of Regents, the University of Nebraska President's Council approved the appointment of the core process team for the project. The project manager named to lead the core project team was Jim Buckler, Controller for the University of Nebraska Medical Center. Buckler was involved with the ASP since its inception in the summer of 1995.

Coming from the different campuses were the remaining core project team—a project administrator, an integration coordinator, and eight project team leaders (refer to the project organizational chart in Exhibit 6). Each of the individuals was appointed to the project on a full-time basis until the system would be placed in production. An additional 15 to 20 resources from all campuses serve in a part-time to full-time capacity as extended team members.

These core and extended team members form the ASP project team and serve as the foundation of the project's five functional and three support teams. The functional teams include External Accounting and Financial Management; Business Planning and Controls; Project Systems; Procurement and Logistics; and Organization and Human Resources. The three support teams are Technical and Data Conversion; End User Support; and Change Management, Documentation and Training. Shortly after the start of the project, the End User Support team and the Change Management, Documentation and Training team unified to form one work team.

Direction is provided by the project's steering committee called the Financial System Task Force (FSTF). The committee consists of the University's CIO, Assistant Vice President for Human Resources, Assistant Vice President for Business and Finance, and a business and finance representative from each campus. This committee reports to the CBOs. Moeller also stated at the project kickoff event, "I have been elated during the selection phase and now the implementation phase to see University employees from all campuses working together for a common goal. People are stepping to the forefront to work together as members of teams to improve the University's ability to manage its resources."

Campus primary resource groups, involving about 60 people, were formed to provide campus-specific support to the five functional teams. Each campus primary resource group is comprised of at least one subject matter expert from all of the functional areas on that campus. Primary resources work as liaisons to the broader University community providing input and knowledge transfer for building the system solution.

About 25 technical resources, mostly from the University's information technology branch—Computing Services Network—were made available to the project. The roles of these technical resources were to provide support for networking, operations, database application, database server and application server. Additionally, several resources provide support by developing technical programs written in SAP's Advanced Business Application Programming (ABAP) language. Other technical resources were made available to provide basic administration dealing with the maintenance and security of the R/3 system.

Campus transition teams were formed to serve as change facilitators and agents. The transition teams are vital links to the success of the Administrative System Project. Their primary goal is to provide a smooth transition at the campus level from the current systems to SAP R/3. They work directly with the End User Support and Change Management, Training and Documentation teams on issues related to communications, training, documentation, and help desk support.

As previously mentioned, IBM Global Consulting was hired as an implementation partner for the project. Led by a consulting project manager, consulting resources assisted with detailed project planning, initializing and configuring the software, transferring knowledge of the system, testing, and documentation.

There are four phases in the Administrative System Project (see Exhibit 7). They are preparation, analysis, design, and implementation.

- The preparation phase started in September 1997 with defining business requirements, assessing business strategy, performing some business process redesign, and defining the project's scope. As in any environment, team building had to take place, including the orientation of the team to ERP implementation methodology and the tools they would use to achieve success.
- In December 1997, the analysis phase started with the actual detailed examination of the University's "as is" and "to be" states by building on the results of data identified during the preparation phase. Other major activities during the analysis

phase included defining current and future functions and processes, training of project team members on the system and analysis of end user training and documentation needs.

- The design phase, started in February 1998, began with the future business functions and processes defined in the analysis phase and mapped them to SAP functionality, resulting in a fit-gap analysis. A prototype configuration was also established and demonstrated to the user community. Feedback from the prototype demonstration was incorporated into the design of the system as configuration continued. This phase also included the identification and design of technical interfaces, conversion programs, and reports.
- September 1998 was the start of the most resource-intensive phase: implementation. Major milestones and activities of the implementation phase included detailed configuration of the final system, finalizing development of technical programs and reports, quality assurance testing, and end user training. Additionally, a cutover process exists for the transition from the old system to the new in preparation for the July 1, 1999, “GO LIVE” date. Cutover includes loading the system with real data and preparing it for production.

Buckler provides the following comment regarding the combined effort after the completion of the analysis phase: “We have clearly stated goals and are committed to bring this project in on time and under budget. It will be with the assistance of many campus individuals and a lot of very hard work that will prove its success.”

PROJECT SCOPE

A primary benefit of implementing SAP was to facilitate the University operating as one integrated business system. The ASP project team was chartered with developing a common set of transactions and processes that could be supported by the SAP R/3 system. The project’s scope was defined in the preparation phase and refined in the analysis phase. The scope pertains to system development, conversion, and implementation activities fundamentally necessary for the University to function.

“We will be implementing best business practices wherever possible, as part of this effort, on all campuses,” Walter Weir points out in reference to the standard methods that will be used to design and implement the system. In addition to being a member of the FSTF and serving as the Chief Information Officer (CIO), Weir is the director of Computing Services Network, the information technology branch of the University.

Exhibit 8 delineates the scope boundaries within which the ASP team focused its system development efforts.

AVAILABILITY OF RESOURCES

As the project progressed, identifying and obtaining resources became an issue. The Technical and Data Conversion team’s resource plan called for eight man year’s worth of effort to complete the currently identified list of technical programs such as data conversions, interfaces, and extensions. Additionally, it is important to note the plan did not account for any possible additional interfaces that may or may not be required once configuration was near completion.

The End User Support and Change Management, Documentation and Training work team developed a solid plan during the preparation and analysis phases. However, during the design phase, the two team leads were spending a considerable amount of time recruiting technical writers and other support personnel from the University community to help implement their plan. The majority of the University’s business and finance functional resources were already tapped. Additionally, non-business and finance employees in the University did not have ownership in the project so they were not interested.

The stability of consulting resources was another area of concern. Buckler states in the project management’s biweekly status report for the period ending August 7, 1998:

While the University staffed its team very quickly and has experienced limited turnover (one core team member and approximately the equivalent of one full-time extended team member), our consulting resources have experienced significant turnover. During the almost eleven months of this project, we have experienced almost

100% turnover of consulting resources. Within the HR/Payroll area alone there have been four (4) different consulting leads.

FIT-GAP ANALYSIS

Most standard ERP implementations include an activity of identifying differences between functionality provided in the ERP package and the organization's desired business functions. The extent to which these desired business functions are included in the ERP package is called *fit*. Any difference between the desired business function and the functionality provided by the ERP package is called a *gap*.

During the design phase, the University conducted a fit-gap analysis. Exhibit 9 summarizes the percentage of fit between the SAP R/3 system and each University business function. The percentages presented in Exhibit 9 account for 53 specific gaps that were identified between SAP's functionality and the University's desired business processes. Of this total, 14 were considered critical whereby resolution of these particular gaps was imperative to ensure a fully configured system.

Exhibit 10 lists the 14 critical gaps with a brief description of each gap and the SAP R/3 application module affected by the gap.

IMPACTING THE FUTURE

Project management and the FSTF must give consideration to all factors that can potentially be impacted by the critical gaps. Such factors include the scope of the project, resources (human and budgetary), the timeline, and previous configuration of the system to name a few. Project management described the importance of resolving the critical gaps in their biweekly status report for the period ending August 7, 1998.

Gap resolution continues to be an area of great concern to the project team. This critical success factor was discussed in depth at the project sponsor briefing conducted July 29, 1998. It was identified at the meeting, and in a position paper, that resolution of these gaps, establishment of a work plan and identification of resources must be accomplished prior to the end of August 17, 1998.

IBM anticipates that several, if not all, of the identified gaps potentially require programming changes for resolution. However, the University has to abide by its legal agreement with SAP. In simplest terms, the contract states the University of Nebraska and the University's implementation partner, IBM, cannot change the R/3 system's core program code. Hence, only SAP can derive programming changes to the software.

SAP validates that the critical gaps are resolved in the next release of their R/3 software. Furthermore, SAP states the new version will be available no later than March 1, 1999.

The following options were presented in a position paper as possible solutions to resolve the 14 critical gaps:

1. SAP to provide on-site developers to incorporate the needed functionality into the system. With SAP responsible for the development, this option ensures integrity of the system and actually protects the University from the possibility of having changes overwritten by future upgrades of the software. In order not to push the project's plan and timeline, developers would need to be on-site immediately, certainly no later than August 17, 1998. The cost of this option is unknown, as SAP would have to determine.
2. IBM to provide programming support to develop workarounds. Since neither the University nor IBM can change the R/3 system's core program code, temporary solutions or "bolt on" programs would have to be developed. With the University's technical resources engaged in writing interfaces and data conversions, IBM would have to provide additional resources to ensure a timely resolution of the workarounds. This would be a costly change to the project in terms of budget and time for knowledge transfer with new resources. With this option, it would be greatly desired that SAP provide a developer to coordinate efforts and hopefully coordinate the incorporation of the solutions in future releases.

3. Extend implementation activities until July 1, 1999, to implement version 99x. The current project timeline dictates configuration, testing, and cutover activities to be completed by March 1, 1999. This deadline allows for three months of user training before the July 1 “GO LIVE” date and time to do any final “touch-up.” This option would push configuration to be performed simultaneously with integration testing in March and April followed by the remainder of testing in May and June while user training is being conducted. Integration points between the modules would have to be constantly monitored and kept in synchronization as much as possible. Training of end users and testing of overall system will be disjointed and potentially repetitive.
4. University delays payroll until phase II. Because the current payroll system provides the required functionality, this option would serve as a stopgap until SAP functionality is available. However, the current payroll system is not Year 2000 compliant and the maintenance agreement has been discontinued. A SAP solution would be required prior to December 31, 1999. Additional cost associated with configuring, testing, and training beyond the original project would be incurred. Furthermore, if the December 31, 1999 deadline were not met, more costs would be incurred to upgrade the payroll software to its newest version. This is also a departure from the mandate of the project and will become a consuming change management task to handle expectations.

Exhibit 11 summarizes the options presented to the FSTF by project management.

As Buckler prepares for his meeting with the FSTF, he ponders the merits of each option. The first option of SAP providing on-site developers is the most appealing as, by itself, it would resolve all of the critical gaps and ensure the necessary functionality supported in future releases of the R/3 system. However, a sizable challenge exists in persuading SAP to take ownership and responsibility for resolving the gaps. The moderate risk involved indicates that other options would need to be considered.

The other three options do not resolve all of the critical gaps and they have a greater impact on different factors of the project. In many cases, these options change the scope of the project and affect the project’s timeline. Additionally, identifying and obtaining the necessary resources could potentially be a problem considering the resource challenges to date.

With these constraints and issues in mind, Buckler contemplates which one or combination of the four options is the best course of action. Should SAP and IBM be working concurrently on resolving the gaps (i.e., options 1 and 2)? This seems to be the safest course of action, but it will be very costly. Should the project timeline be extended till July 1, 1999? What if SAP could not resolve all the gaps by that time? Would that deter the University from transiting smoothly into the new millennium? Should the implementation of the HR/Payroll module be delayed? These options will have to be carefully considered and a recommendation made at Buckler’s meeting with the FSTF in a few hours’ time.

SUGGESTED ASSIGNMENT QUESTIONS

1. Characterize University of Nebraska’s (NU) existing competitive environment. What role does IT play in the organization? How important is the success of Administrative System Project (ASP) to the University of Nebraska’s competitive strategies?
2. Which, if any, of the problems in ASP does SAP appear helpful in addressing? Is it a right decision to implement an integrated system for NU?
3. Is there a good fit between SAP R/3’s functionality and desired business process of NU? What are the strengths and weaknesses of SAP R/3 for NU?
4. Which of the four options or combination of options would you recommend to project management and the steering committee? What are the risks involved in your recommendation? How would you manage the risks?
5. What challenges does NU face in the next few months (prior to Y2K)? What challenges does NU face in the near future (immediately after Y2K)? How well positioned is NU to meet those challenges?

Exhibit 1 Governors of University of Nebraska

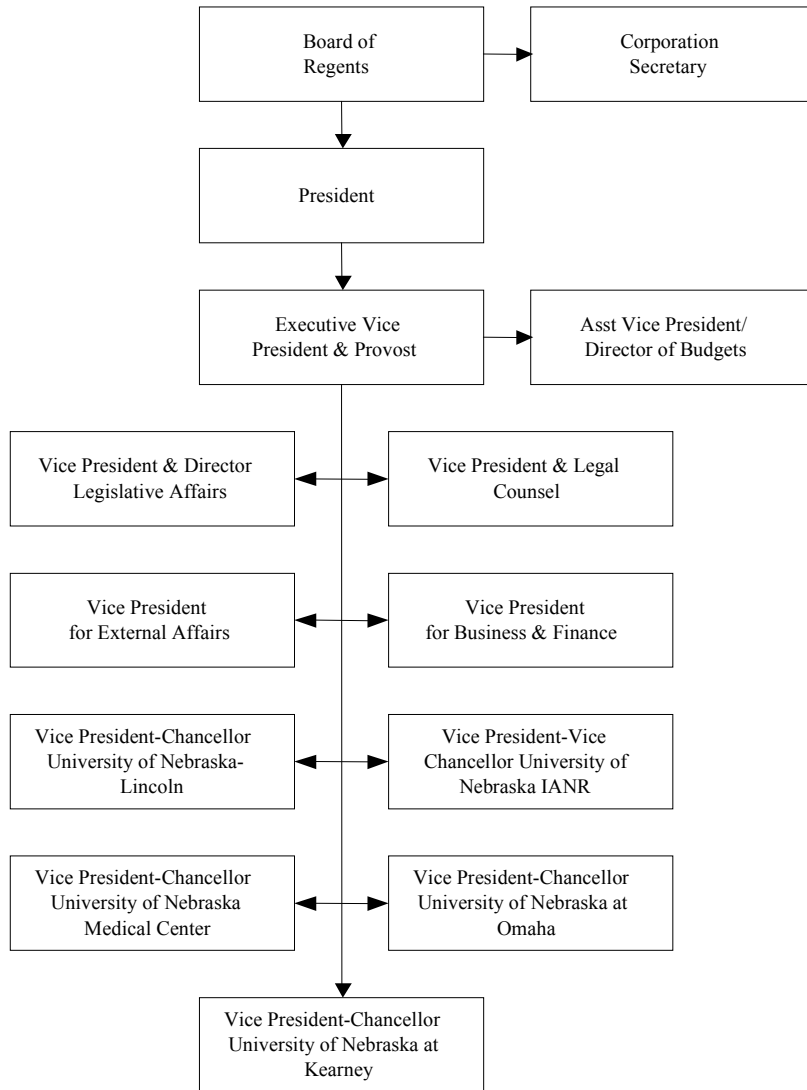


Exhibit 2 1998-1999 Estimated Revenue by Fund Source

1998 Estimated Revenue by Fund Source

Federal Funds	152,799,374
Revolving Funds	291,596,128
General Funds	354,082,481
Trust Funds	114,943,469
Cash Funds	159,603,977
Total Estimated Revenue	\$1,073,025,429

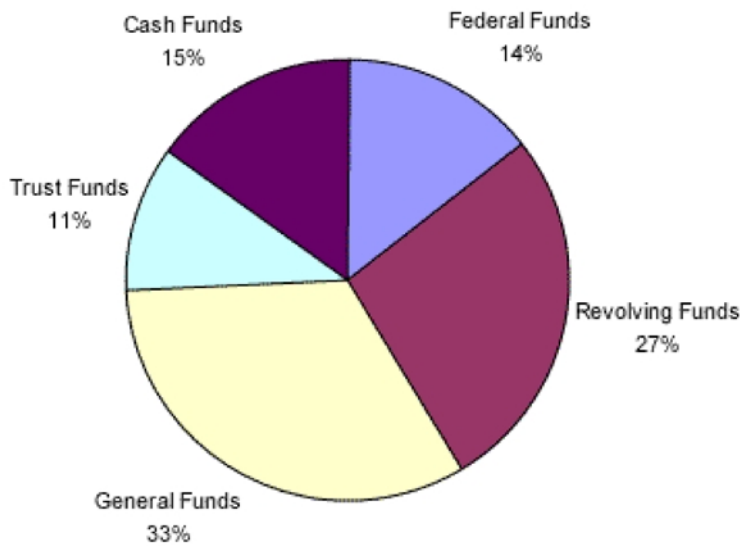


Exhibit 3 1998-1999 Budgeted Expenditures by Spending Category

1998-1999 Budget Expenditures by Spending Category

10-Instruction	337,455,275
20-Research	159,012,769
30-Public Service	88,637,781
40-Academic Support	72,325,647
50-Student Services	91,009,681
60-Institutional Administration	73,002,817
70-Physical Plant Operations	48,698,924
80-Student Financial Support	40,637,261
90-Independent Operations	14,643,605
00-Other Non-Expenditures	147,601,669

Total Budgeted Expenditures \$1,073,025,429

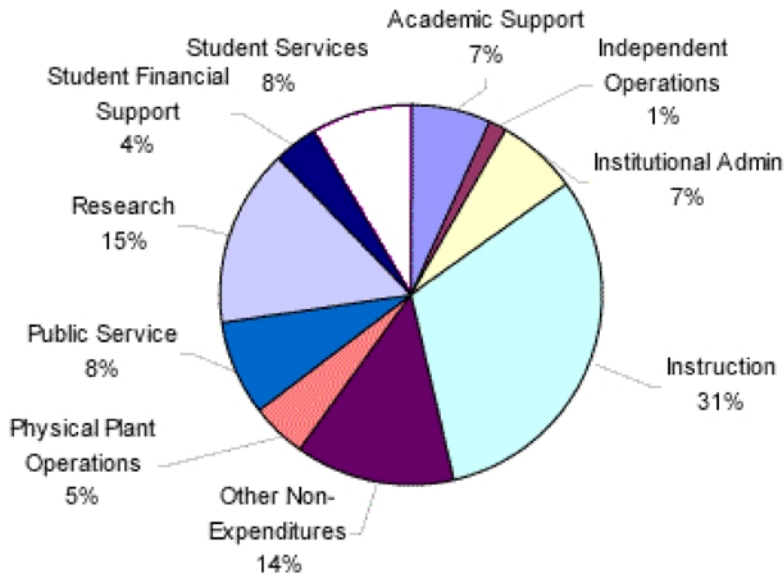


Exhibit 4
Student Enrollment at the University of Nebraska

Student Enrollment on Campus (Fall 1997)			46,288
Undergraduate		(78.4%)	36,268
Full-time undergraduate	(21.6%)		10,020
Part-time undergraduate	(79.8%)		28,939
Graduate and professional		(20.2%)	7,329
Full-time graduate and professional	(47.1%)		4,716
Part-time graduate and professional	(52.9%)		5,304
Resident		(88.1%)	40,799
Nonresident		(11.9%)	5,489
Male		(48.3%)	22,340
Female		(51.7%)	23,948
White		(88.4%)	40,932
Minority		(7.2%)	3,343
Nonresident Alien		(4.3%)	2,013

Exhibit 5
Full-time Faculty and Staff Employed by the University of Nebraska

Full-time Faculty and Staff (Fall 1997)			11,304
Executive/Administrative		(2.2%)	256
Faculty and Other Academic		(30.3%)	3,422
Professional		(28.0%)	3,164
Clerical/Technical/Service		(39.5%)	4,462
Male		(48.3%)	5,460
Female		(51.7%)	5,884
White		(88.4%)	9,995
Minority		(9.9%)	1,124
Nonresident Alien		(1.6%)	185

Exhibit 6 Administrative System Project Organization

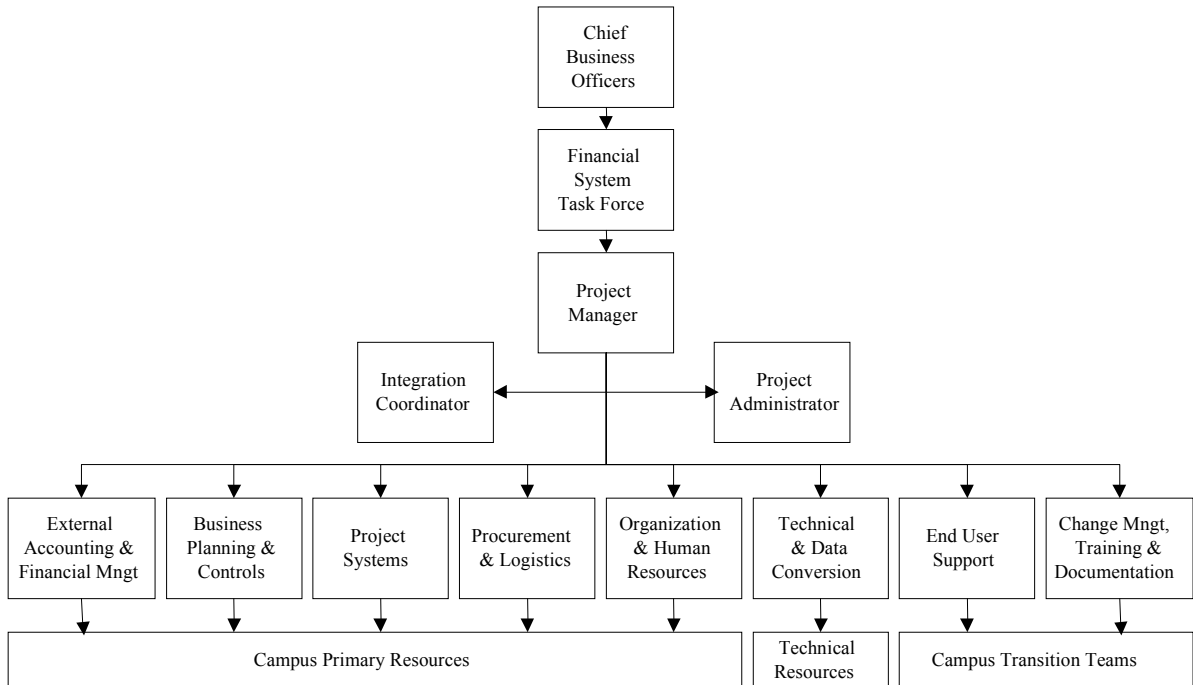


Exhibit 7 Phases in the Administrative System Project

Phase	Major Milestones/Activities
Preparation	Team orientation Define business requirements Define project scope
Analysis	Define current and future business functions and processes R/3 system training for project team members Analysis of end user training and documentation needs
Design	Map future business functions and processes to R/3 functionality Develop a prototype configuration Identification and design of interfaces, conversion programs, and reports
Implementation	Detailed functional configuration of the final system solution Finalizing development of technical programs and reports Quality assurance testing User training Cutover to production

Exhibit 8
SAP Modules Implemented in the Administrative System Project

SAP Module	Functions
Financial Accounting (FI)	General Ledger Accounts Receivable (extent to facilitate cash receipts) Accounts Payable Business Trip Management Special Purpose Ledger
Treasury (TR)	Funds Management Encumbrance/Commitment Accounting Budget Maintenance
Controlling(CO)	Cost Center Accounting Enterprise Controlling Profit Center Accounting Enterprise Planning (Budget Planning and Development) Profitability Analysis (only to extent needed for internal reporting) Internal Department Project Accounting
Project Systems (PS)	Work Breakdown Structures (for grants, contracts, loans, and plant funds) Personal Activity Reporting (Federal requirement for grants/contracts)
Asset Management (AM)	Traditional Asset Accounting Depreciation
Materials Management (MM)	Purchasing (includes material master and vendor master data) Inventory Management Reorder Point Processing Invoice Verification Material Valuation Vendor Evaluation External Services Management
Human Resources (HR)	Personnel Administration Payroll Time Management (partial) Benefits Administration Recruitment Personnel Administration Personnel Planning & Development Organization Management Cost Planning Position Management

Exhibit 9
Percentage of Fit between SAP R/3 System and
University Business Function

University Business Function	Fit to SAP
Purchasing	85%
Accounts Payable	80%
Projects	75%
Financial Management	65%
Asset Management	65%
General Ledger	60%
Costing	60%
Human Resources	60%
Treasury	50%
Budgeting	30%
Funds Management	30%
Average	60%

Exhibit 10 Description of the Fourteen Critical Gaps Identified

Critical Gap	SAP Module	Description
Multiple Funding	Human Resources (HR)	The University uses multiple funding sources for individual positions on a regular basis. This occurs when the work of one position serves more than one department, when a position is partially funded by a grant, or when a department receives funding from a variety of sources. The current version of SAP R/3 does not support this need.
Multiple Assignments	Human Resources (HR)	Some employees at the University are assigned to multiple positions that may have different funding sources assigned to each position. For example, a chair of an academic department generally holds two positions—the administrative portion for serving as a chair and the balance as a faculty. The current version of SAP R/3 does not support this need.
Multiple Hourly Rates	Human Resources (HR)	It is a very common situation at the University to have a student worker employed by three separate administrative units at three different hourly rates, but working only a total of 15 hours during any given workweek. The business requirement of allowing multiple hourly rates for the same employee is not supported by the current version of SAP R/3.
Federal Work-Study Split	Human Resources (HR)	The University administers an extensive Federal work-study program where funds are allocated to each campus and the money is used to partially cover the costs of employing students in part-time capacities on each campus. The Federal money pays a portion of the student's wages and the University pays the remaining portion. Several restrictions apply to this program resulting in complicated management and accounting procedures. The current version of SAP R/3 does not address the functionality needed for this program.
Non-resident Alien	Human Resources (HR)	Federally required non-resident alien taxation is not apparent in the delivered SAP R/3 system. Additionally, the University needs a process to incorporate scholarship amounts for non-resident aliens into the gross payroll process. The current version of SAP R/3 does not support this need.
EEO-6 Report	Human Resources (HR)	The University is required by the Equal Employment Opportunity Commission (EEOC) to compile a semi-annual EEO-6 report, which is the set of reporting requirements for higher education institutions. The delivered SAP R/3 system provides for EEO-1 reporting for profit generating organizations.
Tax Interface with BSI	Human Resources (HR)	Business Solutions Inc. (BSI) is a third party vendor that works with the SAP R/3 system to provide tax table data related to payroll. The tax tables have to be interfaced with the SAP R/3 system in order for payroll to be calculated correctly.
Payroll Simulation	Human Resources (HR)	Functionality in the current human resource management system allows the University to model an employee's payroll to determine the effects of changing a parameter such as income tax withholding allowances or sheltering more money through the retirement program. This modeling goes beyond SAP R/3 payroll simulation functionality as simulation just predicts payroll in advance but does not allow for applying parameters.

Critical Gap	SAP Module	Description
Employee Travel	Human Resources (HR) and Financial Accounting (FI)	Travel (or business trip-management as it is called in SAP terminology) is currently administered through the HR module and therefore does not encumber the funds for travel at the time the trip costs are being estimated and pre-authorized. The University would like an option that would allow for the encumbering of travel monies as well as allow for travel authorization numbers to be generated at the time the trip details/arrangements are being made at the department level.
Annual Salary Updates	Human Resources (HR)	The University provides annual salary increases to its permanent staff where each employee's increase is determined individually within overall guidelines established by the Board of Regents. At this time, the University has not been able to clearly identify how SAP R/3 will meet this requirement.
Position Management	Human Resources (HR)	One University business process includes the budgetary management and tracking of positions by monitoring the projected versus actual comparisons of salary information on a position by position basis as well as the cost objects from where the position is funded. The personnel cost planning and personnel development portions of the HR module in SAP R/3 addresses some of functionality, but not all.
Position Salaries to WBS Elements	Human Resources (HR)	The HR module in the current version of SAP R/3 does not support posting salaries directly to work breakdown structure (WBS) elements. WBS elements are cost objects used by the University for accounting of expenses related to grants, contracts, plant funds, and loans. The SAP R/3 delivered functionality appears to only allow posting of hourly wages to WBS elements.
Balanced Business Areas	Financial Accounting (FI)	The University currently has 10 fund groups (general, restricted, endowment, etc.) in its audited financial statement. The University's legal reporting entity is composed of five geographically and administratively separate campus units. Not only does each campus unit prepare a set of financial statements to be individually audited and must comply with legal reporting requirements, but these individual statements are consolidated to create the University-wide legal reporting entity statements. This requires that the University maintain up to 50 balanced legal reporting entities (10 funds x 5 campuses). SAP R/3's primary organizational element for external financial reporting is the company code. The operational impact of maintaining 50 company codes is undesirable in terms of general ledger account segments, vendor accounts, customer accounts, and human resources/payroll.
Internal Sales Markup	Materials Management (MM)	The University includes a markup on inventory that is issued from a warehouse and sold internally to another University department. In the current version of SAP R/3, only one price can represent a stock item and the same price would be used as the charge to the department.

Exhibit 11 Summary of the Four Options Considered

Option	Description	Gaps Affected	Risk	Costs
SAP provide on-site developer(s)	SAP provides on-site developers to edit the R/3 system's core program code and incorporate the changes in future R/3 system releases	This option would resolve all gaps	Moderate risk as solutions will be incorporated in future R/3 system releases; however, developers must begin immediately	Expected low cost to the University as SAP would be asked to absorb most of the costs
IBM provides developers to create workarounds	IBM creates temporary workaround solutions that are "bolted on" to the system and are not part of the core SAP R/3 system code	This option would resolve most gaps as attempts to develop workarounds for some gaps would not be feasible	High risk as solutions are not guaranteed to be in future R/3 system releases	High cost to the University for the consulting resources needed to complete the workarounds
Extended project timeline until July 1, 1999, to implement the next version of SAP R/3	Push project timeline three months resulting in some implementation activities being conducted simultaneously to meet the July 1 "GO LIVE" date	SAP validates that all critical gaps are resolved in the next R/3 system release	High risk as new version must be delivered on time and resolution to critical gaps must be supported	Moderate cost for some additional resources; potential for high cost if gaps are not resolved in new version
University delays payroll until the next phase of implementing functionality	"GO LIVE" with non-HR modules as outlined in the project scope and interface the R/3 system with the University's current human resource management system	This option only addresses those gaps related to the human resources (HR) application module	Low risk as current payroll system is functional	Moderate cost for some additional resources and to address change management issues; potential for high cost if payroll system has to be updated for Y2K compliance

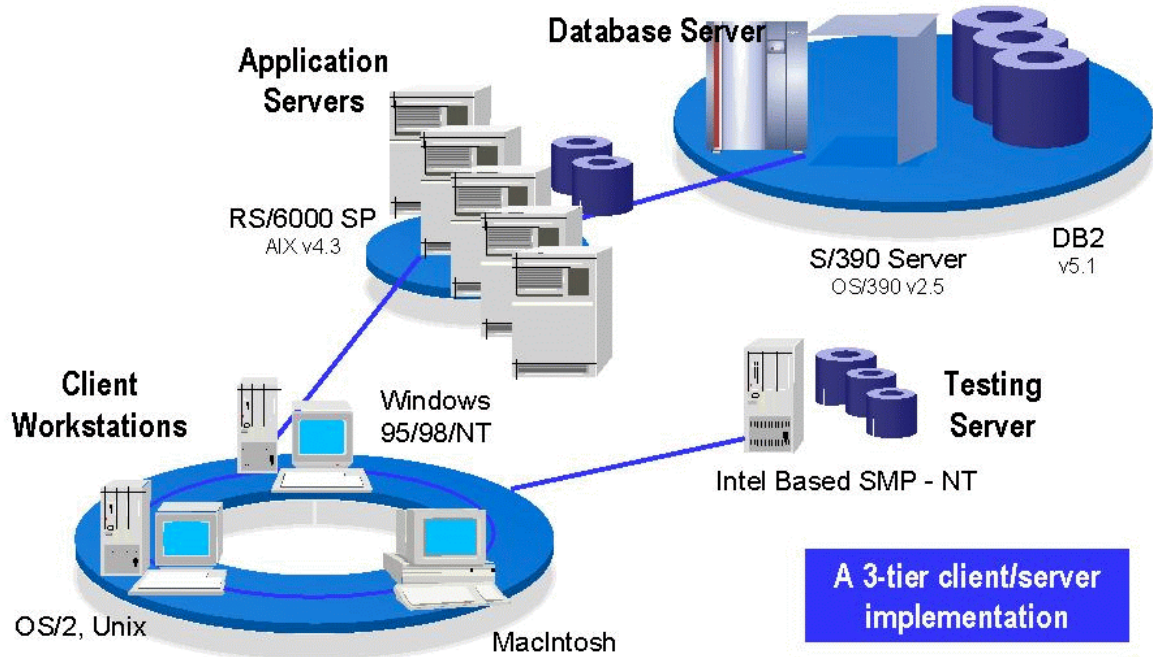
Exhibit 12 The Client-Server Architecture of the SAP/R3 System as Implemented at the University of Nebraska



ASP AS
SP ASP ASP A
SEP ASP **Administrative System Project**
SEP ASP ASP *Year 2000 and Beyond*
SEP ASP ASP AS
SP ASP ASP A
ASP ASP

**University
of Nebraska**

Client/Server Infrastructure



Source: University of Nebraska Computing Services Network

Exhibit 13 The SAP R/3 System Architecture and Modules Implemented at the University of Nebraska



ASP AB
JP ASP ASP A
ASP ASP **Administrative System Project**
ASP ASP ASP *Year 2000 and Beyond*
ASP ASP ASP AS
SP ASP ASP A
ASP ASP

**University
of Nebraska**

System Architecture

Financial:

- CO – Controlling
- FI – Financial
- PS – Project Systems

Human Resources:

- HR – Human Resources

Logistics:

- MM – Materials Management



Source: SAP America, Inc.

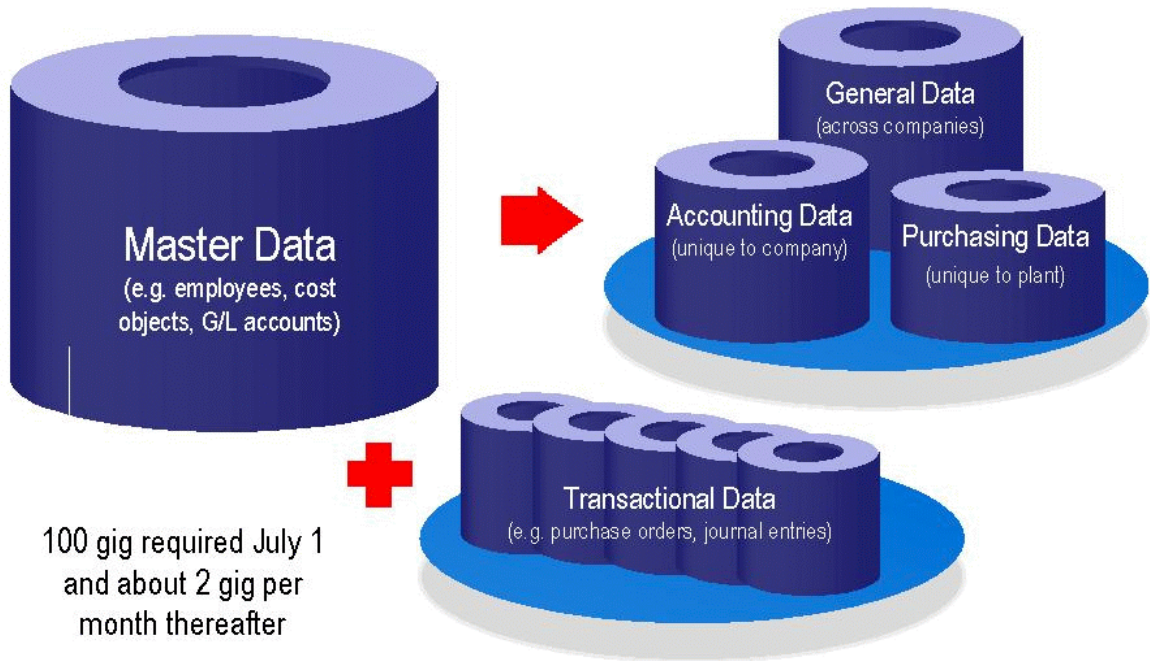
Exhibit 14 The SAP R/3 Data Architecture as Implemented at the University of Nebraska



ASP ASP
ASP ASP ASP A
ASP ASP **Administrative System Project**
ASP ASP ASP *Year 2000 and Beyond*
ASP ASP ASP AS
ASP ASP ASP A
ASP ASP

**University
of Nebraska**

Data Architecture



Source: University of Nebraska Computing Services Network