Iowa State Government Technology Assessment Project

Prepared by:

the Yankee Group
Boston, MA

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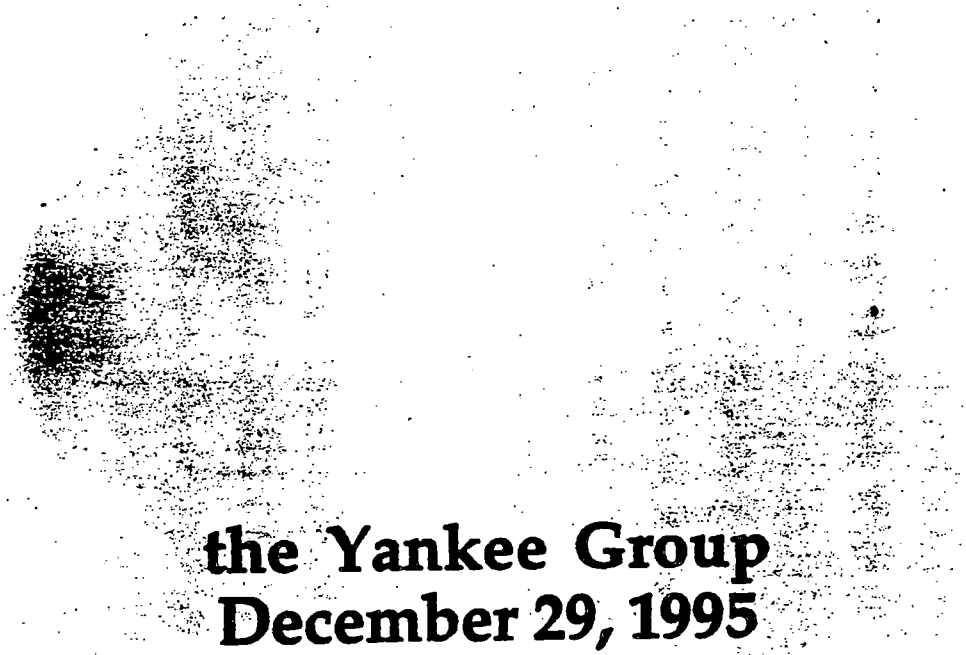
Section 1

Project Overview



the Yankee Group

December 29, 1995

1.1 Yankee Group Mandate

The State of Iowa is conducting an assessment of Information Technology (IT) in the Executive Branch. The purpose of this assessment is to gather data on costs, applications, systems, utilization, operations, hardware assets, administration and activities associated with the provision of IT services. To accomplish this, two leading technology vendors conducted an intense assessment. These vendors, Integrated System Solutions Corporation (ISSC), and Electronic Data Systems (EDS) analyzed extensive data provided by the various agencies and conducted on-site interviews during the week of November 13, 1995. Additionally, in the first week of December, the American Federation of State, County, and Municipal Employees (AFSCME) Iowa Council 61 sponsored an assessment. These assessments are included as Appendices B, C, and D to this report.

The Yankee Group's scope of work, as defined by the State of Iowa is as follows:

1. Review the activities and resources associated with providing IT service to the executive branch agencies of Iowa State government.

2. Review, analyze and evaluate the IT assessments provided by the IT services vendors and AFSCME.

3. Working with a State information technology team in conjunction with vendor assessments, summarize information and develop recommendations for the provision of IT services.

4. Validate / estimate one-time annual savings / costs associated with the recommendations.

5. Prepare an "Executive Report" which responds to #1, #2, #3, #4 above and submit to the State of Iowa by 12/29/95.

1.2 Process

The Yankee Group participated in several meetings in Des Moines on November 13, 1995. The first meeting was with the vendors and the State IT Team with the goal of ensuring that the objectives, time-line, and process were understood. Additionally, the Yankee Group attended meetings EDS and ISSC individually held with a subset of the State team to share their respective processes that would be used during the week to obtain detail information.

1.2 Process (continued)

On December 1, 1995 the vendor assessments were received by the Yankee Group and a preliminary analysis was conducted. This analysis was intended to assimilate the information from the vendor reports and verify vendor observations with our analysis of the State provided documentation. The Yankee Group found vendors assessments were consistent with our analysis.

The Yankee Group then prepared an initial set of observations that were used in a work session held in Des Moines on December 7, 1995 with the State IT Team. The objectives of this session were:

1. To share with the State IT Team Yankee Group copies of the vendor assessments and solicit team comments,

2. To provide initial Yankee Group impressions to the team and obtain team feedback on accuracy of observations, and

3. To brainstorm to be certain the vendors had not omitted any important issues from their analyses.

AFSCME was invited to and participated in the December 7, 1995 meeting. During the ensuing week, AFSCME completed its assessment and submitted its report on December 15, 1995.

The Des Moines meetings, the State IT Team feedback, the vendor and AFSCME assessments, our review of substantial State supplied material, and Yankee Group experience in reviewing IT efficiency and effectiveness are the bases for our report.

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Section 2

Executive Summary

the Yankee Group

December 29, 1995

Yankee Group analysis of the assessments provided by the vendors confirms our opinion that both service vendors are qualified and capable. They were, in a relatively short time span, able to assimilate and analyze a substantial amount of data, and then to provide a high-level analysis of the current IT situation in the Executive Branch.

2.1 Observations

The following sections present a Yankee Group compendium of the most significant observations gleaned from the three reports.

Dedicated and Committed Staff

Both vendors and AFSCME agree that the State IT staff is dedicated, capable, committed to supporting the agencies' missions and it provides a high level of service to its agency customer base.

Datacenter Consolidation Results in Immediate Savings

Both vendors indicated savings were possible in the short term through the consolidation of the three major data centers (Department of Transportation, Department of General Services, and Department of Employment Services). The Yankee group concurs with this. Consolidation provides for savings through lower software license expenditures, hardware expenses, and labor resource requirements.

Help Desk Consolidation Results in Improved Service

Both vendors and AFSCME recommended a consolidated help desk. They observed in the current environment, both formal and informal help desks exist. There are varying degrees in quality of support for the end user community, and limited capability for developing an enterprise wide pro-active problem prevention strategy. The Yankee Group believes this consolidation is essential. In the short term, it may not result in appreciable cost reductions, because a technology investment is required. However, long term service improvement and cost savings are likely.

2.1 Observations (continued)

Enterprise Wide IT Leadership Is Required

ISSC, EDS, and AFSCME recommend an enterprise wide IT leader be appointed. Through their interviews, ISSC and EDS determined that independence of agencies causes inconsistent strategies to be pursued in an uncoordinated manner. This fosters duplication, inhibits common data sharing, and foregoes many economy of scale opportunities including purchasing power and scarce skilled resource sharing.

The Yankee Group supports the recent appointment of an enterprise wide CIO to provide leadership for implementation of future IT strategies. This position should be the catalyst, working with agency management, participating in re-engineering activities and driving a long-term IT strategy. It must also evolve quickly to be a position with autonomy and authority as part of a central State IT agency. It cannot be managed by committee and be effective.

Implement Enterprise Wide Disaster Recovery

Some documentation exists describing the processes to follow in the major data centers in case of a catastrophic failure. However, a full scale test of a simulated disaster has not been conducted. Without full scale testing, plans provide general guidance but not assurance that recovery is achievable. Also, the Yankee Group could find no evidence that agency business managers had been directly involved with the development of the plan. To ensure business continuity, plans must be developed and processes must be rigorously and regularly tested in conjunction with agency business management.

2.2 Recommendations

2.2.1 Background

The Yankee Group recommends that the State begin an IT transformation process immediately. Gains can be made by transforming selected IT functions, thereby freeing up resources (financial and people) for investment in re-engineering activities.

Approaches for transforming state IT service to improve value and cost are:

1. Implement the recommended changes using existing staff,

2. Implement the recommended changes using existing staff augmented with both management and technical consulting services, or

3. Outsource selected functions to an IT services vendor.

The first two strategies continue to use State resources. They require investment the vendors did not estimate. Our experience indicates that this would be significant, likely requiring a special appropriation covering two fiscal years. Additionally, these strategies require the State to assume the financial and technical risk of completing the transformation without service level perturbation, and to provide empowered leadership.

The reluctance of individual agencies to make the required enterprise compromises presents the largest risk of failure. In 1992, the Department Directors' Executive Committee issued "A Strategic Plan for Information Management." If implemented, it promised to improve the service and effectiveness of the IT delivery infrastructure. Ironically, in the December 7, 1995 meeting, the State IT Team indicated the vendor assessments were a re-affirmation of this 3-year-old statement.

Option 1 would be extremely difficult to complete, because of the required investment, and the current strong independence of the agencies. The Yankee Group does not see strong evidence the State has the empowered leadership to overcome this established independence and embark on an extensive transformation. In addition, the existing staff would have difficulty in maintaining current service levels concurrently with implementing such a transition. The State IT Team advised strongly that during any transition, existing service levels cannot be compromised.

2.2.1 Background (continued)

Option 2, a variation of the first, employs consultants. Management consultants direct the overall project and technical consultants augment existing staffs. This additional staffing provides the resources to accomplish the transition, thereby reducing the service level risk. However, the State still must fund the transformation, bear the risk of a successful transition, and provide empowered leadership to overcome current agency IT independence.

2.2.2 The Next Step

The Yankee Group recommends outsourcing be pursued to transform the IT delivery infrastructure. Each of the assessments provided actions to improve the service levels and reduce cost. **Outsourcing is not the strategy. It is the means to accomplish the actions recommended in the three assessments.** Outsourcing eliminates the requirement for transformation investment because the vendor can be instructed to include it in the quoted pricing. A vendor will need to recover this investment, while providing a competitive price. Hence, the Yankee Group recommends that the initial term of the outsourcing agreement be no less than five years. **Outsourcing is the only option that provides the State with a guaranteed transformation at a predictable cost.**

The Yankee Group recommends that the State develop a Request for Proposal (RFP) for a possible outsourcing arrangement with a single IT services vendor that encompasses the following elements of its IT environment:

1. Enterprise Infrastructure - data centers and network management,

2. Workstation Management - help desks, PC workstations, and client/ server management, and

3. Internal Application Development and Maintenance (AD/M) - those AD/M activities currently performed by State employees.

The Yankee Group recommends the formation of an independent IT agency within the Executive Branch. As the first step in the outsourcing process, it would assume organizational ownership of all State IT employees, assets, and budgets associated with the functions to be outsourced. From the inception of the outsourcing contract, this agency would be responsible for contract management, being the focal point between the IT services vendor and other state agencies.

The Yankee Group further recommends that the contracting of external AD/M consultants be coordinated by the new agency to ensure other State agencies consistent quality and pricing.

2.2.2 The Next Step (continued)

The Yankee Group estimates that the State can expect savings from this degree of outsourcing in the range 13% to 17%. A more detailed breakdown of this is found in Section 5.

It will be necessary to appoint an outsourcing team. This small (4-5 persons) team should be formed and be in operation by January 15, 1996. The general and realistic timeline recommended to move forward quickly is:

Jan 15	-	Team Formed
Feb 16	-	Scope to Outsource finalized
Mar 15	-	Preliminary draft - Request for Proposal (RFP)
Mar 29	-	RFP Issued
May 2	-	Responses from RFP
June 3	-	Selection of Vendor
July 19	-	Negotiations Complete
July 22	-	Contract Inception

2.2.3 Current Cost Structure

Our review of the data provided by the state agencies verified the figures that were presented in the ISSC assessment. To aid in the reader's analysis, a summary is presented below. The vendors' assessment reports provide additional detail.

	FY 1996($M)
Application Development & Maintenance / Consulting	24.3
Data Center Expenditures	23.3
Workstations/Client Servers	17.7
Network	3.2
Misc	3.0
Total	$71.5

This expenditure pattern is not unusual, with the possible exception that the network costs as a percentage of the whole are lower than expected, likely due to the use of the Iowa Communications Network (ICN).

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Section 3

Analysis of Assessments

the Yankee Group
December 29, 1995

In this section, the Yankee Group will summarize the specific recommendations and observations of each contributor. EDS approached it's recommendations and observations from a business process perspective. ISSC coupled the business process perspective with specific detailed data on functional service segments. AFSCME's primary emphasis was orientated toward the human resource aspect. These different approaches provide an opportunity to analyze the current IT transformation from each perspective and provide the State with the broadest collection of observations.

3.1 EDS Assessment

EDS analyzed the IT environment from the following topical perspective:

- Independent Structures
- Independent Planning
- Human Resources
- Equipment Investments
- Autonomous Agencies
- Technology Change
- New Technology
- Standards
- LANs and Office Automation
- Data Processing/Data Centers

Independent Structures EDS found that each agency is funded and administered in accordance with its respective missions and programs. This separateness results in State services being delivered to the end user in an uncoordinated manner. In turn, this drives independent IT strategies.

Independent Planning The agency-local IT infrastructure supporting this independence forgoes any common approach. Decisions are based on individual agency needs instead of taking a statewide enterprise perspective.

Human Resources EDS found the employees to be conscientious, having pride in their jobs and agencies. In many interviews employees expressed frustration because they were continually asked to do more with less. This is not a surprise, given tight budgets, and continual pressure to reduce costs. It supports the observation the IT budget may be understated. The lack of an adequate number of skilled, available IT personnel fosters performance of IT functions by non-IT people. This activity is not usually considered an IT expenditure by individual agencies. Also, existing professional IT personnel must keep the infrastructure running rather than focusing on the real business issues facing their agencies. This causes further frustration and limits individual development opportunities.

3.1 EDS Assessment (continued)

Equipment Investment EDS observed that the lack of a clearly defined enterprise architecture resulted in independent agency hardware/software acquisitions. This uncoordinated approach to investment leads to different platforms and inefficiencies. From agency-provided information the Yankee Group noted a wide disparity in PC platforms, both hardware and software. Each agency, investing on its own, could be very effective as an individual identity, but this uncoordinated investment strategy eliminates the ability to leverage the State's purchasing power.

Autonomous Agencies EDS observed that each agency has "acceptable, highly individualized IT environments." The IT applications are tailored for each agency's specific requirements without regard for sharing across agencies. This creates "information islands." Additionally, a disparity exists between larger agencies, which are able to obtain more funding and resources, and smaller agencies. Smaller agencies have a much more difficult time competing for resources to meet their requirements, often resulting in a very small IT support staff and a dependence on one or two key people to support current application portfolios.

Technological Change Observations in this area indicated the staff was doing an excellent job of coping with a large aging legacy application portfolio. As these applications grow older, a larger and larger proportion of staff resources will be necessary just to keep them operational. As a result, new development activity is frequently subcontracted, while the State employees make day-to-day changes rather than upgrading systems to meet new business requirements.

New Technology Each agency creates its own strategy for acquiring, and implementing new technology. These independent decisions drive up support cost, creating an infrastructure where data cannot readily flow between agencies. For example, EDS identified six different operating systems for PC workstations.

Standards Enterprise-wide standards must exist to provide for data interchange and sharing. EDS observed that operating personnel often choose the standards they are comfortable with, creating support requirements for a wide array of products and reducing the potential to leverage staff resources.

LANs and Office Automation Generally, inter-agency connectivity does not exist. An example cited was the inability of management to communicate to the entire government user base using electronic mail. EDS observed that "while many agencies have made a substantial investment in current hardware, they are not able to take advantage of the investment".

3.1 EDS Assessment (continued)

Data Processing/Data Centers EDS found "tremendous redundancy" with the operating of the three data centers. This sets the stage for very substantial cost reductions through a consolidation of these facilities.

EDS Recommendation EDS recommends that a complete evaluation of agency IT infrastructure be done. EDS suggests "the results will serve as a blueprint for all future IT decisions." While this IT re-engineering could result in more efficiency over time, there are areas the Yankee Group believes can and should be addressed in the next year through outsourcing, overlapping the re-engineering effort. The Yankee Group has found that implementation of new IT strategy lags re-engineering activity by a minimum of 12 to 18 months. During that time, existing IT support functions can be made more effective generating a funding source that can be invested in new IT applications.

Delaying the transformation of current IT infrastructure additionally creates continuing personnel unrest. The IT personnel will be in a position of not knowing what their future is. The Yankee Group recognizes the need for re-engineering, but recommends IT infrastructure be improved now, concomitant with any such re-engineering activity.

3.2 ISSC Assessment

ISSC analyzed the IT environment from the following functional perspectives:

- Data Center
- Help Desk
- Network (LAN/WAN) Management
- Workstation Management
- Application Development and Maintenance

Data Center ISSC observed that each independent data center (DOT, DGS, DES), provides excellent services. It also indicated that significant opportunities for improvements in service delivery exist. Standardizing on common platforms, data center consolidation, enterprise wide hardware inventory management, process investments, and staff leveraging are recommended actions to improve service and reduce cost. ISSC outlines many specific technical and process actions that need to be implemented. The Yankee Group agrees that these all make sense and will result in the benefits cited.

Help Desk ISSC's observations indicated that there are many duplicate help desks in existence throughout the enterprise. These multiple points of contact for end user clients cause confusion, are too costly, and reduce effectiveness. There are significant opportunities for improvement through consolidation, standardization, and increased use of automation.

Network (LAN/WAN) Management ISSC indicated the wide area networks have evolved historically to provide connectivity between non-intelligent devices and their associated CPUs. In the past, it was difficult to justify any consolidation activity. At this time, especially with the robust ICN infrastructure available, a strategy of consolidation should be implemented.

Workstation Management This environment is the most diverse. It is very difficult to determine the total enterprise expenditure level. Yankee Group review of the data provided leads us to ISSC's conclusion. There are many different platforms, resulting in tremendous redundancy and loss of purchasing leverage. Also, this diverse environment makes it virtually impossible to implement proper asset management disciplines. The obvious answer is to consolidate and provide an enterprise management system and service. The Yankee Group agrees this makes sense; however this area, unlike data centers, must be approached more carefully. Each agency has implemented unique platforms for valid business reasons, and has implemented technology to support that need. Moving to a central management environment must maintain the unique requirements of each agency.

3.2 ISSC Assessment (continued)

Application Development and Maintenance ISSC observed a mix of State employees and contractors supplying the skills in application development and maintenance. The contractors are deployed on new development projects, while the State employees are more likely to be deployed on the maintenance of the legacy systems. The Yankee Group sees this often, as technical and business knowledge resides with long-term employees. This knowledge is essential for keeping the current legacy systems operational. Contractors are added as new projects are approved, thereby keeping this component variable in cost structure. ISSC indicated that current development tools, processes, and methodologies should be implemented.

ISSC Recommendations ISSC recommends outsourcing all functions except Application Maintenance and Development. The Yankee Group agrees outsourcing is the approach for the State to implement but the scope of our recommendation is broader than ISSC's.

3.3 AFSCME Assessment

AFSCME approached its assessment primarily from the human resource perspective, discussing:

- [proposed] Virtual Team,
- IT Enterprise Connectivity
- Software Inventory
- Hardware Procurement
- Disaster Recovery
- External Consultants
- Organization

Virtual Team The AFSCME proposal for an IT Enterprise Virtual Team addresses primarily application development and maintenance areas. The Yankee Group concurs that a centrally managed labor pool for application development and maintenance is a better approach, but recognizes that the State will continue for some time to have a massive maintenance workload. Also, most of that maintenance requires personnel intimate with the applications they are maintaining. Given this, it is difficult to support the level of personnel mobility proposed by AFSCME. The Yankee Group thinks that it will continue to be necessary to staff developmental projects with different personnel than those engaged in much of today's maintenance activity.

IT Enterprise Connectivity Most of the ideas in this section require investment, some substantial. The Yankee Group suggests that they be input to the re-engineering program we are recommending be undertaken by the new Iowa CIO, in conjunction with outsourcing.

Software Inventory A statewide software inventory is clearly an important part of any next step.

Hardware Procurement The Yankee Group agrees that central procurement of IT hardware is also important. There may be limited opportunity to take advantage of the used equipment market, but the Yankee Group cautions the State that the new application and connectivity opportunities it will surely wish to pursue (many of which are in this report) require modern equipment not generally available in the used equipment market.

Disaster Recovery The Yankee Group concurs with AFSCME that a robust business recovery plan is essential. This plan must include mainframe, LAN/WAN, and PC environments.

3.3 AFSCME Assessment (continued)

External Consultants It appears that the Full Time Equivalency (FTE) cap caused most agencies to look at external consultants for new application development tasks. In the private sector the Yankee Group sees more and more of this. Our clients recognize that demands for skills in new application development go up and down unpredictably. Hence, the variable cost aspect of external consultants is generally a far more attractive financial proposition than dedicated full-time staff. Given our earlier comment about the need for legacy application maintainers to stay close to their applications, the Yankee Group does not see how AFSCME's proposal will significantly reduce costs.

Organization This section presents a number of personnel enrichment ideas. The Yankee Group notes that many of these may increase State costs without any matching savings.

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Section 4

A Closer Look at the Yankee Group's Recommendations

the Yankee Group
December 29, 1995

4.1 Outsourcing

ISSC's assessment was organized along IT processes, and its recommendations were made addressing each identified functional areas. Outsourcing requires IT functional areas to be grouped into complementary processes that can be effectively managed between separate business entities. For example, separating Network Management and Data Center functions creates an operational environment that is difficult to manage in an on-going relationship. Outsourcing one without the other causes elaborate measurement systems to be devised to ensure that the right service provider (outsourced or internal) is held accountable for its service levels. Keeping functions together in one seamless organization allows effective tools, process, and measurements to be implemented while eliminating finger-pointing.

The Yankee Group recommends grouping the State's IT functions into the following four processes for consideration of outsourcing:

- Enterprise Infrastructure - data centers and network management
- Workstation Management - help desks, PC workstation, and client/ server management
- Internal Application Development & Maintenance - those AD/M activities currently performed by State employees
- External Application Development & Maintenance - those AD/M activities currently supplied by contractors

The Yankee Group recommends that all processes except External Application Development & Maintenance be outsourced to one vendor. This report re-examines each process:

Enterprise Infrastructure This area provides the greatest opportunity for service improvement and cost savings. The data center consolidation should be more than just a co-location. The consolidation should combine current data center multi-platform environments into a common architecture. This enables efficient implementation of a "data warehouse" concept, thereby facilitating improved IT capabilities to support enterprise wide data requirements.

4.1 Outsourcing (continued)

Workstation Management Outsourcing these processes does not provide the short-term savings potential that enterprise infrastructure does. The long-term savings potential is substantial. Enterprise management of the end-user workstation by a vendor eliminates duplicate evaluation staffs and support teams. The outsourcing scope should include all new asset acquisition and asset management. This will significantly reduce future capital requirements for the State.

The help desk functions currently provided in multiple organizations would be consolidated and outsourced. The vendor would provide the investment in tools, processes, and education for staff that must be made. As the new help functions are implemented, current peer group hidden costs of support will be dramatically reduced.

Internal Application Development & Maintenance As stated in the AFSCME assessment, "The State of Iowa has an invaluable asset in its Information Technology human resources." Outsourcing this skill base to a vendor whose business is IT provides the personnel with a new employer who will make the investments in tools, processes, and education. Because IT is its core business, vendors must make investments in their personnel to keep skills current with client demands. This investment is not optional, it is required. With the implementation of a common platform and infrastructure, the vendors will be able to invest in improving the effectiveness of the current state skill base. The Yankee Group finds that individuals committed to IT careers find significantly more job satisfaction working for a company with IT as its core business.

External Application Development & Maintenance This is not the right time to change the current strategy of using external skills for selected Application Development & Maintenance. Outsourcing the other processes will, over time, reduce this activity as common approaches and strategies are implemented. Since this expenditure is variable, as the requirements for unique agency investments change, each agency can continue to manage this expenditure for the next few years. After the infrastructure transformation and any business process re-engineering activity is completed, the degree to which it is appropriate to contract or more globally outsource Application Development & Maintenance can be determined.

4.2 Management Structure

The Yankee Group recommends the formation of an independent IT agency within the State prior to the initiation of the outsourcing process. This entity would be charted to administer immediately the functions determined to be outsourcing candidates. To ensure an enterprise-wide approach, the creation of this new agency is mandatory. It would assume ownership of employees, assets, and budgets from agencies now controlling these resources to ensure the State maximum benefit from the ensuing outsourcing arrangement. From the beginning of the outsourcing contract, the new entity would be responsible for the management of the contract and be the focal point between the vendor and individual agencies ensuring that the best value is obtained and that service requirements are met and maintained.

To manage the outsourcing activity, the Governor should appoint a small outsourcing team consisting of the following members:

Team Leader
CIO
Financial Executive
Data Center/ Network Executive
Application Development & Maintenance Executive

The above individuals are required full-time throughout the outsourcing process. Once contracted delivery begins, this team will not be required on an on-going basis. The management of the contract will be the responsibility of the IT agency. Each team member must be at an executive level, as he or she will represent his or her particular area of expertise and must be able to gather additional resources throughout the process to provide detail vendor requirements and proposal analysis. The team leader has the overall responsibility for the outsourcing project, and is the focal point for the vendors, agency directors and the Governor's office. The individual filling this position does not require a detailed technical background. Functional members have this responsibility. The CIO ensures IT strategies are properly specified and evaluated. Augmenting this team, the Yankee Group recommends the current State IT Team be continued to act as an advisory and review body for the team leader.

In addition to the above individuals, expertise in Human Resources and Legal issues will be required throughout the seven month process on a part-time basis.

4.3 Effectiveness Opportunities

Outsourcing is not, as previously mentioned, the strategy. It is the means to accomplish an IT transformation resulting in a lower cost structure. The transformation is required to put in place an effective IT infrastructure that can support agency business re-engineering requirements. Savings realized should be re-invested to support new IT requirements to facilitate completion of the vision outlined in the 1992 document. The Yankee Group supports the appointment of a CIO and recommends this function have the primary responsibility of developing an investment strategy to provide the highest return on the available resources generated by the implementation of improved infrastructure obtained through outsourcing.

4.4 Outsourcing Process

At this point, the State has a high level assessment of the IT functions. The information provided is complete enough to begin a process that will assume an eventual outsourcing contract. However, as pointed out by the State IT Team, much of the data was gathered very quickly and has not been validated. The purpose of the high-level assessments was to determine potential actions.

Our experience indicates that once an outsourcing process starts, it should be completed as soon as possible. This is primarily driven by concerns for employees, the ability to maintain service levels, and the need to retain critical skills. The scope for the outsourcing endeavor should be set firmly before any vendor bids are solicited.

The Yankee Group recommends a much more deliberate process from this point forward. The State should assume outsourcing will be the implementation direction.

AFSCME shared a quote for Franklin D. Roosevelt in its assessment that the Yankee Group endorses.

"But above all try something."

Our recommended approach for managing the outsourcing process is separated into logical steps. These steps, when followed, will result in the **right** decision for the **right** reasons.

Step 1: Define Process/Schedule

The Yankee Group proposes a rough time line for the next steps in this process. This must be understood and accepted by all affected parties.

4.4 Outsourcing Process (continued)

Step 2: Scoping

The Yankee Group has recommended an initial scope to be outsourced. The functions outlined must be defined in detail and agreed to.

Step 3: Vendor Identification

The outsourcing team must review a broad set of potential technology services vendors. After initial evaluations, the team needs to identify well-qualified bidders for further consideration.

Step 4: Financial Modeling

Once the scope is set, the anticipated expenditure levels must be calculated. This "base case" will be used to evaluate vendor responses.

Step 5: Decision Criteria / Weighting

Once the processes to be outsourced have been clearly defined, the decision criteria and weighting scheme to be utilized in determining the winning vendor must be developed.

Step 6: RFP Creation

To ensure that each vendor bids on the same criteria, a precise document must be produced and issued to selected vendors.

Step 7: Human Relations Issues

Employee briefings, alternatives available to employees, and regular status reports to the effected population must be developed and regularly presented.

Step 8: Bidders' Conferences

To ensure that all vendors are treated equally, conferences must be held during the process.

Step 9: Vendor Due Diligence Preparation

Questionnaires and criteria for evaluation of other account sites will need to be developed and used to determine the capability of vendors.

4.4 Outsourcing Process (continued)

Step 10: Reviewing/Scoring Vendor Responses

The outsourcing team must review and score all the responses from the vendors against the criteria developed earlier in the process.

Step 11: Contract Negotiations/Review

Once the winning vendor is determined, the contract must be prepared and negotiated with the vendor.

Step 12: Transition Planning

The transition to vendor delivery must be carefully planned. Areas such as Service Level Agreements, standard architectures, and technology strategies must be considered.

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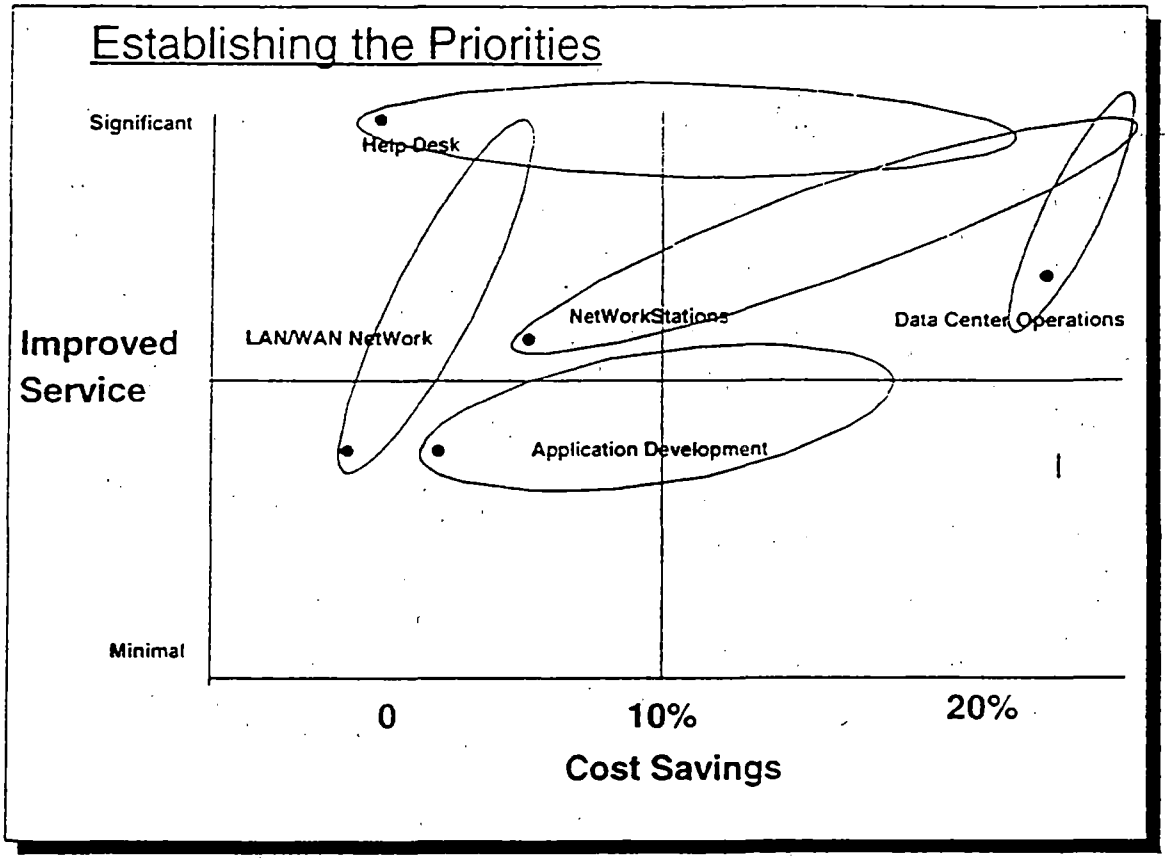
Section 5

Estimated Savings

the Yankee Group
December 29, 1995

5.1 Savings

The chart on page 41 of the ISSC assessment provides a basis for our discussion on potential savings. It is reproduced below:



Data Center Operations The savings indicated in this chart (more than 20%) are in line with what the Yankee Group expects in a consolidation of three data centers into one facility. The chart indicates an immediate savings potential driven by consolidation efficiencies and over time, service improvements. Reduced cost is more a function of estimated volume than any other factor. Therefore, as the outsourcing scope is defined, the effect on the volume specified in the outsourcing bid could result in a different impact on the cost structure than indicated.

5.1 Savings (continued)

Help Desk The chart indicates that savings from consolidation of help desks are in the future. The driving short-term reason for consolidation is increased effectiveness in serving end users. Once the consolidated help desk is in place, utilizing appropriate hardware and software investments, savings will come from reductions in current help desk staffing and from elimination of many hidden agency costs where these services are now performed by non-IT personnel.

Network Management The savings indicated on the chart are in the correct perspective over time, given the capabilities of ICN and it's current cost structure. However, there would be some minimal savings in the first year, as the multiple WAN/LAN's are converged under a common management. The major benefit in this area, is in improved service as complexities of multiple networks are removed.

End User Workstation Management Our analysis supports the savings indicated in the chart. Over time, cost savings becomes very substantial as redundancies and inefficient purchasing are eliminated, and as asset redeployment and common software platforms are implemented.

Application Development and Maintenance Most of the State employees in this category are deployed on maintenance and support of systems. Savings potential is minimal. The bulk of the cost is, in the short term, relatively fixed. The Yankee Group recommends that the portion of this function that is provided by state employees be outsourced and treated as an enterprise resource. The vendor will implement new processes and tools resulting in a more effective resource. This more effective staff allows for a modest cost reduction. Current contracted expenses will not be effected by the outsourcing of other processes.

5.1 Savings (continued)

Given the above assumptions, and using FY1996 expenditure levels as a base, Yankee Group analysis of the potential savings for outsourcing all processes, except the FY96 $12.7 million in current contracted application development and maintenance, is:

	FY96	FY97 (Est)	FY 1997 Outsourcing Estimate	
			Low	High
Enterprise Infrastructure	$ 26.5	$ 26.5	$ 18.8	$ 20.6
Workstation Management	17.7	18.6	16.9	17.3
Internal Application Development & Maintenance	11.4	12.0	11.3	11.7
Other	3.0	3.0	2.8	2.9
Total	$ 58.6	$ 60.1	$ 49.8	$ 52.5
Savings Range			$ 10.3	$ 7.6
Percent Savings Range			17%	13%

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Section 6

Proposed Timetable

the Yankee Group
December 29, 1995

6.1 Project Timetable

The State of Iowa is at a juncture as it moves forward in transforming its IT infrastructure. In 1992, the "Strategic Plan for Information Management" document was issued, but never implemented because there was no clear sponsor or executive champion. By having the IT environment assessed, the State is now at a point where the specifics about the current environment are known and a recommended course of action set. However, that State cannot accomplish the transformation itself, but must use the capabilities and expertise of a vendor through outsourcing. The Yankee Group has created, as a starting point, a high level plan showing some of the recommended steps that are required to implement an outsourcing transformation. It is included as Appendix A to this report.

Iowa State Government Technology Assessment Project

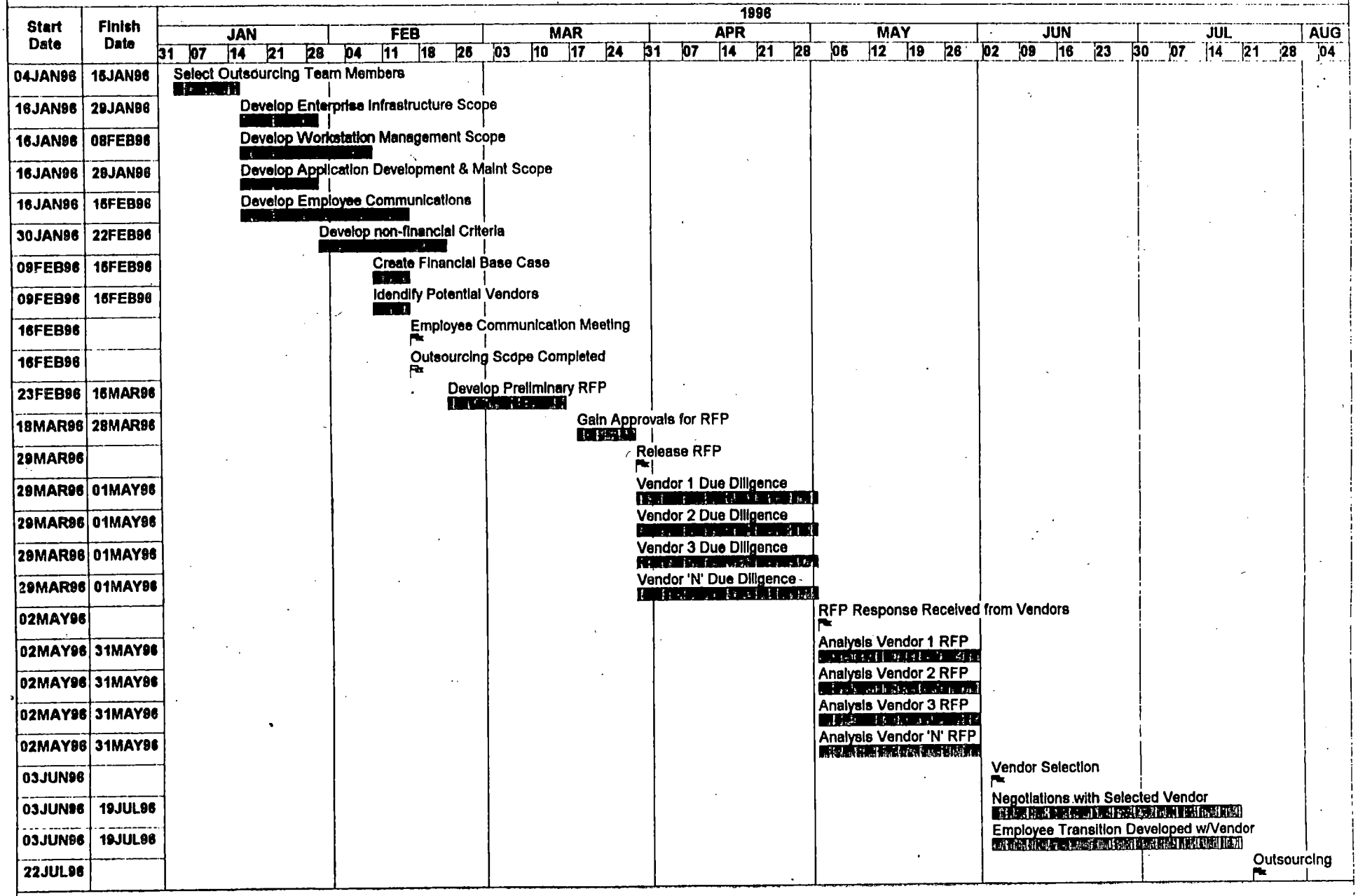
Appendix A

Proposed Timetable Display

the Yankee Group
December 29, 1995

State of Iowa

Yankee Group Proposed Outsourcing Project Plan



Start Date	Finish Date
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16JAN96	29JAN96
16JAN96	15FEB96
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09FEB96	15FEB96
09FEB96	15FEB96
16FEB96	
16FEB96	
23FEB96	15MAR96
18MAR96	28MAR96
29MAR96	
29MAR96	01MAY96
29MAR96	01MAY96
29MAR96	01MAY96
29MAR96	01MAY96
02MAY96	
02MAY96	31MAY96
02MAY96	31MAY96
02MAY96	31MAY96
02MAY96	31MAY96
03JUN96	
03JUN96	19JUL96
03JUN96	19JUL96
22JUL96	

Iowa State Government Technology Assessment Project

Appendix B

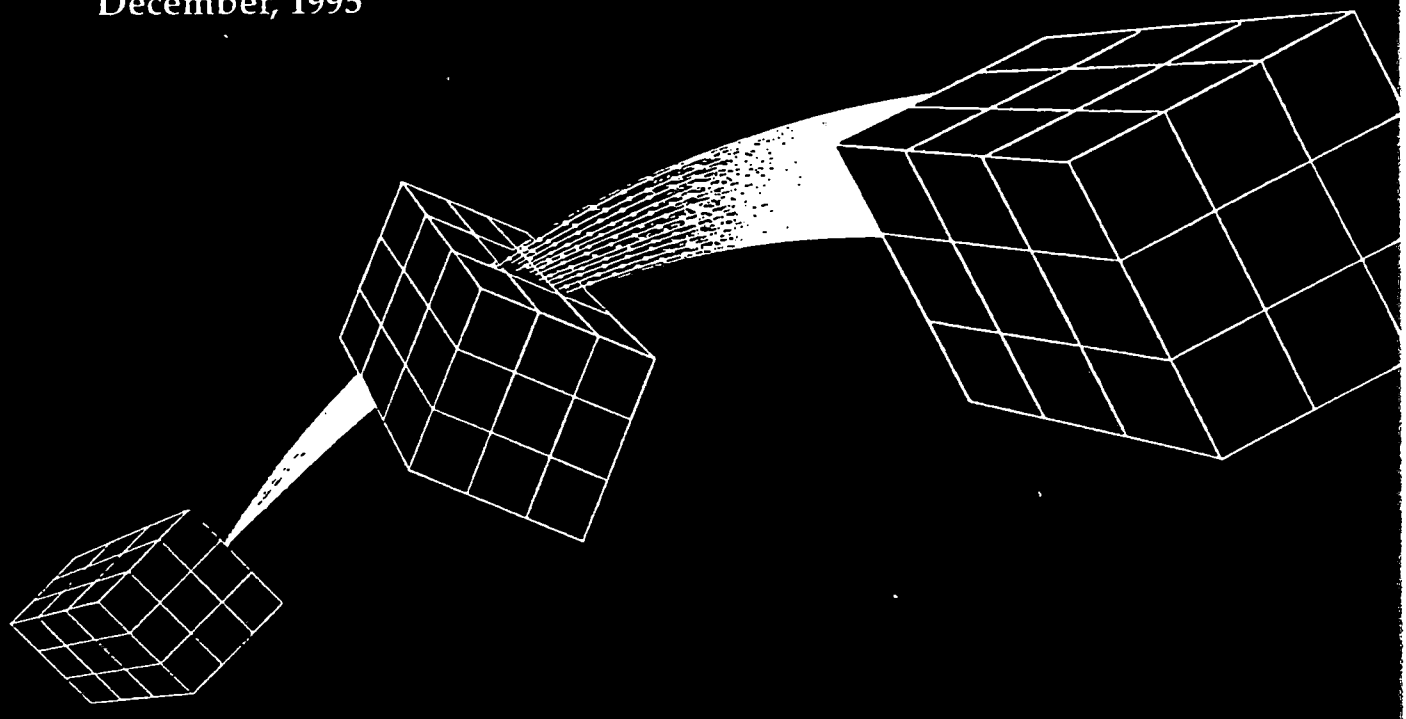
EDS Assessment

property of: the Yankee Group
December 29, 1995

A recommendation for reaching the realm of the possible . . .

INFORMATION TECHNOLOGY ASSESSMENT

December, 1995



An EDS
White Paper for the
State of Iowa

EDS

An Information Technology Assessment for Iowa

A Recommendation for Reaching the Realm of the Possible

I. Introduction

Electronic Data Systems Corporation (EDS) was asked to participate in a study to assess the State of Iowa's current information technology (IT) capabilities and its ability to support future IT demands. After an initial study of the State's IT documentation, the EDS study team spent a week in on-site interviews and conversations with Iowa's agency and department representatives.

We met with representatives from 14 State agencies to discuss the State's IT environment. In this report, we provide both a high-level assessment of the State's IT services and resources, and recommendations for enterprise-wide action.

Composition of EDS' Visiting Team. EDS' study team was comprised of ten senior EDS employees who have worked on and directed a wide range of IT programs for government and commercial industry customers.

The executives and professionals on our study team were chosen for their range of disciplines and depth of experience—coming from projects ranging from large system development, data center management, and business processes reengineering engagements for large, complex organizations.

The ten EDS team members participating in the Iowa assessment are listed below:

- **Barry Ingram**
  VP and Chief Technologist
  EDS Government Services Group
- **Mike Sweeney**
  Corporate Director
  EDS Systems and Methods
- **Don Drunsic**
  Airway Facility Operations Manager
  EDS Government Services
- **Larry Krutulis**
  Business Development Executive
  EDS State and Local Government
- **Mike Long**
  Business Consultant
  EDS Infrastructure New Business
- **Blaise Conwell**
  Market Analyst
  EDS State and Local Government
- **Chuck Hosea**
  VP Enterprise Services
  EDS State and Local Government
- **Charlie Broadbent**
  Chief Technology Architect
  EDS State and Local Government
- **Jean Roberts**
  Midwest Regional Manager
  EDS Human Performance Services
- **Michael Gardner**
  Capture Center Facilitator
  EDS Collaborative Services

II. Overview

Our findings and recommendations in this document are presented as follows:

I. Introduction

II. Overview

III. Current IT Environment

We provide a brief description of the current IT environment and list some barriers to improved IT performance.

IV. Improvement Opportunities

We present a brief description of the desired environment or "desired state" and list some basic and practical approaches to developing a new model for Iowa's IT environment.

V. The Value of an IT Partnership

We present examples and results of EDS' IT integration and process improvement experience.

VI. Summary and Recommendations

We make recommendations to address what we view as the "realm of the possible" for the State—an IT environment that will provide a significant leap forward in government services.

The EDS study team met with State executives and professionals at all levels—users, technicians, IT managers, and agency directors. Our objectives included the following:

- To understand the State's IT mission, vision, capabilities, and decision-making processes
- To assess the effectiveness of IT within the agencies and across the State's IT enterprise
- To provide a broad view of Iowa's future IT potential

To support our study, we employed "Capture Lab" technology—a LAN and LAN-software-based interview process, managed by a facilitator—to allow sharing and capture of ideas and thoughts that emerged from our discussions.

Our discussions were wide-ranging and included the following topics:

- Barriers to accomplishing Iowa's IT mission
- Core IT competencies within the Iowa State government
- Enablers needed to improve the overall IT process

Based on interviews and the capture lab sessions, we offer the following general findings:

- On an agency-by-agency basis, the IT teams are dedicated, capable, and very committed to supporting the agency missions. The dedication to duty and the focus on providing high quality service to the citizens of Iowa is impressive

- The agencies have a genuine desire to take advantage of technology in order to maximize service delivery. The staff recognize the necessity to share information effectively to achieve their objectives

- Iowa stands to benefit from the implementation of enterprise-wide standards. Standards are needed to achieve an interoperable environment—the ability to easily and rapidly move information across hardware platforms to users anywhere. This is a significant issue Iowa will need to resolve if the State is to remain a technological leader

- The common thread throughout most of the discussion was the need and the desire for enterprise-wide IT leadership. EDS believes that getting past the productivity boundaries for Iowa rests with resolving this issue

EDS presents the case throughout our report that Iowa is capable of achieving substantial productivity and service level improvements through the introduction of an outside IT change agent. Use of such a change agent—who would be charged with IT management on a statewide basis—would enable Iowa to fully capitalize on the IT expertise resident in each respective agency and would provide a much-needed enterprise-wide approach that would optimize the State's current and future investment in IT.

III. Current IT Environment

Iowa's current information technology environment has many strengths, including a highly dedicated, highly qualified workforce that recognizes the need for strategic planning. From our interviews, EDS understands that Iowa is looking ahead and is ready to raise its IT business performance to the next higher level.

Iowa has devoted much time and effort to the IT plan it wants to implement. However, the State finds itself constrained by numerous barriers when attempting to deploy an enterprise-level IT plan.

In this section, we discuss Iowa's current IT environment according to the following topics:

- Independent Structures
- Independent Planning
- Human Resources
- Equipment Investment
- Autonomous Agencies
- Technological Change
- New Technology
- Standards
- LANs and Office Automation
- Data Processing/Data Centers

Independent Structures. State agencies are structured, and their programs funded and administered, separately. In the area of human services, for example, currently no arrangements exist for quick, efficient interfacing among agencies should a citizen require services from multiple agencies. Each agency is left to make individual interfacing arrangements with other agencies as needs arise. Such activity often forces the citizen to travel to different locations to deal with a variety of individual State employees to receive a service.

Almost all agencies saw the independence of agencies as a problem that deterred interoperability. They felt that business processes needed to be evaluated to identify opportunities for the exploitation of technology. Many saw the forthcoming federal block grants as an opportunity for changing "business as usual," seizing the associated change momentum to conduct widespread business process evaluation within and across agencies and departments.

Independent Planning. Currently, almost all agencies and departments are making strategic IT infrastructure decisions based on individual needs, instead of aligning with a collaborative, statewide enterprise perspective. In some cases, agency IT decisions do not follow IT industry direction, creating the possibility of additional future barriers to integrating the State's information resources.

Human Resources. State employees are conscientious and take pride in their jobs and in their agencies. There is a healthy competitive environment derived from the feeling that Iowa State agencies do their jobs better than similar agencies in other states.

One key to understanding the use of Iowa's human resources is the fact that Iowa's current IT budget is substantially understated because numerous non-IT professionals are in fact performing traditional IT roles in addition to their core business responsibilities. The necessity for this extent of employee involvement in daily IT tasks

contributes to an unrealistic picture of how much is actually spent on IT.

Parties interviewed expressed concern that they are unable to leverage their IT resources. They felt that they were working harder than ever but were frustrated in the following areas:

- Having to do more with less
- Using their time to resolve IT infrastructure problems rather than business issues
- Experiencing difficulty in attracting and retaining qualified IT people
- Discovering an inability to keep up with technology because of time and knowledge constraints
- Wasting time and energy on fixing aging legacy systems and hardware
- Needing training on new technologies
- Being asked to make decisions without information or time to make accurate assessments

Equipment Investment. Iowa is willing to invest significantly in its citizens and their future. Recognized nationwide for its progressive initiatives, Iowa promotes a customer-based government and works diligently to provide a high level of citizen services. Having already invested heavily in its statewide Iowa Communications Network (ICN), the State is in the enviable position of having in place an infrastructure which could be the supporting foundation for a state-of-the-art IT environment.

However, in the absence of a clearly defined hardware and software architecture, it is difficult to implement an integrated and effective technical environment. Frequently, the impact of uncoordinated equipment-buying decisions is not felt until implementation—and in fact may not be felt until years later.

Autonomous Agencies. Over the years, State agencies have established acceptable, highly individualized IT environments that are characterized by the following:

- Vertical "stovepipe" IT environments that do not work well between agencies and hinder overall integration
- Larger agencies have more funding and resources to leverage
- Smaller agencies are critically dependent on one or two IT people

The State's agencies have created effective IT applications which satisfy individual agency needs, but which meet neither current nor future needs for collaborative data information exchange and reporting.

Technological Change. All agencies are committed to providing their respective users with maximum support in order to support their organizations' primary mission. The unfortunate result is that IT staff spend a disproportionate amount of time making user-required systems modifications (to legacy systems) necessary to support the agencies' core business.

This situation will worsen as the legacy systems age. Legacy systems maintenance will become more difficult, and the maintenance

costs will soon become substantially higher. The State will be forced to pay manufacturers' high prices to provide what amounts to custom support of those systems. Staying on current releases of COBOL and CICS is also a problem.

The year 2000 "century date conversion" is also a major concern. Although General Services has made some year 2000 plans, agencies were aware of the year-2000 problem to varying degrees. (The magnitude of the year 2000 conversion effort is discussed further on page 14.)

New Technology. Each agency is left to its own means when developing, buying, or implementing new technology. The danger here is that the agencies are making, and will continue to make, decisions that increase the barriers to enterprise-wide communication and collaboration. Products selected at the agency level could therefore need to be totally replaced at a very high cost. Many products currently in place do not readily interact with each other.

With desktop operating systems alone, agencies are using OS2, Mac, DOS, Windows, Windows NT, and Windows for Work-groups. There is similar disparity in the applications and software versions on these workstations.

While in many areas agencies are conforming to industry standards, there is no coordinated, implemented process for interactive development as evidenced by the following:

- No cross-agency leveraging of resources—no enterprise-wide perspective
- No existing statewide architecture group
  - Each agency makes decisions based on limited resources
  - Each agency makes strategic decisions considering only its own needs
  - Each agency solves the same problems differently
- Major strategic decisions sometimes made by one or two persons with very limited information

Standards. In order to communicate seamlessly and achieve greater interoperability, standards with regard to architectures, hardware, software, and protocols are essential. No enterprise-wide standards currently exist, leaving an environment marked by the following:

- Some larger agencies realize the need for standards
- Most agencies sacrifice standards in an effort to please end-users
- Each agency pursues its own strategic IT direction

Again, a coordinated, overarching, strategic plan for enterprise-wide standards is absolutely critical. Although each agency and user wants to work with the tools with which they are most familiar, supporting such a wide array of products is unmanageable.

LANs and Office Automation. Every agency has successfully introduced LANs and office automation tools into their organizations. Individuals throughout the

agencies—not just IT staff—have taken an active role incorporating these tools in order to improve processes. The unfortunate result has been disparate configurations that act as a barrier to interoperability. A mixture of integration and connectivity exists among and within the different agencies, as noted below:

- Most agencies are upgrading their computers to current 486 platforms
- Only one or two agencies have standards in terms of office automation software
- Some agencies have several different LANs which don't communicate within the agency
- Electronic transmission of mail or information is not used effectively

While many agencies have made a substantial investment in current hardware, they are not able to take full advantage of their investment. A key contributor to the problem is the lack of standards as addressed above. Once standards have been established, comprehensive application of those standards will enable Iowa to move to complete interoperability.

Data Processing/Data Centers. As a rule, users of the three State data centers are generally pleased with the service they receive. Users are confident that staff at all three data centers understand the business needs and work diligently to fulfill those needs. However, automated operations vary between agencies. For example, General Services is highly automated whereas Human Services and Transportation have varying levels of automation. Other significant findings include the following:

- No batch scheduling system in any data center
- No disaster recovery plan established for any data center
- Twenty-four hour operations vary
- There is no data center technology architect

There is tremendous redundancy associated with operating three data centers in Iowa. Substantial cost savings could be realized quickly if they were consolidated. Reluctance to consolidate is based on the concern that movement to a consolidated data center will result in a significant degradation of service levels.

EDS' experience suggests this not to be the case. There are many examples—some of which are summarized later in this report—where we have managed data center consolidation which resulted in significant cost savings, increased security, and improved user responsiveness. Users still maintain great influence on production schedules, access to applications, and remote print capabilities. The result is a remote user with a seamless link to the data center, just as if the data center were in the building.

Summary of Current Environment

The 1991 Iowa IT strategic plan clearly depicts a vision to remain a leader in the use of technology to serve its citizens. This vision was repeatedly articulated in our meetings at all levels. Overall, Iowa agencies have done an exceptionally good job supporting this vision.

The challenge Iowa faces is the same one faced by countless organizations both public and private. That challenge is to maximize interoperability statewide as technology changes at breakneck speed.

The issues raised in this section of our report will increasingly result in excessive financial or human resources, or both, being devoted to outmoded processes or barriers to interoperability. In the long term, those barriers must be removed in order for Iowa to achieve a position of IT leadership in government.

IV. Improvement Opportunities

Having participated in the on-site study to assess current IT capabilities, EDS found that Iowa possesses very strong IT capabilities overall and is eager to raise its IT infrastructure and service to the next higher level. Tremendous opportunity exists now for the State to explore the "realm of the possible."

There are several influences, brought on by marketplace changes occurring at a pace never encountered before, that necessitate a new approach to managing IT resources and the services those resources enable. These influences, as discussed below, center around the movement toward the citizen-as-consumer and the need for an enterprise-wide approach to providing government services.

Through the use of client/server technology, personal computing, kiosks, voice response systems, business globalization, the Internet, etc., a revolutionary shift is occurring which is redefining the customer as well as the services marketplace:

- The individual is the direct market, with the middleman functions of the traditional service providers eroding quickly because they no longer add value to the process. This applies to both internal customers within State agencies and to the citizenry at large
- Individuals are demanding more customized and accessible services
- Private sector businesses and government are interacting on a global basis because technology has removed many of the traditional boundaries
- There is a need for increased accessibility to services, decreased redundancy in delivery approaches, and the provision of service-related information based on the Any5 concept: any information, to anyone, at any time, in any form, to any place

Credible estimates predict a 1,000 times price/performance increase in compute power by the year 2000. The result of such improvements will be that individuals both at home and work will possess small computers on their desktops with as much power as current mainframes.

In the new "information age," the greatest differentiator among competing organizations in both the public and private sectors will be the ability to readily share information.

An enterprise-wide strategic IT plan will provide the platform for building a common understanding of Iowa's direction for achieving the "desired state" of the future. Such a plan will:

- Provide consistent, enterprise-wide IT architecture that will enable interoperability and ultimately lead to better, more cost-effective service
- Strengthen IT planning, development, and purchasing processes based on an enterprise-wide perspective, which will enable staff to concentrate on core functions rather than infrastructure support issues

- Improve management of the State's technical assets and leverage the substantial investment in those assets

An enterprise view of IT involves new concepts of customer service and operation. To effect the kind of culture change and technology change necessary, some major issues will need to be addressed.

On the following pages in the section "Exploring the Possibilities," we outline the major issues identified as a result of our interviews along with some recommendations to begin resolving these issues. The recommendations are presented according to the following topics:

1. Completely evaluate agency IT infrastructure
2. Establish a central IT organization
3. Develop an enterprise-wide data integration and communication plan
4. Consolidate data centers
5. Implement a legacy systems management plan
6. Develop an application development strategy
7. Implement a comprehensive network management plan
8. Upgrade LAN administration and support
9. Conduct centralized training and education

All these recommendations can be acted upon now. Several can immediately impact performance and set the stage for lasting process and infrastructure change while other items would require more in-depth analysis and longer term implementation.

Exploring the Possibilities

1. **Completely evaluate agency IT infrastructure**—Within the context of this report, the evaluation effort recommended revolves around the planning, development and training necessary to migrate all State IT structures to an enterprise-wide IT environment. This initiative is critical because the results will serve as the blueprint for all future IT decisions. It is this reengineering effort that will enable the State to fully integrate technology into its business processes.

   Clearly, decisions implemented in the absence of such an evaluation can have some positive impact on the enterprise, but only a complete review of all IT infrastructures will result in full interoperability, and enable Iowa to fully achieve its IT vision. As interoperability increases, it is certain that agencies will identify business processes made obsolete, or even unnecessary.

Actions to enable this change include:

- Employ the services of an external change agent to facilitate the implementation of technology plans
- Integrate current systems to provide a seamless "one-stop" approach to serving the citizen.

The real economies of scale will be derived from consolidating current business practices across agencies, thereby leveraging people and facilities across Iowa while at the same time simplifying interactions with citizens.

We must note that this process will require an investment. However, the payback should be—over time—improved responsiveness, improved quality, greater functionality with fewer resources, and improved competitiveness in the local, regional, and global marketplace. In other words, this investment will give the State the ability to meet the current and future demands upon the government enterprise.

2. **Establish a central IT organization**—Because of the isolation in which each agency operates, an IT leadership entity concerned with the entire State enterprise is needed. Creating this central IT leadership will remove the greatest inhibitor to the achievement of statewide interoperability and enable leveraging of resources, skills, and infrastructure.

   The establishment of a central IT organization will enable Iowa to implement and manage statewide IT guidelines and methodologies. This will ensure the foundation for sustained IT progress for Iowa into the next century.

Actions to enable this change include:

- Reorganize and centralize most data processing functions in order to leverage support and provide data to the entire enterprise
- Ensure that IT organization leaders can receive and analyze data on an enterprise-wide scale and have authority to control resources that support the agencies

- The IT organization should encompass at least the following areas:
  - Data processing
  - LANs/WANs and PCs
  - UNIX, mini computers, workstations
  - Network management
  - Field service and training
  - Application support

Centralization implies consolidation and leveraging. Reorganization at the enterprise level will not only facilitate making changes across the enterprise, it will allow leveraging of critical, scarce resources. The results will be that the smaller agencies will get better service and IT support, standards will be created because of the need to support multiple customers, and solutions to problems that were resolved in one agency can be replicated at other agencies.

3. **Develop an enterprise-wide data integration and communication plan**—A coordinated, overarching strategic plan for interactive communication is needed. This is a critical initiative if Iowa is to achieve complete statewide data sharing.

Actions to enable this change include:

- Create an enterprise architecture and technology policy that would:
  - Evaluate all current technology used and decide where to standardize across the enterprise
  - Decide what should be supported and what should not
- Implement electronic mail using new desktop tools and migrate away from OV Mail
- Establish connectivity and interoperability among agencies and statewide lans
- Set a common standard for office automation tools

This plan will facilitate the movement of data across agencies and the ability to communicate and collaborate. Several issues will need to be resolved, including establishing the nodes and connectivity with the proper equipment; standardizing the tools that people use; and defining what types of data people need.

4. **Consolidate data centers**—This is an area where substantial economies of scale can be achieved. Under the State's current data center configuration, there is tremendous redundancy in software licenses, service agreements, and human resources. There is also little standardization with regard to protocols, procedures, and configurations. In addition, no data center currently has a disaster recovery plan that has been tested.

While the depth of analysis provided by this study does not allow for detailed estimates, it is clear that substantial cost savings can be realized by consolidating these data centers into one. These savings could be used to help fund other strategic recommendations

in this report. The impact of data center consolidation includes the following:

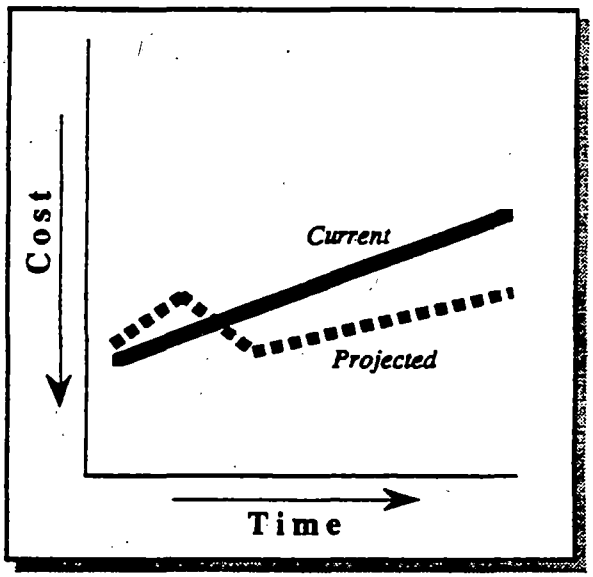
- Reduction of the State's administrative burden and savings from reductions in duplicate job functions, floor space, specialized facilities, hardware and software, and maintenance
- Control of proliferation of diverse technology
- Leverage in enforcing performance norms for the data center and the entire IT structure
- Increased flexibility through improved capacity management, data sharing between systems, technology migration, and staff availability
- Better analysis of data center costs and continuous cost/performance gains rather than "stair step" gains by taking advantage of a hardware-independent IT contractor's volume purchase agreements

The exhibit, "Consolidation Savings," shows the projected order of savings that could be realized by the State through data center consolidation. The value and importance of other, less tangible benefits, such as a comprehensive disaster recovery plan and improved data security measures, are also substantial.

Actions to enable this change include:

- Develop and implement a disaster recovery plan
- Define standards for the entire enterprise using General Services standards as a good base and implement these in the consolidated data center

Consolidation Savings

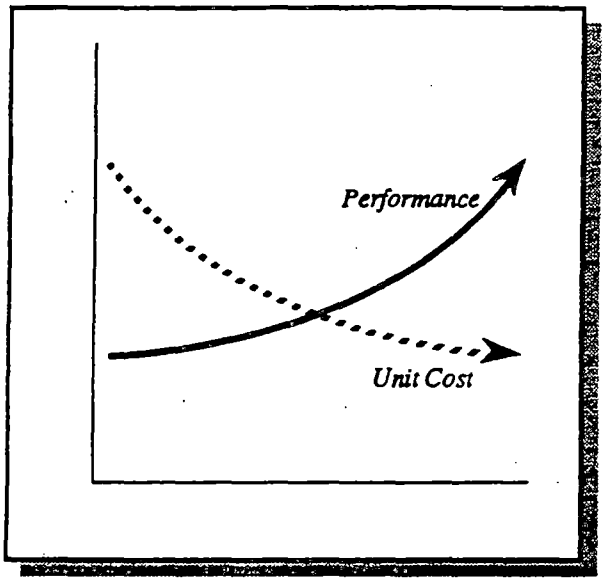


Consolidating facilities and reducing duplication can yield a lower basis of cost and continued savings over time.

- Create a migration plan to move processing to a single, robust data center

The myriad products currently used in the data centers would be evaluated and the best combination would be retained or installed. The exhibit, "Performance vs. Cost," shows the relationship between performance and cost following data center consolidation.

Performance vs. Cost



An IT management relationship can lead to predictable performance while reducing unit costs.

5. **Implement a legacy systems management plan**—Support of current legacy systems requires a disproportionately high level of scarce human resources. This problem is compounded by the reality that the human skill set required to maintain these systems is rapidly aging.

   In addition, the approaching year 2000 data conversion presents a monumental challenge for legacy systems. Our experience shows that for a typical large organization with many systems, 100% of the code must be analyzed, roughly 5% will need to be changed, and then 100% must be tested.

   This is an underestimated effort throughout the industry and the time required to make necessary modifications could be two to three years. The year 2000 problem is akin to replacement of a small part in the core of an engine. One must completely break down the engine to replace the part.

   Actions to enable this change include:

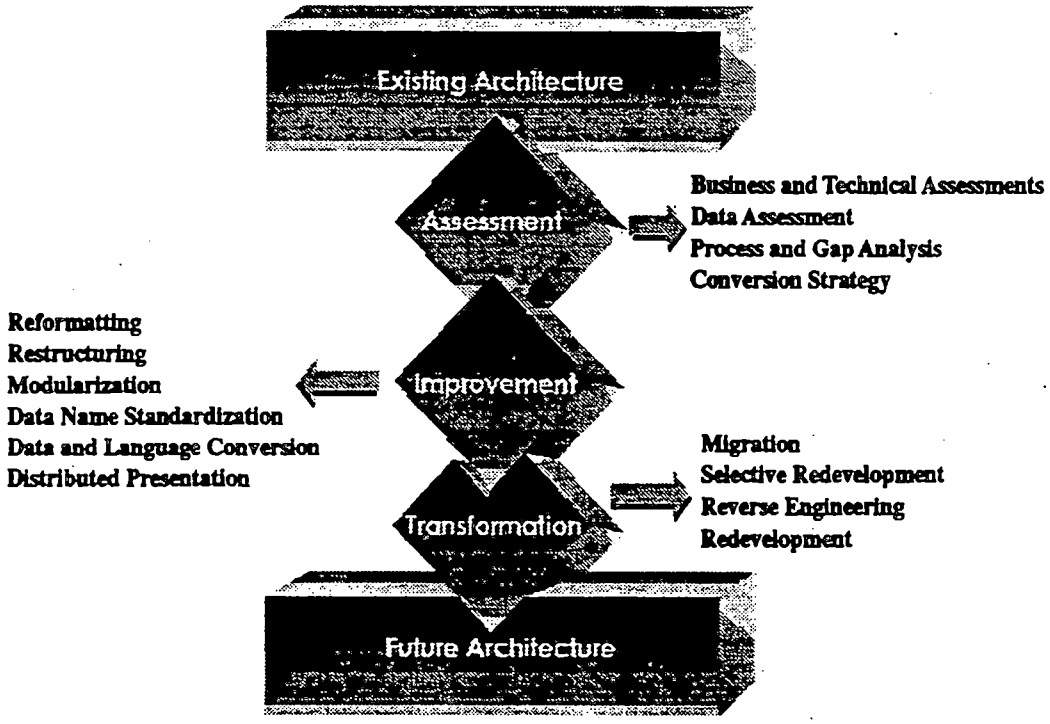
   - Inventory all compilers and software support systems and bring capability up to industry standards
   - Create a comprehensive solution for the year 2000 conversion
   - Create a configuration management plan
   - Target future development with industry standard tools
   - Reengineer systems for future support and maintenance ease of use through a proven methodology such as EDS' Software Performance Engineering for Legacy Systems (SPELS) methodology, whose capability is illustrated in the exhibit on the next page.

   A legacy systems management plan will, in the short term, improve inter-agency and intra-agency data sharing. In the long term, it will move the State toward more current and flexible technologies.

6. **Create an application development strategy**—The independent approach to application development taken by each agency results in substantial duplication of effort in order to capture and manage identical information.

   An application development strategy will enable the State to reduce application development costs, and enable future application development efforts to fully share existing sources of data.

Software Performance Engineering for Legacy Systems (SPELS)

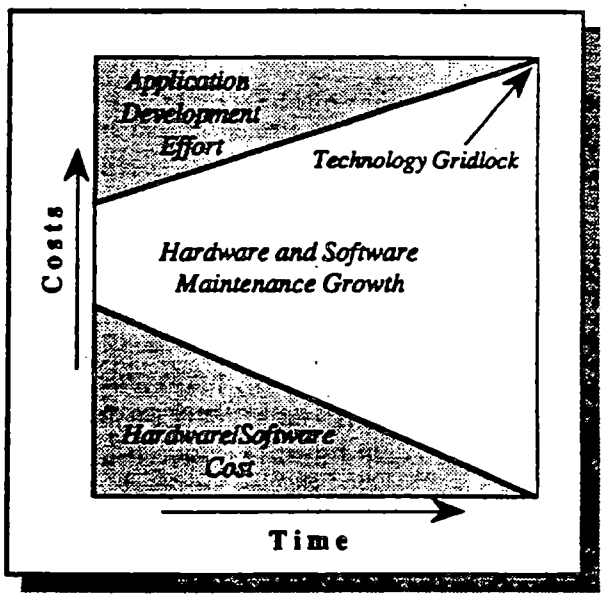


The establishment of an enterprise-wide data architecture will enable Iowa to reduce costs through the following actions:

- Elimination of redundant data management functions within the agencies
- Faster new system development and deployment
- Application of modern software development tools and the halt of inappropriate legacy system development to drive down maintenance costs

The exhibit,"Technology Gridlock," illustrates the reality that as the human and financial costs of maintaining legacy systems increases, they do so to the exclusion of new system development. At the point of technology gridlock, legacy system maintenance consumes virtually all available IT resources.

Technology Gridlock



Application of modern software development tools to maintain and eventually replace core systems can slow and ultimately reverse the rising costs of legacy

Actions to enable this change include:

- Develop an enterprise-wide data warehouse to provide users with optimum access to data
- Resolve issues involving distributed and centralized processing
- Ensure that new development leverages current legacy systems and provides user-friendly interface
- Take advantage of current desktop and mobile computing technology
- Ensure that new application development tools are supported across the enterprise

The application development strategy will maximize the legacy system investment and provide a bridge to developing new applications.

7. **Implement a comprehensive network management plan**—Iowa without question became a world leader with the implementation of the ICN. The implementation of an overall data network management plan will allow the State to take full advantage of communications technology.

Actions to enable this change include:

- Consolidation of all network support and monitoring into one help desk unit
- Complete migration to the ICN backbone while unloading redundant circuits
- Develop a network disaster recovery and continuity of operations plan for the enterprise
- Implement a configuration management plan for the enterprise
- Upgrade the network with routers and hubs to support LAN-based inter-connectivity

Implementation of this recommendation will maximize use of the ICN by ensuring standardized gateways and routers, by ensuring complete and orderly conversion to the ICN by all agencies, and by centralizing network support and help desk functions.

8. **Upgrade LAN administration and support**—LAN administration and support is for the Iowa government, as it is for most organizations, a nearly incalculable cost. This is because in addition to the designated administrator, who frequently has other primary responsibilities critical to the core business, there are numerous other individuals devoting valuable production hours toward the support of their LANs and workstations. Centralized LAN administration, monitoring, and technical support is recommended.

Actions to enable this change include:

- Set standards and service level agreements
- Upgrade the entire enterprise with standardized current technology and tools
- Implement and administer LAN-based e-mail capability

The primary problem is the distraction away from core business activities and the subsequent impact on the citizenry. Implementation of centralized LAN administration and support will enable agency employees to attend to their core responsibilities, plus ensure the ability for statewide data sharing.

9. **Conduct centralized education and training**—This is critical because attracting and retaining a highly skilled and motivated workforce is necessary for Iowa to remain a leader in public administration.

Actions to enable this change include:

- Develop centralized education and training plan
- Leverage the ICN network to provide Interactive Distance Learning (IDL) training, especially for remote users
- Implement a communication process that provides timely and pertinent information to employees such as enterprise-wide business direction information

Interoperability is predicated on common standards and methodologies. Only with proper education and training can these be rolled out and maintained on an ongoing basis.

Summary of Improvement Opportunities

While there were improvement opportunities that came to light as a result of the assessment process, the capability and performance of Iowa's IT staff are very good. On an agency-by-agency basis there are barriers to overcome, but the entire IT staff is dedicated, capable, and very committed to supporting the agency missions. If the barriers between agencies come down, Iowa will have tremendous opportunities to enhance the delivery of services.

The challenge to implementing these recommendations is one that all organizations face. Complete implementation requires nothing less than a culture change in the organizatio from top to bottom, with leadership from th top of the enterprise.

Basically, we believe the major challenge at hand is whether the State will be able to effect the necessary cultural and technical changes in a timely manner. Although Iowa has a strategic plan and a vision of the future, the State must effectively implement the changes quickly enough to leap to the forefront of—rather than fall behind—the technology curve.

V. The Value of an IT Partnership

Enterprises of all types are today experiencing increasing demand for information processing services while simultaneously contending with shrinking budgets. Fewer dollars are available to spend on the technical infrastructure. In this respect, the State of Iowa is no different from many large business enterprises. The challenge to industry and government alike is to increase the level and quality of services while facing budget constraints and rising costs.

Because Iowa has recognized the current issues, the State has some advantages in solving these problems. EDS believes that Iowa can make great strides forward in its statewide information technology systems by working toward the following objectives:

- Establish an enterprise approach to organizing and managing information resources
- Build an enterprise architecture for information technologies that provides effective access to information
- Strengthen and solidify the technology -planning, -development, and-purchasing processes
- Improve the organization and management of Iowa's technical assets to leverage the State's substantial investment in those assets while minimizing related costs

An experienced IT partner can assist the State in achieving these objectives and enable the State to focus its attention on its core competencies of managing government programs and policies and serving its citizens.

Proven Ability.
We offer in this section a brief look at our ability to perform the range of services required by this report. One prime example is our experience as the IT partner to General Motors, a partnership that began ten years ago.

As the world's largest corporation, GM possessed data assets and functions that were as diverse as they were vast. GM faced an information technology challenge of immense proportions.

Both GM and EDS recognized from the outset the absolute necessity for the two corporations to work as strategic partners in unifying and streamlining GM's information management. EDS was tasked with managing and enhancing an enormous and globally scattered information technology operation that spanned the spectrum of vendor platforms as well as every major category of application, standard, and protocol known.

Within two years, we had consolidated more than 20 data centers and 77 major applications systems into 8 major network and processing concentrations. Within those two years, we had designed, engineered, and built the world's largest private digital network—combining voice, data, and video.

Although GM is the largest enterprise that has benefited from our systems management experience, it is not the only one by far. For example, last year we began one of the largest government agency-private partnerships ever with the United Kingdom Tax Authority. EDS manages all of the UK Tax Authority's data processing, administers the

staff and IT infrastructure, and performs strategic systems architecture design, development, and implementation. As part of this enterprise-wide partnership, EDS manages 13 data centers and has transitioned 1,900 Tax Authority employees to EDS.

Over our 32-year history, we have assumed full IT responsibility for hundreds of other customers as well. The exhibit, "Related EDS Experience," gives additional examples of our IT partnerships. IT management is one of our company's core competencies.

As we demonstrated for the UK Tax Authority, whenever a business partnership results in customer employee transition, we are committed to achieving a smooth personnel transition that ensures customer and employee satisfaction. We apply a well-developed, organized transition process supported by a team of experienced human resource professionals.

We offer a history of successfully transitioning employees from a wide range of public and private sector customers. We have completed over 200 transitions since 1978, ranging in size from 1 employee to more than 7,000—indeed, more than 35% of EDS' employees came to the company through transitions.

Should Iowa decide to partner with an IT change agent, the State may want to organize the control of its information technology operation according to the following steps:

- An enterprise-level director to manage the IT change agent
- Functional-level managers focusing on key business functions and core competencies who would report to the enterprise-level director
- Agency-level managers focusing on each agency's unique applications who would also report to the enterprise-level director
- Enterprise data managers assigned to each agency who would ensure consistent use and application of the enterprise architecture and would report to the enterprise level director

Such an arrangement would give the State great leverage in enforcing enterprise-wide standards while still giving each agency the necessary flexibility for addressing its own unique needs. In addition, such an organization would give the State positive control over its change agent partner at all levels of the organization.

When this type of organization supplies the framework—close interface and control between the State and its representatives—the agencies, their representatives, and the change agent partner cooperate at every level. The State remains the planner and policy maker, the agencies supply the unique needs, and the change agent partner ensures the implementation.

EDS

Related EDS Experience

Customer	Customer Goal	Results
Arrow Electronics *Customer Comment:* **"We will always view EDS as having been instrumental to our growth and development."** Arrow CEO Stephen Kaufman	Enable IT infrastructure to keep pace with explosive company growth	• Enterprise-wide, state-of-the-industry system that linked 42 distribution centers, 50 sales outlets, and nine regional programming centers • Flawless transition to new technology that was almost transparent to the end users • After meeting customer goals, supported the customer for an equally seamless transition to take system back in-house
Jackson National Life *Customer Comment:* **"Each step of the way, our systems have stayed ahead of our growth, providing capabilities that help us deliver outstanding customer service."** JNL Vice President Terry Johns	Enable company to focus on core services to provide better service and manage rapid growth	• Dramatically lowered JNL's fixed costs to 9% below industry average • By focusing on its core business, JNL achieved dramatic growth while keeping IT costs down • Process enhancements provided by EDS substantially reduced customer service response time
River Forest Bancorp *Customer Comment:* **"We're industry experts, not information processing experts...EDS allows us to focus our energies completely on growing our business and keeping costs down."** River Forest Bancorp Vice President David Johnson	Maintain focus on business growth and controlling costs	• Management of all IT requirements since 1983 through a partnership that has maximized River Forest's IT investment • Meteoric growth in customer deposits and stock price • Extremely flexible outsourcing arrangement enabling River Forest to use EDS services to meet ongoing specific business demands
Riser Foods *Customer Comment:* **"Helping us plan for the future is one of EDS' greatest assets."** Riser Foods President Charles Rini	Respond effectively to changing business environment to improve customer service	• Analyzed Riser's business needs and initiated a three-phase "strategic systems project" that integrated or replaced disparate systems • Consolidated three data centers into one resulting in $528,000 hardware savings and $70,000 annual maintenance savings • Reduced Riser's IT expenses by 20% annually

To achieve the maximum potential, a change agent contract should require the IT partner to supply two specific capabilities:

- Outstanding service in every area
- A willingness to be the State's strategic partner in order to implement a shared vision with the ultimate goal of increased benefits to the people of Iowa

We recognize that simply operating the State's hardware and software more efficiently or cheaply does not address the full range of the State's needs. What is needed is a contracted, change agent partner who has demonstrated an ability to manage all aspects of information technology across the board.

Such an arrangement benefits the State in several ways:

- Greater leverage to set expected performance levels
- A reduction of the administrative burden
- Ready access to the expertise of a change agent partner whose core business is information technology
- A reduced focus on technological details, returning the State's focus to its core competencies
- Greater purchasing power through change agent partner's volume purchasing agreements

An enterprise-wide arrangement with a change agent partner minimizes the risk of disruption and provides early access to the benefits of improved operating economies. Frequently, EDS also teams with our customers' existing IT providers to maximize and strengthen those existing arrangements, sometimes through the master purchasing or national teaming agreements that we maintain with major IT vendors. For example, EDS is one of the largest purchasers and resellers of IBM products in the world. We can bring this teaming power to bear for our customers.

A proactive partner and enabler of change, EDS strives to build a solid relationship with each of our IT partners. We structure creative teaming agreements with other vendors when such agreements can promote and enhance our customers' success. And, we embrace the skills and experience of transitioned employees. These practices are the foundation of a successful IT partnership.

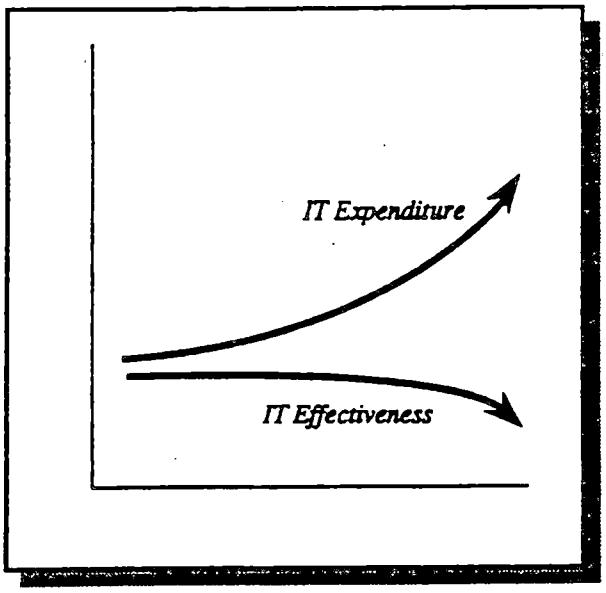
Very few organizations have successfully accomplished this change on their own. As we discuss in the next section, many organizations have utilized a change agent who is unencumbered by the past, bringing a fresh and objective perspective to illuminate the opportunities.

VI. Summary and Recommendation

It is our belief that Iowa needs to employ the services of an external change agent to support the development of an IT environment which transcends current capabilities. The environment we envision could have a positive impact on every Iowan through improved services to citizens, better access to government, and improved productivity for agencies and employees.

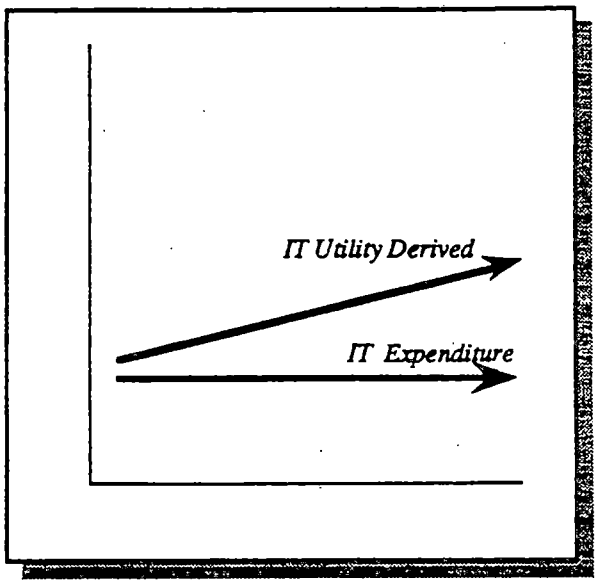
These improvements can be achieved because the envisioned environment will help to close the ever-widening cost and effectiveness gap. The exhibit, "Current IT State," shows annual IT expenditures rising while the utility derived from these expenditures declines.

Current IT State



The exhibit, "Desired IT State," shows how the net financial impact of IT improvements to the state can be cost neutral, while the IT utility derived increases markedly. We foresee a significant leap forward in capabilities

Desired IT State



for the State—Iowa's next step in information technology is indeed within the "realm of the possible."

The change agent partner employed by the State would undertake the following overall responsibilities:

- Provide IT leadership and direction
- With the Iowa staff, develop and implement an enterprise-wide, specific IT vision for the next 10 years
- With the Iowa staff, develop and implement an enterprise-wide, world-class IT environment

This effort will require the development and implementation of new processes to make the government enterprise more effective for future years.

We believe this approach will also substantially expedite the implementation of the following desired improvements:

- Enterprise approach to IT
- Improved interoperability
- Data center consolidation
- Year 2000 software analysis, fix, and testing
- Disaster preparedness
- Legacy system transformation
- Employee training and employee development
- Standards implementation
- Improved distribution of services

While the list is not comprehensive, the areas listed above offer tremendous opportunities for beginning the IT transformation process. We believe that partnering with a change agent is a sound investment in the future. It can be a vehicle to enable the State to take advantages of changes that are occurring—and accelerating—at a pace never before encountered.

To deliver value to the State, Iowa and the change agent would work together to form a collaborative relationship—clearly defining value and measuring it according to the State's terms. A change agent would provide services far beyond operating the State's IT services.

The change agent should become a full-service consultant who provides valuable advice regarding the State's business processes, recommends better business performance approaches while making maximum use of technology, and assists the State in implementing needed change.

A change agent's successful performance will have a positive impact across the State's entire budget, not just the IT portion—because information is critical to all State functions. Technology, when wisely applied, transforms data into information, and information into the knowledge the State needs for appropriate decision-making.

To work, a change agent-State relationship must be a collaborative one. Iowa should view the change agent as a business partner who assists in achieving the State's strategic goals. As a partner, the change agent helps the State evaluate and potentially reengineer its business processes. Enhanced IT services can generate new sources of revenue, help control or cut costs, deliver improved service to citizens, and ensure the State's attractiveness to new business investment.

Iowa can realize the following rewards from an arrangement with a change agent specializing in IT services and in improving business performance levels:

- Primary focus on its core mission—serving Iowa citizens
- Access to IT management experience and expertise
- Enhanced network and telecommunications management
- Use of best available technology
- Higher service levels and better use of resources due to an enterprise-wide plan

- Improved responsiveness of all IT functions
- Better-trained people
- Comprehensive backup and disaster recovery plan
- A single point of accountability for IT management
- IT cost stabilization and savings

Our vision is for the State and the change agent to enter a true partnership arrangement—an environment in which both the State and the change agent share in the rewards and risks of the enterprise. We believe that Iowa possesses the human resources and core IT competencies to form an effective partnership with the appropriate change agent.

In conclusion, we understand that it will take tremendous courage for the State to engage in the process of transformation to enable it to reach the "realm of the possible." If the State continues to invest in the current IT environment, it will experience a progressive degradation of overall performance and effectiveness of those invested IT dollars.

Fortunately, Iowa has already taken the first steps toward change. Our assessment indicates that Iowa is poised to continue—to complete this important process now, before events force it to later. We therefore recommend that Iowa embrace the future, deepen its resolve to seize today's opportunity, and expedite the process of change.

Iowa State Government Technology Assessment Project

Appendix C

ISSC Assessment

the Yankee Group
December 29, 1995

An Information Technology Assessment

Prepared for

the Yankee Group

at the request of

The State of Iowa
Department of Management

December 1, 1995

I. Introduction

Integrated Systems Solution Corporation (ISSC), a wholly owned subsidiary of IBM, is pleased to submit the following assessment of Information Technology operations at the State of Iowa.

We want to thank all the employees that prepared the initial package of materials, and were so helpful to us as we conducted our reviews. Their efforts provided us valuable insight into how information technology is currently managed in the State. Our recommendations are a combination of our experience and their input. For their assistance, we are grateful.

Since the level of implementation often varied widely between departments, we attempted to indicate these ranges in each recommendation. On occasion, we used department specific examples. These examples were not intended to be exclusive, nor were they intended to label specific departments as role models. They were simply used to clarify our recommendations.

A. Mission

ISSC was invited by the Department of Management to conduct an assessment of information technology in the executive branch. This consisted of visits to three major data centers, meetings with 12 departments, and written assessments from 27 departments. Our mission included the following:

1. Perform a comprehensive review of the costs, applications, programming, systems, utilization, operations, hardware assets, software assets, administration and activities associated with the provision of I/T services to and by the Executive branch departments of Iowa State government.

2. Assess the efficiency and effectiveness of existing I/T services and the State's ability to adequately respond to I/T service requests as demand for technology increases in the future.

3. Identify potential areas of I/T service improvement or cost savings.
   a. Short term opportunities (current operations)
   b. Long term opportunities (future operations)

4. Recommend actions necessary to more cost effectively provide or improve I/T services.

5. Prepare an "Assessment Report" which responds to #1, #2, #3 and #4 above, and submit it, to the Yankee Group by 12/1/95.

To accomplish these objectives, ISSC reviewed department input, provided through a written questionnaire, and conducted over 120 interviews during the week of November 13. We also conducted site visits to selected locations in Des Moines and Ames.

B. Structure of Report

ISSC has structured our recommendations in a manner that we hope will be beneficial. They are formatted into a general findings section and five functional areas. The functional areas include:

- Data Center,
- Help Desk,
- Network (LAN/WAN) Management,
- NetWorkStation Management (managing the end user environment), and
- Application Development and Maintenance.

We then assessed which activities, if implemented, offer the greatest potential for return, whether implemented by ISSC, done internally, or a combination of both. The savings estimates are based upon our understanding of your current expenditures, and our experiences with other customers with similar environments.

Our assessments on the potential for service improvement are subjective, but like our savings estimates, are based upon past experience. Similar levels of improvement can be achieved by uniformly implementing our recommendations across the enterprise. The recommendations specified in Section II are a subset of the activities ISSC routinely performs for our clients -- ***to improve service delivery and reduce costs.***

C. Underlying Principles

There are three major principles that ISSC anticipates will remain constant over the strategic period:

1. Information technology will remain critical to the delivery of government services in Iowa.

Countless examples exist in every department; the State demands a stable, technology infrastructure. Government services can not be effectively delivered without sophisticated information technology systems and state-of-the-art support infrastructures.

2. The use of information technology will continue to grow at very rapid rates for the foreseeable future.

Despite significant resource constraints, information technology demands in Iowa are increasing at very rapid rates. The Fisher Report indicated information technology expenditures, for comparable departments, were approximately $35M in the early 90's. The I/T budget information provided to us by the departments indicate an annual expenditure for FY'95 in excess of $70M.

The increased investments reflect the growing importance of information technology as government is reengineered. Information technology offers significant potential for leverage as departments continue to attempt to do more with less.

3. The distribution of computing power to increasingly sophisticated users will continue.

With approximately 10,000 personal computers installed, the State has made sizable hardware and software investments in distributed systems (PC's, LAN's, etc.). This trend is similar to trends we see with other customers as users demand greater access to information.

Often, this growth is misinterpreted to be a reduced dependence upon large central systems. Our experiences indicate this growth is incremental. Managing massive amounts of data will still require large central servers, albeit sometimes in a different role.

D. Enterprise-wide or decentralized delivery model -- striking the proper balance

This report includes a number of recommendations that require an understanding of our overall approach.

ISSC was requested to assess the State's information technology services and identify potential areas for cost savings and service improvements. It quickly became evident to us, across each function, that taking an enterprise-wide approach offered the most significant opportunity to improve service and provide the greatest near and long term savings. This is obvious in areas such as data center, where physical and logical consolidation should be considered, but equally important in Network, NetWorkStation Management and Help Desk.

There are no technological inhibitors to consolidating any of the assessed functions at an enterprise-wide level, but there certainly may be political, organizational, and historical inhibitors. We are not qualified to address these inhibitors from those perspectives, so we have elected to stay within the boundaries of our mission and expertise.

Whenever consolidation or enterprise-wide view was mentioned in our discussions, the departments were quick to point out "why it has not worked in the past." Loss of control in establishing priorities and allocating resources was the predominate reason cited. Consolidation without structural changes probably ***is*** doomed to failure. Structural changes would include changes in the I/T delivery organization, appropriation process, personnel practices, and procurement processes. They can be accomplished internally or through an "external agent of change", but in either case, must accompany consolidation.

Properly managed, by implementing best-of-breed processes, an enterprise-wide approach works and significant savings can result. Improperly managed, it can result in diminished service levels and higher costs.

In a consolidated environment, resource allocation and the establishment of priorities must appear transparent to the customer requesting the service. It is simply not satisfactory to tell the department user that resources are not available, they are allocated to other projects, or the appropriation was not approved.

It is somewhat analogous to procuring electric power from a utility. A utility customer has no interest in the power generation capacity or the limitations of the utility. They simply want power on-demand, on their terms.

The ICN is the only major State of Iowa I/T facility that currently serves all branches of Iowa government. It has virtually unlimited capacity and offers services at or below the cost a department would be able to independently achieve. In that sense, it operates as a utility. To a degree, computing services in the State have been offered in the same way. However, resource, funding, and structural constraints have limited the State's ability to react -- no matter how hard the individuals work, the structural limits remain.

Departments often demanded, and were willing to pay for, more resources however, budget, capacity, resource or other process constraints existed. This caused users to look elsewhere for service delivery options.

As a rule, enterprise-wide functions should be managed from an enterprise-wide perspective and business function decisions should remain as close to the functional management as possible. Equally important, the enterprise-wide provider must have ready access to the resources necessary to provide service levels and performance equal to, or better than, what is achievable by the best individual department or user. Taking an enterprise-wide view should not mean diminished service or loss of control, but rather the "freeing- up" of day-to-day operational responsibilities, allowing users to concentrate on their core business concerns. It is only through excellent, consistent and dependable performance that departments and users will embrace consolidated functions.

In numerous portions of our report, we recommend consolidations and adopting an "enterprise-wide" view of service delivery. The real questions are "how much?" and "how soon?". Once those questions are agreed upon, the next question is "how to consolidate?", which can either be through insourcing with structural changes, outsourcing or some combination.

ISSC recommends beginning with data center operations, network management, and help desk; then NetWorkStation Management, and application development and maintenance. The decision between outsourcing and insourcing simply becomes which provider of service has the best chance of success, at the lowest risk and most cost effectively.

ISSC believes the internal structural barriers are so great that looking to an outside service provider makes sense. Outside organizations can do things differently, and with the same people, improve results, deliver services more cost effectively, and increase the probability of successful implementation.

Sometimes the perspective of an outsider is exactly what an organization needs to achieve major improvements. "User Control" can be increased, by partnering with someone whose core competency is information technology. Large asset purchases are avoided, virtually unlimited access to skills and assets is provided, when and where needed.

The control of how much resource is used and how it is applied rests in the hands of the user, not a central organization that is not intimately knowledgeable about why the resource is needed.

Our findings confirmed, that in many cases, users are very satisfied with the services provided by their I/T staffs, but are often not satisfied with "how much and how soon" those services are provided.

E. Summary

In the following report, ISSC provides over forty recommendations for implementation, most from an enterprise-wide perspective. It is only through an enterprise-wide approach that maximum savings can be achieved and the greatest improvements to service can be realized for all departments.

These recommendations mirror actions that ISSC has successfully taken with numerous customers to consistently improve service delivery and reduce costs. We hope that the State will find them beneficial.

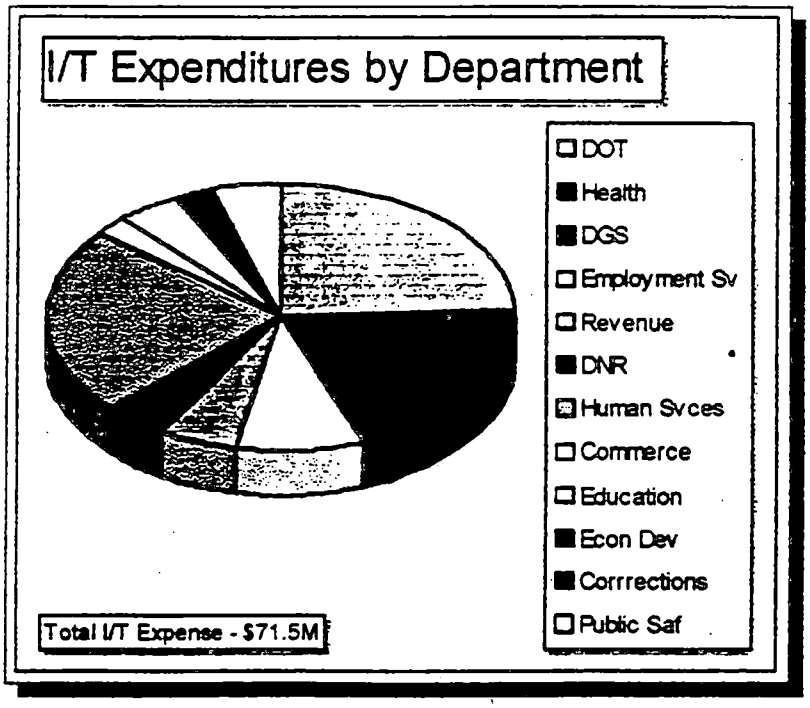
II. Observations and Recommendations

ISSC interviewed over 120 State employees, from twelve departments, and reviewed over 5,000 pages of detailed department I/T data. The following observations are those items of information we believed were directly relevant to our recommendations.

A. General Observations

1. The State of Iowa Executive Branch departments reviewed spend approximately $71M on Information Technology annually.

From the data provided in the written packages and confirmed in our interviews, Iowa's Executive Branch departments spent over $70M on Information Technology in FY 1995. This includes hardware, software, support personnel, and outside services, but does not include facilities and utilities costs.

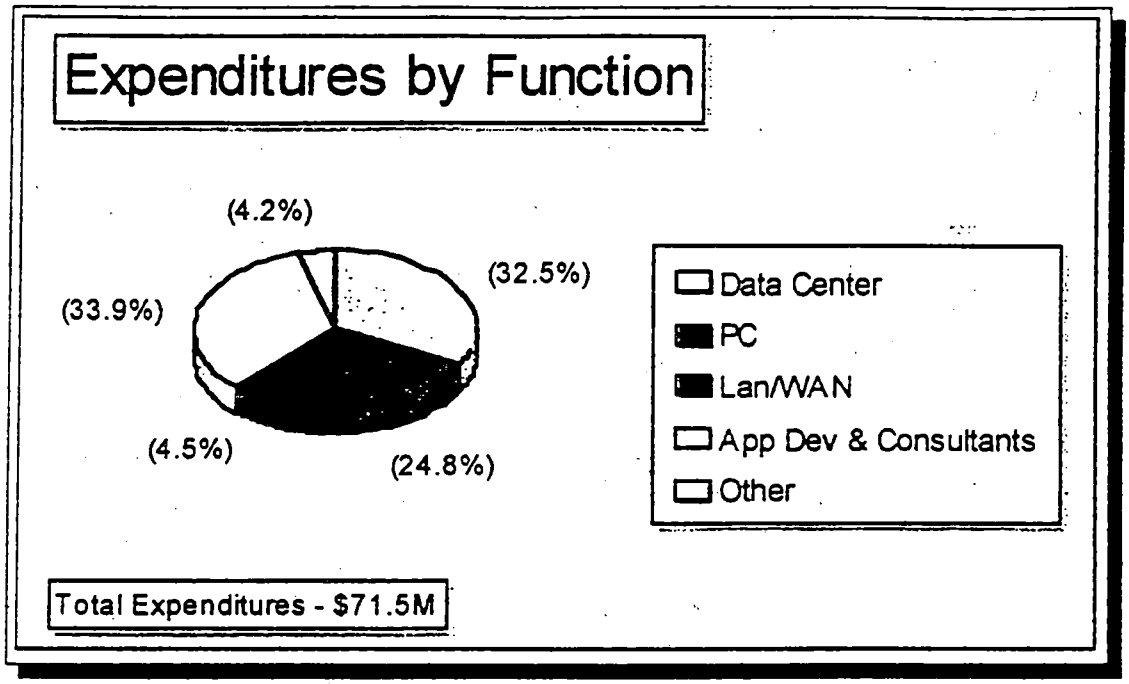


Over 75% of this total is from the four largest departments- DOT, Human Services, General Services and Employment Services. ISSC did not interview all departments nor did we include spending for departments that we were not able to adequately verify.

Despite the obvious growth since the Fisher Commission findings were published, many resource constraints still exist. Constraints on computer resources, both skills and technology have delayed implementations, and indicate that the demand for computer resources continues to significantly exceed supply.

2. Personal Computer (PC) spending represents 24% of total information technology expenditures.

The PC revolution has hit Iowa. Approximately 10,000 PC's are installed with aggressive plans to continue roll-outs in almost every department.



Given the rapid growth, expenditures on PC systems will shortly match those spent in the data centers. This is not a surprising phenomenon, but does indicate the importance of establishing an effective management system for distributed computing.

The 24% includes all hardware, software and "visible" support expenses. Approximately 132 full time equivalents support the PC environment and in most departments, this does not include the cost of the "informal" support networks outside the I/T budget.

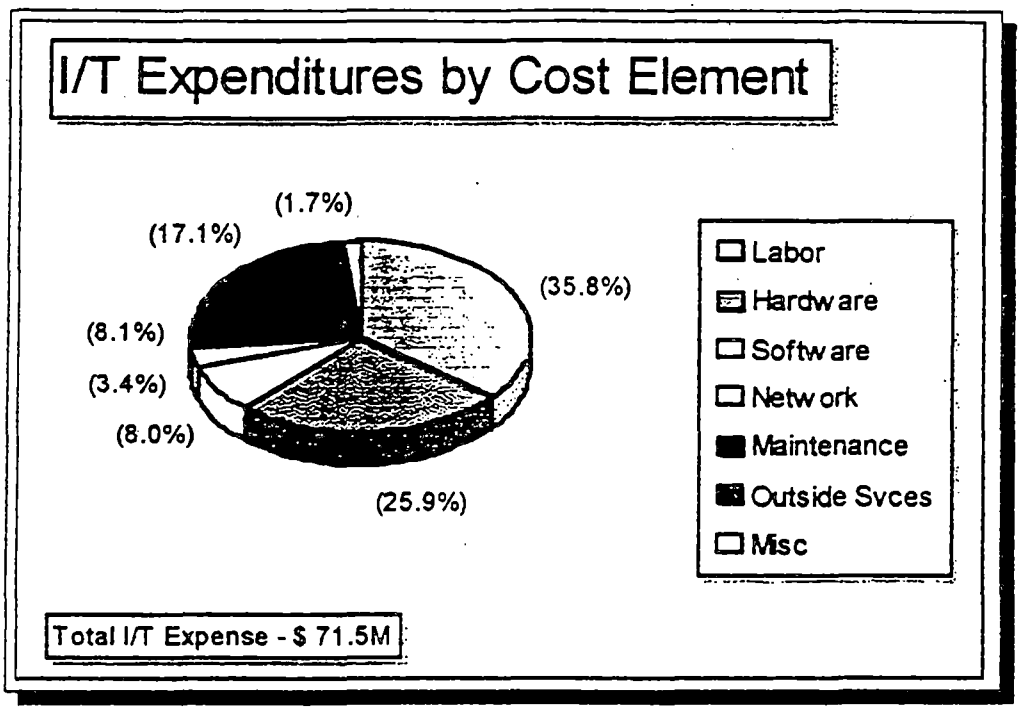
A recent Nolan Norton study emphasized that user needs are driving the levels of peer support more than they are driving the levels of I/T support. Business users unable to get I/T support from a central group will "do what is necessary" to operate in their environment. They rely on their peers to provide services traditionally provided by I/T organizations. This "hidden" cost is due to the productivity impact on otherwise productive employees, now assigned to I/T related positions.

Unfortunately, this method of support is the most costly to the organization.

3. Labor costs are approximately 36% of total I/T expenditures.

This percentage is typical of what we have seen in other states. It helped us calibrate our data and confirmed that the total expenditure assessment is accurate.

The average I/T salary, with benefits included, is slightly over $46,000.

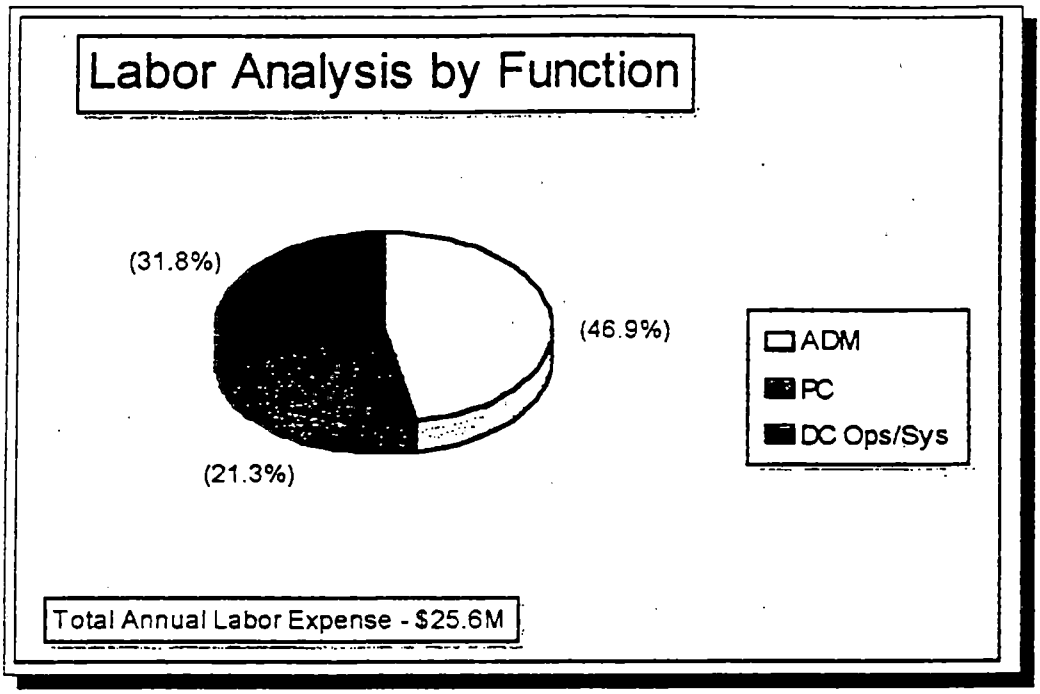


Spending on outside services (e.g., consultants and contract programming) totals just over $11,000,000, and illustrates the extent to which additional skills are needed for special projects or peak workload demands.

Hardware and software expenses include both PC and data center hardware. Maintenance is predominantly for the data centers, as most PC's are still under warranty. Most departments do not procure PC maintenance when warranties expire.

4. Application Development expenses are the largest, single labor cost element.

The State currently spends over $11,000,000 on internal application development and maintenance. Understanding, managing and maximizing the return on the application development and maintenance resource requires sophisticated approaches that focus on "results" and not simply on the effort expended.



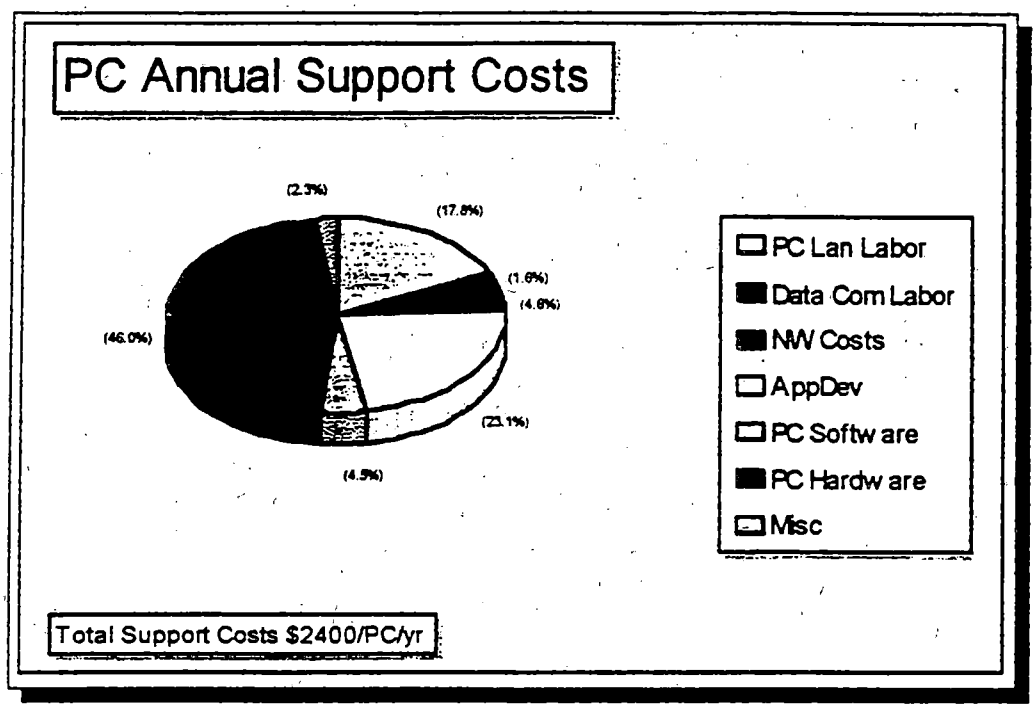
Very few of the departments we interviewed formally measure the productivity of their application development staffs. This limits their ability to award top performers and challenge poorer performers.

Not included in this chart are the $11M of external expenditures for consultants in 1995. These expenditures illustrate Iowa's demand for information technology professionals exceeds existing resources by a significant margin.

The personal computer portion of the labor pool may be understated. Limits on I/T budgets cause informal user networks to grow. The true support costs of PC's are often 3 to 4 times the understood costs.

5. "Visible" PC related costs are $2,400 per workstation per year.

The State is spending approximately $2,400 per workstation per year. Industry averages for "visible" spending are in the $2,000 -- $6,700 range per workstation per year. There are two major reasons for Iowa's "lower than industry" cost. First, many of the current PC users are just beginning to work with "mission critical" applications or are using their networked PC's primarily for terminal emulation. Furthermore, most central I/T budgets have been constrained, diverting a higher portion of the end user support to peer groups. This expense is then "hidden" from budget analysis.

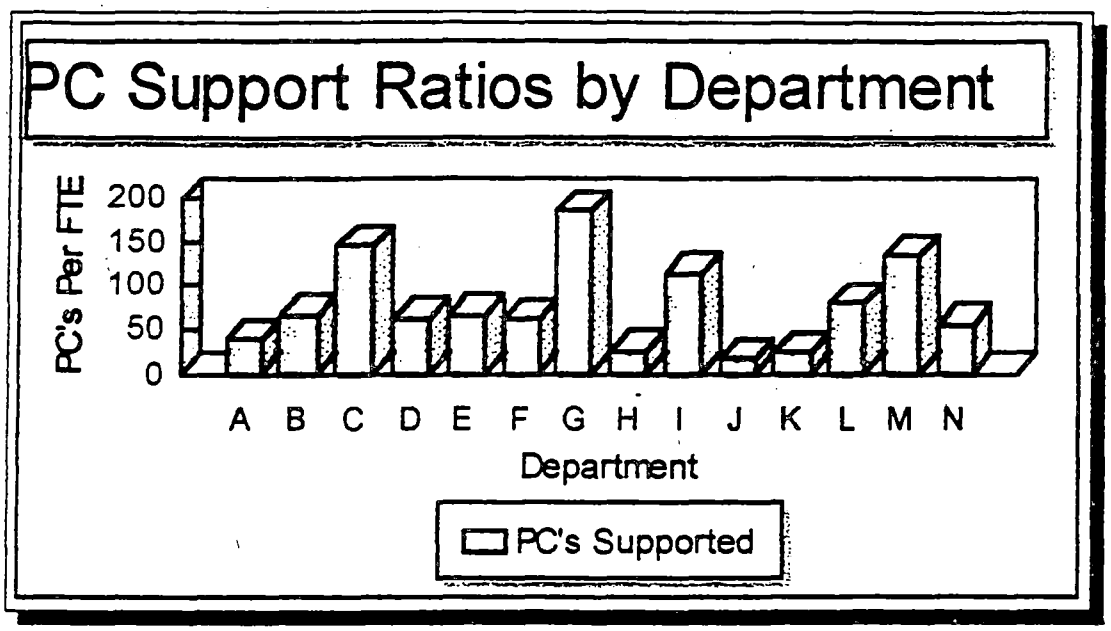


Hidden costs are the productivity costs of peers that "help out with a problem." Industry ranges for hidden costs are in the $6,000- $12,000 per workstation per year range. Hidden costs are usually on the higher end of this range when central support organizations are "constrained" and unable to provide comprehensive support. The user, still looking to solve his/her problem, looks to peers for help and support.

The departments rolling out mission critical applications have made greater investments in their support infrastructures for PC's. Informal support structures and processes simply are not adequate. Over time, as more complex applications are rolled out, we would anticipate that all departments will have to make incremental investments in their "visible" infrastructure.

6. PC support costs are widely varied, across departments.

The following chart indicates that the number of PC's supported per assigned I/T professional varies widely by department. A possible explanation is that some departments are further along in their implementation of PC's and therefore, their structures are more elaborate and comprehensive. A second explanation might be that the higher ratios (150-200:1) are for departments that are not accurately assessing the size of their remote support structures.



Either of the above scenarios should be troubling. If the first scenario is correct and PC's continue to grow, the State can expect support costs to increase at very rapid rates.

If the second scenario is correct, the PC support challenges exist today, and are simply "hidden" from the I/T budgets.

Managing PC support costs may become the single largest I/T challenge facing the departments in the very short term. From an enterprise-wide perspective, the future support costs should be a "target" for cost avoidance

7. Many of the recommendations, highlighted in the March 1992 strategic plan have not been implemented.

Page Three of the Strategic Plan highlighted nine specific recommendations. While some departments have implemented portions of the plan, and some have excellent focus on customer satisfaction, many of the recommendations have not been implemented.

Our recommendations have an enterprise-wide impact and need to be directed and viewed from an enterprise-wide perspective. The recent hiring of a statewide CIO may help to focus attention on these issues.

8. "Structural" impediments prevent I/T organizations from being more effective.

Structural restrictions on hiring, appropriation and purchasing prevent the State from managing information technology effectively.

The information technology industry is changing on a monthly, if not daily, basis. An organization must be able to react quickly to increase leverage. Key skills must continually be hired into the organization. Assets should be upgraded on an as-needed basis, which may mean multiple smaller upgrades within a year's time. Procurement processes should leverage the procurement power of the enterprise, and bids should provide maximum flexibility to the procuring department.

Organizational barriers cause multiple concurrent evaluations of industry direction, with little cross department synergy. Few enterprise-wide standards exist, minimizing economies of scale.

B. Data Center

Introduction

Currently, there are three major data center delivery organizations providing I/T "data center operation" services.

The General Services data center provides a computing utility for many other departments, with the two largest being Human Services and Revenue. The Department of Transportation and the Department of Employment Services data centers provide delivery support and services for their own departments. All three data centers currently provide very good user services:

- Good response times for on-line transactions
- Good system availability with minimal system outages
- A staff responsive to user requests and changes in business computing requirements

Each data center provides the traditional base service deliverables, in addition to providing some leading edge technology services. Examples include:

- Image technology integration at DES and DOT
- Tape library/mount automation at DGS and DES
- CAD implementation at DOT
- Technology training and education at DGS
- Voice response technology integration at DES and DGS

All three data centers have the goal of using current software levels. However, there are some exceptions with back-level CICS and VM/HPO software. Each of the three data centers appears to have a solid base of skilled technical staff to provide software, database, and operational support.

The following table provides data center characteristics for these three data centers:

	MIPS	Gigabytes	Optical GB	Data Ctr Staff	Sys Images
DOT	76	321	464	21	3 MVS/ESA 1 VM/ESA
DGS	101	268	0	53	2 MVS/ESA 1 VM/HPO
DES	66	178	188	25	1 MVS/ESA 1 VM/ESA
TOTAL	**243**	**767**	**652**	**99**	**6 MVS/ESA 2 VM/ESA 1 VM/HPO**

Each of these organizations provides very good to excellent services in many of the areas traditionally provided by I/T data centers. However, there is significant opportunity for improvements in service delivery, process improvements, and overall cost effectiveness through an enterprise-wide approach to data center consolidations, standardization, and automation.

Each organization currently provides its services and future plans as an independent, autonomous delivery organization with very little coordination or synergy between multiple delivery organizations. There is no enterprise-wide view or approach to common problems, goals, or objectives. Through the standardization and consolidation of system platforms, software inventories, technical support staff, operational support staff, hardware inventories, and process investments, there could be a significant reduction in operational costs. At the same, time the State will experience improved service levels and customer satisfaction.

System management controls (SMC) are a proven standard set of disciplines for effectively managing information systems and assuring maximum utilization of information processing assets. SMC disciplines are the tools, techniques, and procedures required to plan, organize, measure, and control the I/T environment, including system software, application software, networks, hardware, and end-user support. The objectives of SMC are to provide levels of service that are equal to, or better than, those required by the Service Level Agreement (SLA) or customer contract. SMC is composed of the following separate systems management disciplines:

- Service Level Management
- Problem Management
- Change Management
- Recovery Management
- Batch Processing Management
- On-line Processing Management
- Performance Management
- Capacity Management

Each of Iowa's three major data centers currently has varying degrees of procedures and/or processes in place to perform several of the above SMC disciplines. However, there is room for significant process implementation improvement. Consolidation of current processes into an enterprise-wide SMC delivery structure will create synergy and serve as a means for process improvement for all current organizations.

Recommendations

The following observations and resulting recommendations are based upon an understanding of the information attained from the review meetings, the documentation generated by the State departments, and the experience of the ISSC Team. Many of these observations show varying degrees of implementation within the departments; from being fully completed or partially complete, to implementation not yet underway.

1. Consolidate the three major data centers into a single delivery organization to gain economies of scale and operational efficiencies.

In the current multiple data center delivery organization structure there are redundant costs for hardware, software, support staff, and data center delivery infrastructures.

Areas of potential savings that result from consolidating into a single delivery organization include: software cost reduction; technical and operational support staff savings; better hardware utilization; and synergy of consolidated process investments. Consolidation results from an evaluation and implementation of a "Best of Breed" approach of combining the strong characteristics of each autonomous organization into a single, enterprise-wide, world class delivery organization.

2. Standardize and consolidate operating system platforms (both MVS and VM) to reduce the number of system images and divergent products wherever possible.

Significant system software inventory redundancy and duplication exists among the three data centers resulting in increased costs for software licenses, support staff, and system overhead utilization.

Consolidation and standardization of system software inventories will enhance systems software version/release currency levels, eliminate redundant systems software and applications, and reduce the number of physical and logical system images. Areas of potential cost savings include software, technical support, and system utilization.

3. Perform enterprise-wide storage analysis study and implement tape reduction and storage management recommendations.

Systems managed storage is not fully implemented across all State data centers.

The enterprise-wide storage analysis will ensure maximum storage efficiency by defining and subsequently implementing a standardized set of automated storage management products and processes. Benefits of this standardization include enhanced hardware asset utilization, increased service level delivery, and a more efficient and productive technical support staff.

4. Investigate and implement an enterprise-wide operations automation strategy and utilize tools to reduce operator intervention and expedite recovery activities.

Operations automation is not fully exploited across all data centers.

An enterprise-wide automated operations strategy should be implemented to establish an efficient and effective consolidated automated operations environment. Managing the console operations on an enterprise-wide basis, through a single point of control, requires the commitment to operations automation. The benefits of full utilization of operations automation include enhanced

operations staff utilization and improved service level delivery. This will ultimately result in improved customer satisfaction.

5. Implement and fully utilize an enterprise-wide batch job scheduling and control automation product. Expand the batch "Production Control" and monitoring responsibility for the operations delivery organization.

Batch job scheduling, monitoring, and control are largely manual process. Full utilization of automation products and tools is not achieved.

For a large part, batch submission, monitoring, and control are currently performed manually by operations, customer organizations, and/or application support groups. Consolidated and standardized batch job scheduling and restart tools would greatly improve batch throughput and service level delivery. The benefits of full batch control utilization include enhanced enterprise staff utilization and improved batch service level delivery. This will ultimately result in improved customer satisfaction.

6. Investigate and implement world-class, real time system performance monitoring tools and a technical performance support infrastructure to determine enterprise-wide performance problem bottlenecks in a proactive fashion.

All three data centers currently use different performance monitoring tools such as CICS Monitor, NetView, NetSpy, NetView Performance Monitor (NPM), RMFMON, and others. System performance monitoring is, for the most part, conducted on an ad hoc and reactionary (after the fact) basis by systems programmers as a subset of their overall responsibilities. Full utilization of automated, real time, system performance monitoring tools and processes are not implemented across all data centers.

To ensure cost effective hardware management, utilization of I/T resources typically grows and approaches more constrained levels of efficiency. To avoid constraining efficiency, real time system performance monitoring, based on pre-established performance thresholds, and automated performance system balancing actions can be implemented. The result of this implementation is a proactive system performance optimization which utilizes automation and prevents performance problems before they become customer problems.

Investments in enterprise-wide performance monitoring tools and technical support staff dedicated to proactive performance optimization result in proven benefits. These benefits include enhanced hardware and software utilization, enhanced technical staff utilization, and improved service level delivery. The ultimate result is improved customer satisfaction.

7. Enhance the investment in technical education for operators, systems programmers, and technical support personnel and develop formal technical education plans for all support personnel to ensure new technology vitality.

Formal technical education plans do not exist for most operations personnel. Currently, technical education largely consists of ad hoc on-the-job training on an as needed basis. It is not evident that all data centers consider ongoing technical education of operations and technical support personnel to be critical to successful service delivery.

Utilization of new technologies will be key to future I/T cost effectiveness and technical education of all operations support personnel will be key to taking advantage of new technologies. Translating future customer requirements into I/T solutions will become increasingly dependent upon the exploitation of new technologies. The benefits of enhanced technical education include I/T delivery cost savings, improved service levels, and enhanced morale of technical support personnel.

8. Develop and implement on-line operations documentation and procedures that provide for up-to-date, searchable, knowledge-based databases to assist operations personnel in the performance of their daily functions.

Operations documentation and procedures are mostly hard copy which makes them susceptible to being down level versions and labor intensive.

The benefits of on-line documentation include the assurance that operations personnel are using the most current and approved procedures which will result in enhanced service delivery and higher system availability.

9. Investigate and implement a service contract for enterprise-wide disaster recovery services which upgrade the current disaster recovery "cold site" only provisions to "hot/warm site" services with an outside disaster recovery provider.

Current disaster recovery provisions include data center raised floor facilities only (Armory "cold site"). No specific ability exists to recover delivery services in a "hot/warm site" fashion. Full scale disaster recovery has never been tested and it is not known how successful an actual recovery would be. Not all data centers have disaster recovery plans in place.

Provisions for a comprehensive enterprise-wide disaster recovery plan combined with "hot/warm site" services are strongly recommended. This would provide for recovery within 48-72 hours and must be proven to be achievable on at least an annual basis. It is not currently known how long successful recovery would take since equipment is not in place and actual testing is not possible with current provisions. The benefits of a full service disaster recovery contract ("hot/warm" site) include comprehensive disaster recovery planning, risk assessment and annual testing. Guaranteed service restoration time periods minimize impacts to citizens and State workers if there is serious service interruption.

10. Implement a formal study and plan for enterprise-wide print optimization. This includes the full utilization of standardized on-line report distribution tools and remote/local print capability, reducing the amount and expense of centralized print operations.

Utilization of automated on-line report distribution tools is not fully implemented across all data centers, creating opportunity for centralized print reduction.

Utilization of advanced function printing capabilities to reduce the need for special pre-printed forms also assists in the reduction of print expenses. The benefits of print optimization initiatives include reduction of print costs, enhanced operations support staff utilization, and improved service delivery resulting in higher levels of customer satisfaction.

11. Implement a formal security study and exposure correction plan for enhanced enterprise-wide I/T security which ensures appropriate physical and logical security exposures are identified, documented, and corrected.

During the assessment period, several security issues were encountered which would indicate that other security exposures exist and warrant further serious study and assessment. Some of the issues encountered included large numbers of personnel with data center access, ability to access the data center above/below raised floor walls, no RACF on VM systems, combination lock access to data center, privilege ID procedure exposures, and general lack of documented security procedures and reporting.

The benefit of an enhanced security posture is better protection of the State's information assets.

12. Implement a formalized documented enterprise-wide Service Level Management process which includes formal Service Level Agreements (SLA's) for all major service delivery components and customers.

Formal service level agreements are not implemented across all data centers. For the most part, informal service level objectives have been established. However, a process which ensures specific customer requirements is negotiated, documented, tracked, and reported with guaranteed service delivery and financial penalties for non-performance have not been implemented across the enterprise.

The benefits of a formal service level management process are guaranteed service delivery with financial penalties for non-performance and enhanced customer satisfaction.

13. Organize a centralized Systems Management Control (SMC) staff with the mission of ensuring enterprise-wide maturity and implementation of all the SMC disciplines and implementation of state-of-the-art SMC solutions which support the demanding I/T business challenges.

Each of the three data centers has a limited implementation and maturity of SMC discipline processes. Each data center has minimal dedicated SMC staff. Consolidation, standardization, and automation of the three data center delivery organizations into a single SMC discipline implementation will ensure efficient staff and I/T asset utilization. It will also result in improved customer satisfaction.

14. Implement an enterprise-wide formalized and documented problem management process which utilizes a centralized automated problem tracking and reporting database tool.

An automated, centralized, on-line problem tracking system for all problems is not currently implemented across the data centers. Various implementations of manual, hard copy, and limited on-line problem logging is performed by multiple problem resolution support groups within the different data centers.

Implementation of a centralized, automated, enterprise-wide problem tracking and reporting database and a problem management process which ensures problem resolution service level delivery attainment and problem trend analysis, provide several benefits. These benefits include quicker resolution of problems, problem avoidance, enhanced service levels and system availability, and increased customer satisfaction.

15. Implement enterprise-wide formalized documented change management process which exploits a centralized automated change tracking and reporting database tool.

Use of an automated, centralized, on-line change management system for all production changes is not currently implemented across the data centers.

Implementation of a centralized, automated, enterprise-wide change tracking and reporting database and a change management process which ensures a stable production environment by managing the implementation of production changes, provide several benefits. These benefits include enhanced service levels and system availability, and increased customer satisfaction.

C. Help Desk

Introduction

Today, there are many different "help desks", both formal and informal, which support the I/T customers of the three major data center organizations. There are also customers who have set up their own set of help desks. These help desk and problem management support structures are experiencing various degrees of success in meeting the needs of customers and I/T delivery organizations. There is significant opportunity for help desk process improvement through consolidation, standardization, and automation of the help desk on an enterprise-wide basis.

Recommendations

1. Consolidate existing help desk support structures into an enterprise-wide, one-stop-shopping, single point of contact (SPOC) full function help desk providing problem resolution, "how to", and service request support.

Each of the data centers has multiple formal and informal help support structures which have varying degrees of help responsibility. In addition, customers have access to many informal avenues to contact technical support personnel directly, completely bypassing the help support structure and interrupting "productivity".

Investment in a consolidated, automated, enterprise-wide SPOC help desk which provides support for all aspects of I/T including data center, applications, network, PC/LANs, hardware, software, processes, and service requests will provide many benefits. The benefits include more timely problem resolutions, improved control over the problem management process, higher technical personnel utilization, and increased customer satisfaction.

2. Establish a clearly defined tiered problem support structure that ensures better utilization of skilled resources.

Each of the data centers has its own problem support structure which consists of multiple problem support groups which are accessed directly by various methods and customers. Highly skilled technical support personnel are impacted by numerous daily interruptions which detracts from their other responsibilities.

A clearly defined process which positions the help desk as the first point of contact for all problems (Level 1 Support), with a pre-defined technical support structure (Level 2 Support) that handles initial problem escalation, would provide buffering of systems support (Level 3 Support) from constant customer interruptions. Level 2/3 support personnel are identified and support commitments identified in advance for their respective areas of expertise. This support structure would allow for the right level of skill to concentrate on the right level of business challenge and assure appropriate utilization of finite skilled resources across the enterprise. The support structure would also provide timely and quality resolution to customer problems. The benefits

include higher utilization of technical skills, quicker resolution to problems, and enhanced customer satisfaction.

3. Investigate and implement voice response unit (VRU) technology to assist in help desk call routing and automated self help functions.

Utilization of VRU technology to assist in the automation of help desk functions does not appear to be implemented across the data centers.

There are many functions which are automation candidates that would allow customers to get immediate assistance with their request or problem, 24 hours per day, without the intervention of a technical support person. Network line and password resets, system status reports, printer starts and stops, and service requests are all examples of how VRU technology can eliminate calls to the help desk. VRU's can be used to route help desk calls to the appropriate support personnel on the initial contact. The benefits of VRU automation at the help desk include cost effective 24 hour per day assistance, increased call volume capabilities, increased service level delivery and enhanced customer satisfaction.

4. Investigate and implement phone call routing and statistics collection technology to provide help desk call volume and statistics in the management of help desk calls.

As mentioned previously, documentation and tracking of the total problem workload is limited in each of the data centers. Total problem workload statistics that assist in the management of problems and the appropriate implementation of technical support resources cannot be identified if the call data is not collected and reported.

Implementation of an enterprise-wide SPOC help desk and an automated problem management database will enable the State to conduct detailed call volume analysis enterprise-wide. This will provide the basis for a sound problem management service delivery solution.

5. Investigate and implement searchable knowledge-based decision support tools and centralized on-line reference materials at the help desk.

Existing help desk support groups have very limited access to searchable knowledge-based problem resolution tools and must rely on their own experience/knowledge and hard copy manuals and procedures.

Searchable knowledge-based problem resolution tools assist in providing high levels of problem resolution capability without escalation to the next level of support and increase customer satisfaction. These tools provide for very high rates of problem resolution on the initial call contact. The benefits include higher technical support personnel utilization, quicker and more consistent problem resolution and increased customer satisfaction.

6. Invest in help desk intelligent workstation, local area network (LAN) hardware and software tools, and technical support education and training, which will result in technology efficiencies.

Current investments for help desk technologies appear to be limited in each data centers.

As the first line of defense for problem resolution and the most obvious point of customer interface for the entire delivery organization, the help desk requires significant technology investments to make it as successful as possible with high levels of customer satisfaction. These investments include current technology for intelligent workstations, LAN hardware and software tools, knowledge based solutions, and a commitment to ongoing technical support education and training. The benefits include enhanced problem resolution and technical support capabilities, enhanced customer satisfaction, and enhanced help desk support staff morale.

7. Integrate traditional "Data Center" help desk support structure with the development needs of the PC/LAN and mid-range environments and applications.

Existing help desk support groups have a fairly limited scope of responsibility for which they provide assistance. Assistance or services on a range of issues or platforms, frequently requires contacting a wide range of help support groups.

We recommend that the scope of these autonomous help support groups be consolidated into the single SPOC help desk support structure model. The SPOC help desk will be utilized for ALL problems and services including data center, network, PC/LAN/WAN, midrange and others.

D. Network (LAN/WAN) Management

Introduction

This section discusses observations and recommendations of an integrated network strategy. With the current technologies, Local Area Networking (LAN), and Wide Area Networking (WAN) services are quickly converging into a single network strategy. For this reason, this report will combine all the network support as one.

Iowa has the capability to truly integrate its desktop and networking strategies. The ICN infrastructure should allow for the reduction of networking costs, enabling the State to be better positioned to capitalize on the end user computing explosion.

There are four wide area networks, DOT, DGS, DPS, DES. These individual WANs were created historically to provide non-intelligent terminal to CPU connectivity. Since there were multiple data centers, there were also multiple WAN's. For many years it was not cost effective to consolidate the data networks.

Today, even if the data centers are not consolidated, it would be cost effective to combine the WAN's. With a consolidated data center, a consolidated WAN is the obvious choice.

Today, nearly every Iowa department has its own LAN support structure, and much duplication of skills, tasks, education and learning occurs. LAN's, servers and PC's have become a vehicle for the departments totally controlling their own I/T functions. While this approach has freed them from the control of others, it has introduced inefficiency through several different protocols, architectures, objectives, and support structures.

A consolidated Iowa LAN/WAN, when combined with a consolidated data center, if managed as a service delivery entity, would provide Iowa government with an invaluable asset that could become the foundation for much faster and pervasive implementation of automation.

Recommendations

The following observations and recommendations are being stated to supply an understanding of the information attained from the review meetings, the documentation generated by the State departments, and the experience of the ISSC team. Many of these observations have varying degrees of implementation within the departments, ranging from being fully implemented, to partially complete, to not yet started.

1. Implement a consolidated, secure firewall strategy and service.

As more departments utilize the Internet for business purposes, a consolidated access point would maximize telecommunications usage and supply the most bandwidth possible to the users.

This approach is also the most economical. Consolidating the Internet E-Mail (POP) and Domain Name Services (DNS) is the most efficient method to offer Internet services to State departments. It minimizes the number of firewall purchases and reduces implementation costs.

The security of the State computer infrastructure will also improve. Without an single integrated firewall, multiple implementation efforts are occurring. These efforts are using technologies such as router access lists, NetSp and Trust Information System Gauntlet. This means multiple learning curves, multiple development efforts and increased risk to State assets.

Consolidation leads to an increased security awareness resulting in a more secure environment overall.

2. Complete the conversion of all State teleprocessing lines to the ICN network infrastructure, where applicable.

The State owned ICN network infrastructure enables the State to significantly reduce the telecommunications charges paid to the carrier companies. It also provides wider bandwidths to State locations and provides better response times to the users. The strategy to fully migrate wide area links to the ICN network infrastructure is forward thinking, with a short return on investment.

Conversion of the links from the carrier companies varies among the departments from fully complete to 50% complete.

3. Leverage a single network infrastructure across applications and departments.

The State has been successful with its implementation of WANs. The State seems to have three predominant WAN strategies in place. This implies multiple directions are being taken with the procurement of the CSU's, DSU's and other telecommunications hardware.

The next step, after the conversion to ICN services, is to integrate these networks. This will enable the departments to realize savings by reducing the number of lines required, the number of devices required and the inventory of spare parts needed to improve availability. It will also allow better utilization of telecommunication bandwidths and improve application response times.

4. Increase the value added functions offered on the network.

This would include 1) implementing a faster routing backbone technology (FDDI, ATM) for department connectivity and application connection; 2) providing easier access and more bandwidth to the statewide Internet access point; 3) investigating an E-Mail bridge function for a statewide E-Mail backbone; 4) implementing a statewide directory service to eliminate telephone book printing and distribution; 5) implementing a network security code to reduce the number of application log-ins to multiple systems; and 6) investigating the use of PC teleconferencing to reduce intrastate travel.

The State has made significant progress in networking. This includes the ICN, WAN and LAN implementations. A full function Value Added Network (VAN) is a requirement, and should be operated as a business utility that can be very responsive to the various State requirements.

Departments have begun to use the DGS token ring as an inter- and intra- department connection in addition to a connection device to DGS services. Some departments are investigating FDDI and ATM as more client server applications are implemented. Multiple E-Mail systems exist today and bridges are being implemented as electronic communication needs increase. As the integration of services increases, the number of passwords and the complexity of password management increases.

5. Implement a consistent enterprise-wide, secure dial-in capability.

More efficient asset utilization and reduced telephone company charges will result from implementing an enterprise-wide dial-in capability. Availability will increase because a larger pool of ports would be useable at any given point in time. Greater consistency of implementation will provide a better security process and user sign-on procedure.

As mobile computing technologies have improved, the State has found laptops can significantly improve the effectiveness of the mobile worker. Dial-in port services are in place in at least seven different departments to allow mobile and off-shift work to be conducted. This work includes host-based applications, systems support, remote E-Mail connectivity, and client/server applications. With this number of implementations, multiple dial-in processes exist, different dial-in technologies are in use and port utilization is not optimized.

6. Consolidate all LAN/WAN Network Control Centers

The departments recognize the need to support the LAN and WAN users. Creative support methods such as NetReps, manuals, distributed support structures (DHS), user training programs, dedicated and part time staffs have been implemented. However, at the same time, many smaller departments have no organized approach to LAN/WAN management. Helping network users keep up with the technological improvements implemented by department I/T staff is a challenge regardless of department size.

Along with improved network service to many department users, the LAN/WAN network control center would be a single point of contact (level 2) for a consolidated help desk. Resource requirements would decrease due to economies of scale. A higher, more specialized skill base would be available to all departments.

Please see the help desk recommendations which would also include LAN/WAN support.

7. Converge network hardware technologies (FEP's, CSU's, DSU's, modems, routers, bridges, hubs, etc.) and utilize SNMP agents.

This would reduce the inventory required for roll-out and on-site repair actions and minimize the education requirements. Integration complexities would be reduced and volume purchasing agreements would provide additional leverage with suppliers. Automation development efforts would be reduced and automated management capability would be improved.

It is no surprise that network computing is rapidly growing in the State. Every department that participated in the assessment was implementing LAN's and some WAN's. The LAN environments varied from very large Ethernet LAN's to small Token Rings. Some LAN's were highly bridged, some segmented via routers, some routed via servers. All-in-all, many different technologies are being utilized.

As government services begin to integrate, an example is the DES Integrated Information System Blueprint, integration requirements between departments increase and the technological differences become greater challenges.

8. Consolidate tools and implement an automated strategy for Network Management.

This approach would reduce hardware assets and software licenses through larger monitoring stations. It would also provide improved monitoring to some smaller departments. Economies of scale would reduce resource requirements for both development and monitoring operations, improving the availability of problem determination resources, without increasing headcount.

As seen in the two previous recommendations, assisting LAN/WAN users has become a significant investment for the State. Most departments have begun to automate their network management, however, each technician is creating their version of network management. Tools such as IBM NetView 6000, HP Openview 6000, AT&T One Vision, Novell Netware Management system and others are beginning to be deployed. Each of these technologies execute on separate hardware and software platforms, increasing the complexity of the State's network management strategy. Even worse, many departments are not able to implement the strategies.

9. Consolidate, standardize, formalize and document network management techniques.

This recommendation would include: 1) automating the performance management process with consistent tools and monitoring techniques; 2) implementing a capacity management process to be more proactive in managing network throughput; 3) exploiting the tracking and reporting functions of an automated change and problem management system; 4) completing a formal Component Failure Impact Analysis to assure that recovery management procedures are sound and documented prior to a crisis; 5) ensuring that UPS units are implemented at key network control points; and 6) developing formal service level agreements with users for availability and performance.

The State has expended significant resources and capital in attempting to keep pace with LAN and WAN technological developments. We saw several different approaches to implementing the technology and some management techniques beginning to be developed. As could be expected, varying levels of implementation exist, from nothing to fully exploited. The management

techniques highlighted above are as important as the underlying technologies in delivering cost effective and consistently good service.

10. Assuming all lines will traverse the ICN network when applicable, consolidate the procurement of the remaining wide area network links.

This will leverage volume purchasing agreements with suppliers and reduce the telecommunications expertise required in the procurement process. The State has the luxury and challenge of having 150 carrier companies supplying wide area links. Even after ICN conversion is completed, the departments will still acquire the tail circuits from these carriers. Purchasing power is disseminated when multiple departments procure wide area links from multiple carriers.

11. Converge to a standardized network protocol (TCP/IP)

The State is in the middle of a major network evolution. In the past, the computing architecture was predominantly IBM mainframes utilizing the SNA protocol for connectivity. Today, as the State migrates to a LAN environment utilizing mainframe applications, client/server applications, PC based E-Mail systems and Internet services, multiple communication protocols are evolving. SNA, IPX and TCP/IP are the dominate protocols today. A challenge will be to consolidate these protocols, over time.

Today, integration is accomplished by encapsulating the protocols across the frame relay, routed network. As the amount of network traffic grows with on-line image applications, PC-based video conferencing and more client/server applications, other methods for protocol convergence will need to be explored.

This convergence will effectively increase the bandwidth since LAN, host and Internet traffic can all be concurrent users. It allows intra- and inter-department communications to occur.

An enterprise-wide plan should be developed for determining the timeframe and approach for this convergence, based on current and future business case analysis.

12. Implement an enterprise-wide TCP/IP addressing scheme.

An enterprise-wide approach will minimize network design and addressing responsibilities, maximize address utilization across departments, and minimize routing loops when the network is more broadly rolled out.

As the State grows its LAN implementation, along with its client/server applications, it will be challenged to segment and route its LAN's. As departments further utilize the Internet and the industry converges on the TCP/IP protocol, TCP/IP addressing concerns will increase. Today, the State is utilizing a single class B address, divided into multiple class C addresses. Department understanding of TCP/IP addressing varies greatly with the majority of departments not really setting up TCP/IP routed networks.

E. NETWORKSTATION MANAGEMENT (NWS)

Introduction

This section discusses the observations and recommendations of an integrated workstation management strategy.

Personal Computers can help achieve unheard of levels of innovation, creativity and change. They can make users far more productive and save money in the process. But, after years of investing, the challenge for the State is to find a way to leverage this in-place technology with other technologies to maximize return.

With approximately 10,000 workstations installed and annual expenditures in excess of $20M , the State's investment in personal computer technologies is sizable. What is the return on these investments? How can the investments made to date be maximized?

Most importantly, with a large percentage of State employees being users of personal computers, how can the State implement programs to maximize employee effectiveness with these tools and protect the security of its data assets.

Every department interviewed has made productive use of PC's in their business environments. A wide variety of applications have been implemented.

Every department has built some level of PC support structure, made architectural decisions, purchased hardware, software and LAN's. From an enterprise-wide view, the Iowa Executive branch is managing workstations with at least twelve different approaches (we interviewed twelve departments and some of the twelve have multiple approaches; there are several other smaller agencies that also have PC support staffs.) When a new product or technique becomes available (i.e., Windows 95 or new PC hardware), at least 12 separate evaluations will be done. The same is true for each of the twenty-plus unique support organizations associated with PC management. The State of Iowa has huge redundancy in workstation management.

The recommended solution is to provide a consolidated structure that provides enhanced automation support on a service-oriented basis, and to run the PC business with an enterprise-wide perspective. Control of how many, what and when should remain with each department or business function, but implementation, operation, and standards should be consolidated.

Recommendations

These recommendations are based upon information attained from the review meetings, the documentation provided by the departments, and the experience of the ISSC team. As you will note, many of these observations have varying degrees of implementation within the departments; from being fully implemented, partially complete, to not yet begun implementation.

Financial saving are attained: 1) when workstation assets are used more efficiently; 2) when the peer-based support structure is reduced; and 3) when State procurement power is leveraged for consistent hardware and software configurations.

1. Establish user classes with optimal equipment configurations, planned upgrades and network connectivity definitions.

User classes segment the workstation community in a manner that would improve management of 10,000+ complex, integrated personnel computer systems installed in the State. It is impossible to effectively manage the end-user computing environment without some levels of consistency.

Establishing user classes generates increased consistency in workstation configurations and migration paths and provides a better understanding, by both the user and support community, of the software products in use and the capacity available for future applications. Reduced learning and support costs are achieved through a more consistent, manageable approach. Greater inter-department compatibility can be achieved as well.

Sometimes, this recommendation is incorrectly perceived as limiting user flexibility. Users still have ultimate selection options, but the supported environments would include multiple support classes and multiple standard configurations.

The State's current environment is representative of how PC's entered the workplace. For the most part, each Department assessed the market, decided what they needed and procured their own system. As a result, departments have a variety of platforms installed (286/386/486/Pentium), from multiple vendors (AST, IBM, Zenith's, Compaq's, Toshiba, AT&T), with multiple operating systems (DOS, Windows, NT, OS/2, limited Macintosh) and a variety of word processing packages, spreadsheets, graphics packages, database projects, electronic mail systems and collaborative computing systems.

The environment is so diverse that despite major continued investments, sending a statewide E-Mail message to all employees is simply not achievable. Management approaches, satisfactory in the past, are no longer adequate. The investments are simply too significant, the potential impact on department data too great and the potential productivity leverage too important not to manage the end-user environment more closely.

In some departments, if they wanted to roll out a new application, there would be little understanding of how much incremental memory would be required by each user, how much additional disk space is needed etc. The number of user configurations are simply too great to manage effectively.

Role models do exist. One department has an advanced roll out, with common defined platforms and an elaborate support structure. They view the PC's as an integrated system spread across multiple physical platforms. This approach will increasingly become necessary for all departments.

There are significant cost benefits to standardization, as well. Large organizations with very standardized configurations report that their support costs are anywhere from 25% to 35% lower than similar organizations that have not standardized.

2. Define and implement a deskside support structure that is tightly linked to the centralized help desk and network control center.

Deskside support refers to the "on-site" support when physical presence is required to resolve problems. These can include hardware, software or procedural problems.

By implementing a single point-of-contact support structure, employee outage time is minimized when faced with a problem. A user, unaware of whether the problem is in the network, the application, their hardware or software, contacts a single individual responsible for problem resolution. That individual is equipped with on-line tools and a defined, available support structure.

Single point-of-contact help desks also reduce the peer-based support costs; often the most expensive portion of PC support. These peer support costs were uncaptured in our analysis and, when captured, often represent a doubling of the total PC supports costs.

Few departments have made a major investment in an integrated help desk structure for PC support. Some departments have put significant investments into distributed support structures (partial job responsibility), some have implemented informal peer support groups and some have no structure at all.

The challenge with peer support structures is that problems are solved multiple times. No process exists to formally capture the root cause, and record the fix in a manner that others may benefit. This is usually not a concern until a department begins to implement mission critical and more complex applications.

Please see the report section on help desk. The deskside support would be an extension of the consolidated help desk.

3. Consolidate the process of new technology evaluation and migration methods.

Every department devoted a significant amount of I/T support resources to the evaluation and assessment of new technologies. While there are obvious cost benefits attained from fewer people making these assessments, the ultimate benefit is a more cohesive approach to technology implementation.

All industry technologies can be rigorously and independently tested, the "best of breed" selected and then, uniformly incorporated into the user group platforms.

Small departments, unable to afford any investments today, will benefit from the consolidation of these efforts as well.

4. Ensure that security processes and virus protection tools are implemented throughout the State.

Most PC systems groups were sensitive to security concerns. Each department also emphasized that virus detection was installed. However, there is no process for determining best of breed virus protection and detection on an enterprise-wide basis.

As mentioned in the network section, the growing dependence on the Internet raises a whole new set of issues for consideration.

5. Implement an enterprise-wide asset management strategy.

The investments in PC hardware and the appropriate use of software are important issues on an enterprise-wide basis. Unless you have a current and accurate inventory, you may be paying for more software than you are using. Additionally, you may be using more software than you are paying for and subject to legal action. Many large organizations, like the State, do not have an enterprise-wide view of how many PC's they have, much less the software and components installed and what they are used for.

In addition to using "census type" software for asset management and tracking, enterprise-wide procedures must be implemented to ensure that inventories are current and accurate.

6. Define and implement an enterprise-wide strategy for software distribution and licensing.

The State's software distribution strategies were diverse across departments and sometimes within departments. Some departments were implementing electronic distribution to servers, and electronic asset management, while others had no formal central direction.

As the computing environment is moving to the PC, the distribution challenge demands greater attention and understanding.

7. Define a training strategy that includes provisions for the refresh of vital skills

The success of the end user support organization is best measured by how well trained the users of the systems are. Due to the divergent platforms, cross-department training synergies are limited to basic topics such as word processing, spreadsheets etc.

Individual department training approaches are geared more toward application training and peer-based education.

Once platforms are better standardized and defined, enterprise-wide training approaches can be better leveraged. This could include the development of more computer-based courses to maximize flexibility and complement formal classroom training or even one-on-one training. The

F. APPLICATION DEVELOPMENT/MAINTENANCE (AD/M)

Introduction

This assessment of application development & maintenance (AD/M) is the result of reviewing the input gathered from the documentation provided by the State of Iowa departments and the responses from the 120 departmental staff who participated in the AD/M interviews. At a high-level, this assessment depicts only general trends and averages, and leads to overall recommendations for improvements in customer service and cost savings. To fairly balance averages across the departments, overall results are weighted by the AD/M employee populations within individual departments, as reported by each department.

From departmental input, approximately 420 full-time-equivalent (FTE) staff were identified as having programming responsibilities. Overall, maintenance support of existing systems consumes 50% of the staff, but less than 1% is dedicated to fixing programs. More than 60% (260+ FTE's) of the total are State employees. They are primarily focused on maintenance. The additional contracted staff (about 160 FTE's), is for the most part, involved in new development or the one-time integration or maintenance of purchased software packages.

Currently, the State invests considerable resources in the investigation of purchased software packages. This seems to be a result of the departments balancing the need to accomplish one-time activities by "buying" contract resources, while staying within the State's employee staffing caps. This could, in some instances, cause the State employees to be unaware of the newer processes and techniques, and as a result, could also limit the State's internal staff's ability to react to changes in a timely manner.

The range of dedicated maintenance resources varied from less than 20% in some departments, to greater than 65% in others. The contractor staffing varied from 0% to almost 50%, again, focused, for the most part, on package integration or new development. The State should continue to investigate "package" applications verses "homegrown" code to reduce AD/M development and maintenance costs and head-count. Additional focus could be applied to cross-department applicability to reduce further AD/M costs.

Technical skills of the State AD/M employees are estimated (3.5 on a 1-5 scale) to be above average, largely due to their long tenure. This has also led to the staff having a high (4+) understanding of the business processes and needs of the individual departments. This varied +/- 20% department-to-department, the with the lower skilled groups having less annual technical training than the higher groups. Technical training varied from an estimated "less than a week" in some departments, to "two-to-three weeks" per year per person in others.

Various processes and methodologies are used within the AD/M organizations to manage effectively and gain common levels of expectations from their customers. These range from work management processes for accepting, estimating and controlling the work requests, to the internal AD/M methods and standards for producing expected quality deliverables within anticipated times. Overall, it's estimated that these processes are implemented and in use approximately 70%

General Services base can be expanded and grow to cover an even wider range of support services.

Standardization has the additional benefit of providing a more systematic approach to new technology migrations as well. Since the PC explosion has been relatively recent, few departments have had to manage department-wide migrations to new platforms. The training and logistical challenges are significant and must be well coordinated to appear seamless to the end user.

8. Ensure that a client and server backup and recovery mechanism exists for assets with critical data.

Most departments indicated an awareness and understanding of where critical data existed and had backup and recovery mechanisms in place. In the timeframe of the assessment we were not able to test each department's approach, but with an increasing amount of distributed data, this emphasis takes on new importance.

of the time. Their individual use varies from 20% to 90%, depending on the process and department. Individual department averages ranged from 40% to 80%.

The procedures, methods and standards with the highest use (>75%) were programming standards and release management. This appeared to be a result of the release-into-production requirements placed on departments that use the Department of General Services(DGS) system for I/T production.

Those procedures with lower use (<70%) were documented procedures, formal quality processes and project management methods. Departments with higher use of these processes and business management procedures, tend to have higher department satisfaction and project success.

Recent project delivery results are mixed. A significant number have been delivered over-budget and beyond anticipated timeframes. Less than 30% (weighted) reported consistent project success, on-time and within budget. The majority of these successful projects had strong business management and change management processes.

There are no department-wide processes for measuring application size, delivery timeliness or delivery quality, such as production errors per lines of code delivered or function points delivered. Such measurements identify problem processes over time. These become important measurements in a closed-loop "Continuous Quality Improvement" (CQI or TQM) business environment. By establishing application size, quality and timeliness of delivery baselines, departmental AD/M organizations can identify processes which are candidates for improvement and take proactive corrective actions.

Although the AD/M organizations are dedicated, talented, hard working and focused on the State's business needs, significant improvements could be made to increase their overall effectiveness in maintaining the current application portfolios and producing new I/T applications.

RECOMMENDATIONS

1. Implement uniform I/T productivity management and measurement processes to achieve higher department I/T staff utilization and effectiveness.

Few departments measure actual AD/M effort by the amount of development time and manage it against their resource planning levels. One department reported its productivity at 80+% and another department in the 70% range. These are the only departments that performed measurements. Most departments indicated they do not measure the actual work performed. Therefore, the departments could not 'defend' their staffs' effectiveness, other than "they're all busy."

Generally, we found overtime to be limited, due to the union contract. From the departments' estimates, overtime averages 5% of all hours worked, and varies by department from 1%-20%. The departments with higher overtime indicated they have fewer AD/M standard procedures, especially business management procedures, causing shifting priorities and extra work to meet end

user deadlines. To stay within the State's employee headcount cap, some departments use overtime as a method to handle peak workload situations rather than hiring contractors .

We also found that no department has measurements indicating the size of their applications, either in lines-of-code (LOC) or function points. Although neither of these measurement methods are 'perfect', they are industry standard methods of measuring the size of the product being managed. Some departments know the number of their applications and/or programs. However, due to the great variances in individual sizes of the programs, the number of programs is not a good measure of work.

Estimating new work is solely based on the experienced input from the long-time staff estimators. No automated tools are in use and little historic data is available to more accurately quantify the tasks being planned. If there is a major enhancement, it is not known how large the application base is nor the true extent of the modification. In many instances this results in under-staffed and under-scheduled projects, as the pressure from management usually requests ASAP delivery.

National surveys have indicated that 70% to 75% productivity is the norm for AD/M. ISSC, with its measurement systems and processes, achieves 85% to 95% productivity. ISSC has found that function point analysis projects a better understanding of the install base and a more accurate estimation of new work efforts. In addition, implementation of function point analyses with measurements for application delivery quality and timeliness would allow end users to measure application quality, delivery and costs.

2. Establish common department I/T business, change and project management processes.

To varying degrees, some departments implement planning that aligns AD/M with department direction and vision. Several departments have no planning function in I/T to align AD/M with department business objectives.

Generally, I/T organizations reported that department management and end-users are satisfied with their particular AD/M support. A few expressed they are "very-satisfied" with AD/M, while a few others indicated neither satisfied nor dissatisfied. The more involved and organized the relationship between the department's management and their AD/M support, the more satisfied the end-users. This involvement is mainly in the area of setting priorities. The departments with the highest business and end-user satisfaction of their AD/M groups had significantly higher use of business, change management, and project management processes. These departments stated that change and business processes were in use 90% of the time and project management was in use 80% of the time. This is approximately 20% greater use of these processes than with less satisfied departments. The productivity levels of the departments using planning methods, was reported to be approximately 15% higher than the average of all departments. Therefore, those departments who manage their application portfolio from a business management perspective and apply business measurements to their AD/M support, tended to have more successful and effective I/T support.

Implemented in a common manner, I/T business planning, change management, and project management processes will enable the departments to manage their customers' requests and prioritize their work efforts. This reduces productivity loss due to changing priority 'churn', and ensures the most effective use of the limited AD/M resources.

3. Implement enterprise-wide standard AD/M processes, methodologies, tools, and techniques which allows for the cost effective leveraging of AD/M resource and skills.

Today, the AD/M support groups, in many instances, have developed very close ties and positive working relationships with the individual end user organizations they support. However, there is little synergy between AD/M support groups and very little enterprise-wide leveraging of common processes, methodologies, tools, and techniques. The key to future success and potential AD/M cost saving opportunities will be to strike a balance between the now autonomous support groups and the leveraging of commonalties. There are potential significant economies of scale as AD/M organizations increase in size where common tools, methodologies, techniques, processes, and technologies can be applied across the enterprise. Many benefits can be achieved by eliminating redundant efforts and maximizing the utilization of structured, common, and repeatable processes.

Through establishing standard enterprise-wide AD/M processes, methodologies, tools, and techniques, the State would benefit from the following:

- Reduced AD/M delivery costs by having the same standards and processes,
- Enhanced AD/M staff productivity,
- Easier "mobility" and reduced "learning curve" for the technical staff as they move between projects and/or user groups,
- Common application development and production platforms/technologies where there is unnecessary uniqueness today,
- Increased AD/M cost efficiencies gained by consolidating common AD/M support functions for leading-edge "best of breed" technology research.
- Improved skill utilization and technical competencies.
- Provide the smaller department's access to newer technologies and techniques without individual, sometimes prohibitive, resource investments.

4. Implement standard automated AD/M methodologies and tools, such as CASE tools and reverse engineering tools to restructure code, across the enterprise, where it makes sense.

In today's environment with customer demands for reduced AD/M cycle times and continuous quality improvement, the use of computer-aided AD/M methods and tools can be of great benefit. Automated tools range from project methodology and management aids, to business and application design analysis tools, to data base design and data modeling aids, code generation tools, and on to testing and test data tools. Although these tools require significant initial investment from both a monetary and skill education perspective, the benefits to AD/M delivery quality and timeliness are long lasting.

From the information presented during the assessment, such tools are not heavily utilized across the enterprise. With the exception of individual automated project management tools, the current generation of automated analysis and development methods and tools are only sporadically used by individual departments. The estimated individual departments average of automated tool use is slightly greater than 5% (driven largely by the use of project management tools), with no department reporting 10%. Some departments report having no automated methodology or tool use. There are some limited pockets of leading-edge methods, techniques, and automated tool usage within individual departments. However, there is no consistency between departments and there is very limited leveraging of these technologies across the enterprise.

ISSC recommends a greater emphasis and investment be placed on the evaluation of automated AD/M tools and methodologies and where appropriate, these tools be standardized and implemented across the enterprise.

The benefits to the State of implementing standard automated AD/M tools and methodologies across the enterprise would include:

- Enhanced AD/M service levels due to better quality program code and deliverables
- Quicker implementation of AD/M projects
- Enhanced AD/M staff utilization (productivity) and resulting cost savings
- Enhanced AD/M project implementation success (on time within budget).

5. Develop and implement plans to upgrade down-level programming languages (for example: COBOL II & 85) to achieve programming and operational performance efficiencies before vendor support for the old development platform ends.

With mainframe program code currency, many of the COBOL applications in the department's libraries have been migrated to COBOL 85 or COBOL II, as the vendors' support for the older COBOL development platforms is discontinued. However, several of the departments indicated this necessary work has not been started or completed.

In addition, the average age of the code across the departments is estimated at more than ten (10) years old, with significant portions (10-20%) being more than 20 years old. Some departments have significantly less old code and have lower exposure to problems changing code on unsupported development platforms. A few departments have plans to migrate these old legacy applications to newer environments as part of larger department business support plans. However, it appears that there are no firm plans in place to upgrade 40% to 50% of the old code to newer supported versions.

6. Develop YEAR 2000 analyses with implementation plans to avoid expensive emergency situations.

The Year 2000 two-digit date presents a major exposure to the State. Some departments stated that they have assessed their particular conditions and made plans and/or implemented changes in their databases and supporting programs. However, many departments have not completed their assessment of the magnitude of the changes required.

By establishing a central competency AD/M group that would be familiar with upgrades and conversion techniques, the cost of becoming current could be reduced.

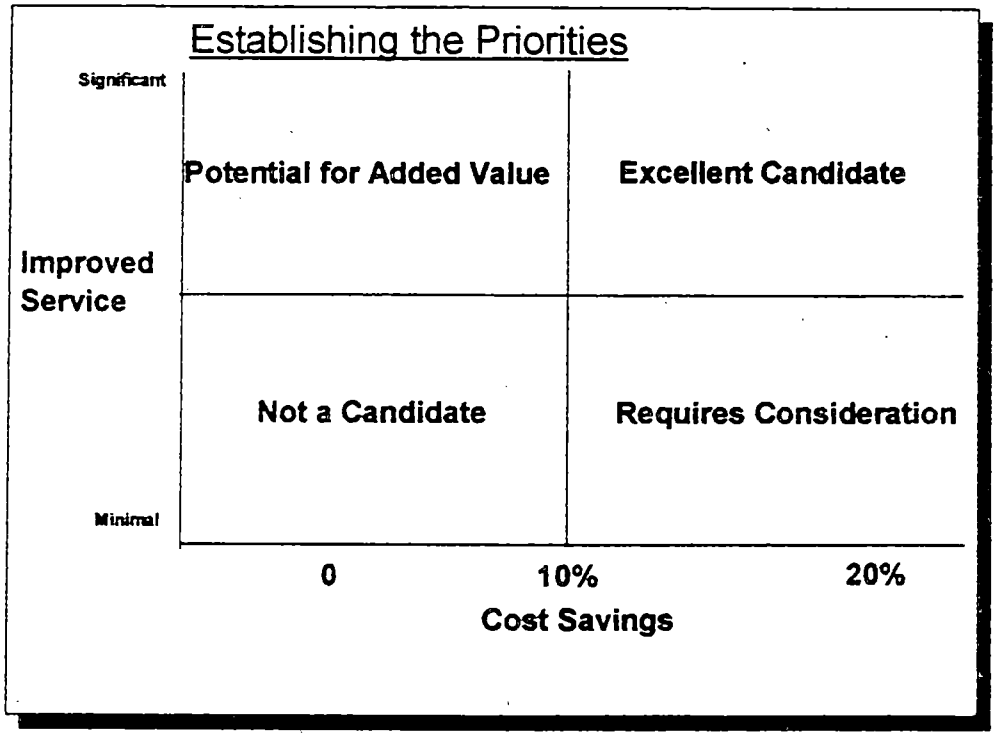
7. Across departments, investigate and implement logical consolidations of common business processes and supporting applications to improve customer satisfaction and reduce duplicate efforts in programming maintenance and support.

Few departments are fostering cross-department I/T initiatives where they have common citizens to support (for example, a recently unemployed Iowa citizen could require employment, education, human and/or health services simultaneously). However, there is no common cross-department I/T management structure to encourage individual department planning alignment toward a common objective. Such common alignment could also lead to sharing of common data (citizen name, address, telephone numbers) and eliminate data duplication and redundant application maintenance across the State departments.

III. Establishing the Priorities for Action

A. Introduction

Combining the potential for return (savings) with the opportunity to improve service, helps to prioritize functions to determine the best candidates for immediate action. We grouped each of the functional areas into one of the following four categories.



Excellent candidates for focus and attention are those functions that provide both cost savings (>10%) and service improvements.

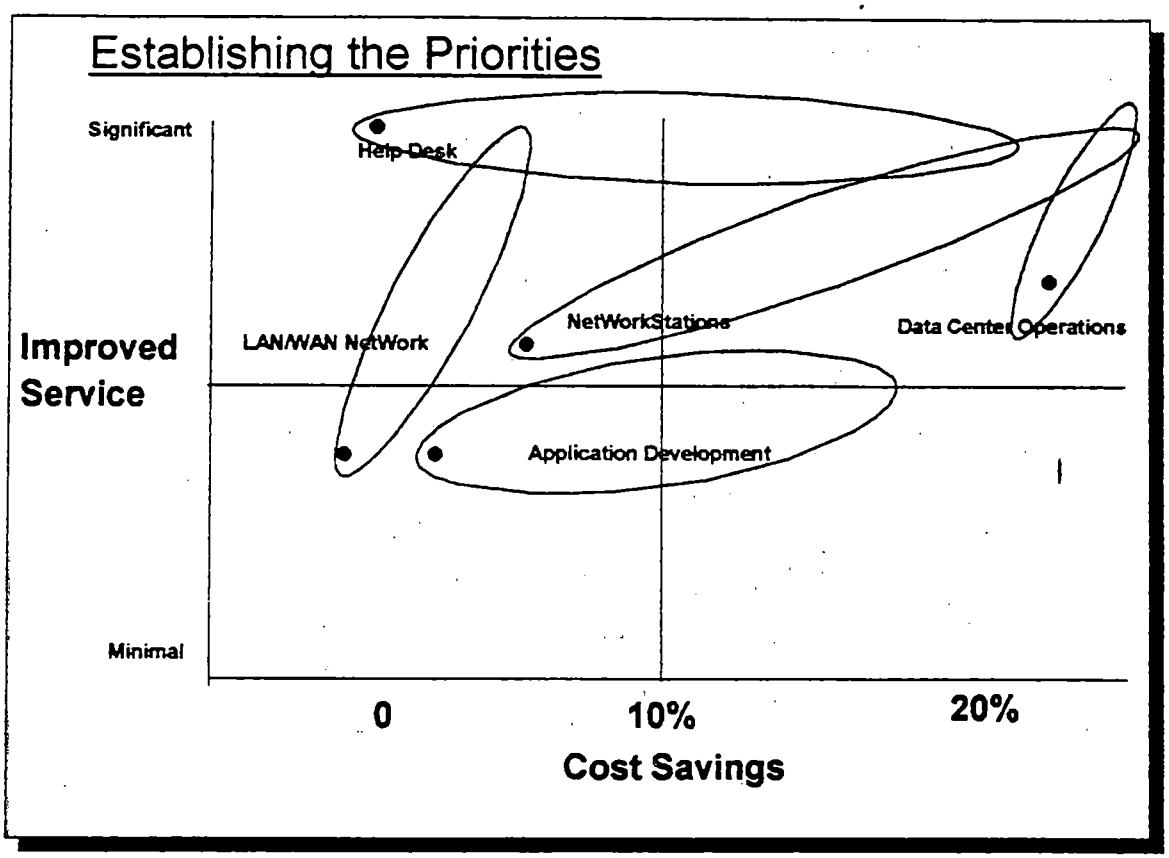
Items ***Require Consideration*** and analysis when they offer significant savings potential but where service delivery is comparable or minimally improved.

Potential for ***Added Value*** exists when there are measurable service improvements but the dollars expended are comparable to what is spent today. Functions that fall into ***Added Value*** are often areas of traditional "under-investment".

Functions would ***Not be Candidates*** if savings were not achievable and the potential for improved services were not clearly evident for both the short term and long term.

B. Establishing the Priorities

Based upon ISSC's assessment recommendations, this chart prioritizes which of the five functions, in our judgement offer the best potential for savings and service improvement.



Current or "short term" status is indicated by the red dot, future direction or "long term" status is indicated by the oval.

C. Data Center

Data center operations is a clear candidate for short term and long term cost savings and service improvements. Even though current service is good, significant opportunities for double digit cost savings percentages exist through consolidation of operations and by implementing the recommendations highlighted in the Section II B, Data Center.

Service improvements will result from all departments implementing the "best of breed" systems management processes and by providing the latest technologies to all departments. Consolidation also would provide uninterruptible power supply (UPS) and diesel backup for all major mainframe users. The latest hardware technologies provide flexible growth alternatives, increased availability and redundancy, and improved performance.

Cost savings would come from reduced software expenses, reduced operational staff requirements, and reduced facilities and utilities expenses. Improved hardware asset utilization would also decrease overall costs.

The consolidation should result in improved service, ranging from limited to significant. Cost savings would be very significant, estimated in the 20% plus range on a total data center cost of $23M. Additional facility's savings would also be available. Since we were not provided facility numbers, we could not quantify those savings.

Given the reduced space requirements of the latest technology, the Starc Armory might be an excellent location for such a consolidation. UPS and diesel backup will provide high levels of availability and recovery protection. It is also centrally located (to a degree) between Des Moines and Ames, convenient for staff from both locations.

ISSC has a great deal of experience in data center consolidations, reducing costs and improving service levels. ISSC consolidated 48 US data centers to four reducing IBM's internal I/T budget by several hundred million dollars. Customer satisfaction also improved.

D. Help Desk

Centralized help desk services provide end users a single point on contact for all their I/T related concerns. If the data centers consolidate, the help desks should as well.

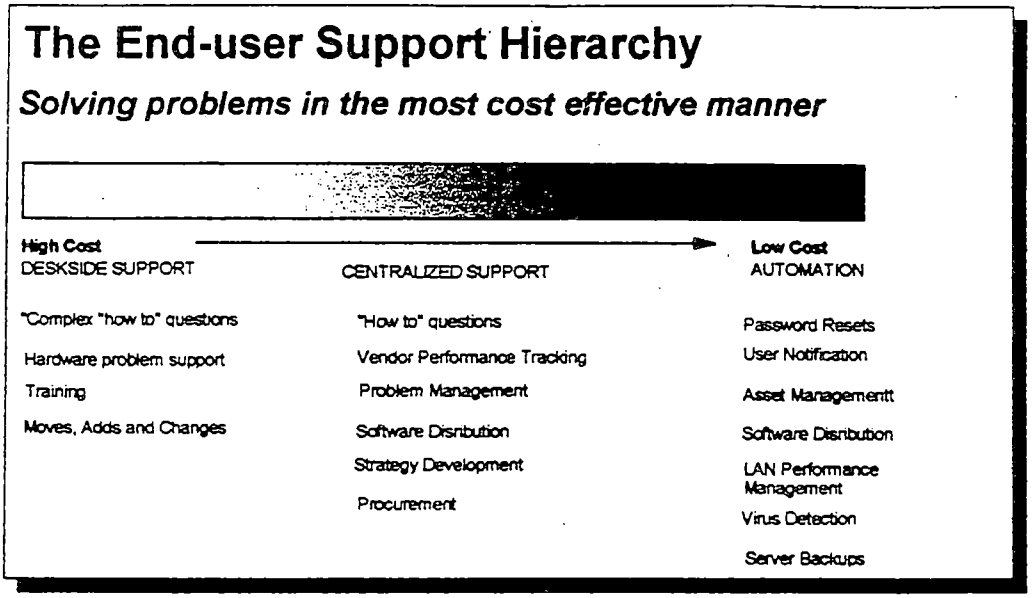
Integrating multiple help desks will permit investments in the latest voice response, telephone, problem management and asset tracking systems. Responsiveness (less than 30 second hold time) and high first call fix ratios (75%+) are common in well-run help desk environments. User support is provided 24 hours-a-day, seven days-a-week.

Most users are not able to isolate whether their problems are in hardware, systems software, application software or network; advanced help desks are the first step in a responsive end-user support program. Help desks can use advanced tools to gain control of the user desktop and can guide the user through the steps of problem resolution. The help desk support technician owns the problem through resolution, using a combination of on-line tools, and second and third level support structures. Most importantly, the resolution of problems and their symptoms are recorded in the on-line database, immediately available for the next problem call.

For the short term, help desk fits into the "Added Value" category. Most departments do not have discrete help desk staffing and the current investment is low. Eighteen FTE's provide help desk services across all departments today. Most user support is provided on an as available basis and has been "informal" in the sense that problems are not captured and logged. A dedicated staff is not available 24 hours-per-day, seven days-per-week. Little cross-department synergy exists in help desk operations and staffing.

In the "Establishing the Priorities" graphic, we show the long term potential for 15-20% cost savings. This represents the savings anticipated from implementing an enterprise-wide help desk.

As the PC base grows and applications become more complex, support demands will outgrow the current, more "informal" approach.



Properly implemented, centralized help desks reduce the dependence on peer and systems staff support -- the most expensive and "hidden" cost of end user support. Centralized does not mean "lack of department specific understanding". Depending on the problem, callers to the help desk can be directly routed to department specific call takers who are schooled on unique applications and platforms. If on the other hand, the problem is known and simple, automation may be able to handle the request without help desk personnel involvement (i.e. password resets). This support "hierarchy" ensures that expensive and valuable staff time is dedicated to challenging issues and that comparatively low cost automation handles the more routine calls. The on-line problem database could also be used as input to training classes.

E. Network (LAN/WAN) Management

LAN/WAN management consolidation is also a candidate for short and long term savings, and is an exceptional candidate for long term service enhancements.

Combining the existing WAN's (DOT, DGS, DES and DPS) would by itself present opportunities for savings and service enhancement. But if WAN and LAN management were consolidated into an effective, efficient service oriented, enterprise-wide network, the potential benefits could be significant. While there are four WANS, there are LAN support structures in nearly every department, and several within some departments.

A single, Iowa enterprise, LAN/WAN and single support structure could provide a cost effective and highly functional "Iowa Value Added Network" backbone. This backbone would be the any-to-any network for the use and benefit of all Iowa government applications. A consolidated LAN/WAN, when combined with a consolidated data center, provides an end-to-end Iowa I/T

service delivery function; just as a phone company or electric utility provides end-to-end user delivery.

It is essential that a consolidated LAN/WAN service delivery structure not be limited by resource, budget or structural constraints. It would only be successful if it were run like a service-oriented Value Added Network.

F. NetWorkStation Management

NetWorkStation management is a candidate for short term service improvement and short term cost savings. Over the long term, significantly greater savings and service improvement potential exist.

Today, the State is spending approximately $2,400 per workstation per year on its 10,000+ network of personal computers. This is relatively low compared to industry averages which range from $2,000-$6,000 per workstation per year.

There are relatively few mission critical applications rolled-out; what is rolled-out is often supported by a "hidden", informal, support network. As more mission critical applications are distributed to personal computers, an informal peer support structure will no longer be affordable or sufficient.

As I/T budgets have been cut over time, pockets of informal support have grown. This shifts the expense burden from traditional I/T budget line items to more "hidden" peer support. It is natural that people rely on those closest to them for support; unfortunately, it is also very costly.

Properly supporting the rapid growth of workstations requires a combination of centralized and deskside support organizations. It also requires sophisticated problem tracking systems, state-of-the-art problem identification and analysis tools, and highly skilled individuals.

In order to stay current with industry trends and products, we recommend that a few highly skilled individuals conduct formal reviews on all new products, rather than having each department attempt to keep up individually. These individuals will establish best-of-breed platforms and assist in rolling-out the platforms in a consistent, quality manner to all departments.

Software upgrades will be distributed electronically and inventories of equipment and configurations maintained on-line. Server backups will be performed nightly, automatically.

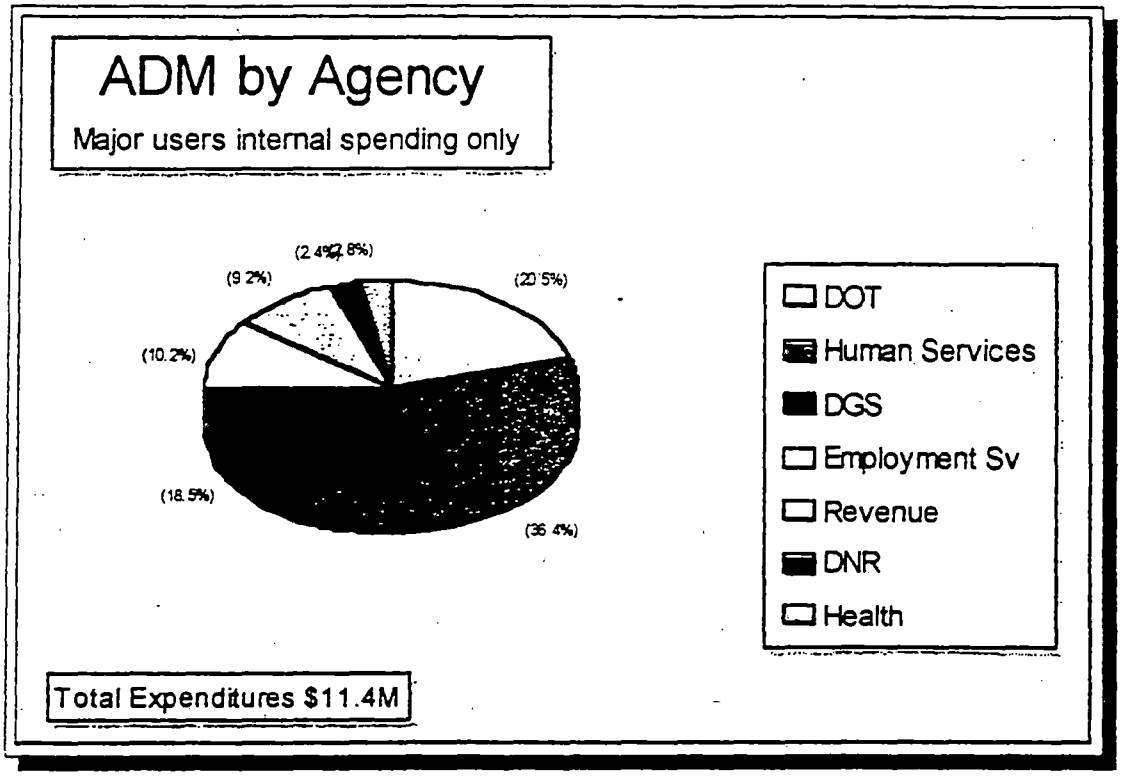
The support infrastructure includes a combination of low cost help desk automation, lower-cost centralized support and high-cost deskside support. As the tools become more sophisticated and the organization becomes more familiar with the support structure, more and more problems are handled by the lower cost automation tools and fewer by the deskside support team.

Unfortunately, without a good understanding of the "hidden" costs of NetWorkStation support, it is difficult to understand the value and therefore, the savings of an investment in a sophisticated

support structure. If the State believes the $2,400 per year support costs reflect total costs, it would be difficult to see additional cost savings; however, if PC support costs were increased to include the hidden support costs, the savings would easily be beyond the 20% range. For this reason, we reflected our range of savings for NetWorkStation to be very broad.

G. Application Development and Maintenance

Application development and maintenance (ADM) is defined as the new application build and legacy support activities currently performed in almost every department. It is the single largest labor cost in information technology and is crucial to the delivery of department services.



Application development and maintenance, more so than any other function, demand a close tie between I/T and the user community. An excellent example are the ties between DOT users and their support teams. It would be unwise for anyone to alter these excellent relationships because the institutional knowledge could never be replaced and is a valued asset of the State. We would expect to leverage and build on this base to improve service levels over time.

In the short term, minimal savings should be expected if application development and maintenance would be outsourced. Over the longer term, significant savings could be achieved from a combination of improved management, tools and application development processes.

H. Summary

This section estimated, to the best degree possible, the areas of service improvement and quantified the potential savings opportunities. We have established short and long term estimates based upon what could be expected if ISSC were to perform all the functions recommended.

Given the magnitude of investment in data center operations, the potential for short term and long term savings and the potential for service improvement, data center operations should be the first priority for consolidation. Network and help desk operations are logical extensions of the data center, and are also candidates for immediate consolidation.

IV. Implementation Options

This next section weighs the advantages and disadvantages of the three potential approaches to implementing consolidation.

A. Introduction

We believe our recommendations, when implemented, will have significant cost saving and service level improvements. When implemented enterprise-wide, the executive branch will become a more effective and efficient user of information technology.

Three implementation options exist for each of the five functional areas:

1) Insource - Major investments may be required in processes, tools and management approaches to implement our recommendations. Structural changes to procurement, hiring and personnel practices would also be required.

2) Insource with supplemental consulting services - Continue to invest in consultant services to provide guidance on industry leading approaches. Implementation responsibility would be retained by the current staff.

3) Outsource the consulting and operation - Contract with a vendor, whose core competency is information technology, to provide the guidance and implementation of these recommendations.

The risk of achieving success with each option must be weighed against the potential benefits to be gained. The following describes the advantages and disadvantages of each of the above approaches.

B. Insource

Improvements in process, management and tools would be required if the State were to implement the recommendations in-house. However, our interviews indicated that these investments have decreased, not increased, over time -- typical for organizations that view I/T as an expense rather than as a strategic investment.

The I/T industry is changing rapidly; constant continual investments, which are often not affordable on a small scale, are required to remain competitive.

The State of Iowa is a large user of information technology, but does not enjoy the economies of scale typically associated with being a large user. The current department-by-department approach to I/T reduces the benefit of scale, reduces asset utilization, makes skill development more challenging, and therefore, is more expensive. Gaining internal efficiencies will require both organizational and cultural changes, including taking an enterprise-wide view of I/T.

While potentially attainable, it will be difficult to achieve these efficiencies as quickly as a company whose primary business is information technology. I/T is simply not a core competency of government and the costs and risks of building and maintaining this competency are often prohibitive.

ISSC does not recommend this approach unless major structural modifications are made as well. Core competencies are not quickly built or easily maintained. For example, personnel and pay practices would have to change to retain industry leading skills. Initial and on-going major, investments in education would be required. Organizational, procurement and resource processes will require modification. Even if the changes are made, there is no guarantee of success. Cultural changes are often best made by an entirely new approach.

The challenges facing the State are similar to those facing other Fortune 500 sized organizations. Traditionally, the only alternative was to "do it ourselves". Today, other alternatives exist that reduce risk and more rapidly realize benefits. This is one reason why so many large organizations have looked at outsourcing.

C. Insource with supplemental consulting services

Outsourcing companies, such as ISSC, offer consulting skills that will help the State implement the recommendations we outlined in Section II. Under this alternative, ISSC experts would provide advice, complementing internal staff, transferring knowledge and expertise. As an example, we often consult on the consolidation of data centers or on the implementation of application development productivity measurements.

Hiring consultants is relatively simple and consultants can provide the skills necessary to complement in-house staff. Contracting of services is much easier than contracting for outsourcing and the commitment can be quickly terminated.

The major risks of consulting are that the skill transfer does not always occur, the recommendations do not achieve the desired results or the newly skilled individuals do not remain with the State. Savings are usually not as large as those provided by outsourcing, and often, consulting may be more costly in the short term.

D. Outsource the consulting and implementation

Currently, there is limited understanding of, or experience with, outsourcing within the Iowa information technology community. The knowledge that does exist is clouded by fears of "what will happen to me" if the State proceeds.

Outsourcing is a combination of the two earlier approaches with the benefits of guaranteed results and cost savings.

ISSC provides guaranteed rates, based upon user controlled metrics, for up to ten years. Normally these rates are lower than current rates and the pricing structure is analogous to

procuring utility services. Capacity management becomes the responsibility of the service provider, who is encouraged to provide unlimited resources and rapid, responsive service.

Existing State employees become employees of the outsourcing company -- with a mission to provide the best possible service to their customer. They will have new opportunities for personal development and career growth. They will join a company whose core competency is information technology.

The disadvantages of outsourcing are a more complex and lengthy procurement process -- more so than contracting for consulting services. Outsourcing is a long term commitment and will be a change for the affected employees. This "fear of change" must be managed throughout the procurement process; employee concerns about job security must be addressed or the best employees may leave prior to contract award.

ISSC is rapidly growing, and the information requirements of the State of Iowa are growing as well. In this dynamic environment, we will need all the information technology professionals we can get. Additionally, we would plan to consolidate operations in Des Moines, limiting the impact on employees. Some amount of uncertainty is natural, however the levels we saw during our assessment were far greater than normal.

ISSC's reputation in handling employees is unmatched in the industry; our retention rate for our new employees is 95%; existing pay levels are maintained and our benefit plan is one of the most comprehensive in American industry.

E. Summary

Given all the above, we believe that outsourcing has merit and that the State should, at a minimum, outsource a portion of its I/T operations. ISSC suggests the following priorities:

1. Data Center Operations - Data center functions can be clearly defined, current costs are easily determined and the benefits of consolidation of operations are too significant to ignore.

2. Help Desk - Centralized, single, point-of-contact support is the first step in cost-effectively managing a complex, distributed computing environment. We recommend that the help desk be outsourced concurrent with the data centers.

3. LAN/WAN Network Operations - With the potential for significant improvement in service, this area becomes a logical extension of outsourcing data center operations.

4. NetWorkStation Management - Managing all elements of the remote computing environment will continue to be the most rapidly growing portion of the industry. Costs are growing rapidly. Over the long term, this area could have the greatest potential benefit to Iowa State government.

5. Applications development and maintenance - Department reluctance to "lose control" makes application development a less obvious candidate. Benefits can be achieved, but customer

acceptance may make implementation more difficult. Increased familiarity with outsourcing is probably required prior to considering application development. Once outsourcing is proven, and the problem is better understood, departments will be more willing consider this element.

Iowa State Government Technology Assessment Project

Appendix D

AFSCME Assessment

the Yankee Group
December 29, 1995

Executive Summary

The objective of the AFSCME IT Employee Group is to provide for "results from information assets that customers value." We can accomplish this mission by engaging in new business technologies, research and new product and service development, production services, data operations, consultation in areas such as systems planning, and provision of information and training to customers and employees.

This is a high-technology environment where norms have been turned topsy-turvy through innovative changes. In addition, many other exciting--and sometimes chaotic--changes continue to occur almost daily.

Moreover, we have many diverse stakeholders who share a central theme: to serve the public. With the extremely rapid pace of the technology evolution (including our own internal service development), it becomes difficult to define tasks, technologies, or even organizational structure in static terms.

Many of the same critical issues face the Iowa IT Enterprise as with other organizations. Issues with the most major impact include human resource management. Some of the issues (but not all) are: installation of new technology and the implications on internal promotions, reassignment or recruitment of employees, employee skill development programs necessary to remain competitive in the job marketplace.

The successful future of the enterprise will rely heavily on efficient and rapid implementation of technology, the ability to move parallel with and adapt to technological demands, and the ability to continue to provide services on a cost-efficient and value-added basis.

One method to accomplish this is to bypass the slow moving "ripple effect" of change and use a process of employee "empowerment" to address needs, use judgment, and take action without delaying the decision-making process. The focus and visionary direction must be on balancing the tangible and intangible (research and development, new product pilot projects, product customization, etc.) to remain on the cutting edge. With the goal of providing quality service to our customers that results in a "value-added" outcome (operating policies, procedures, and staff training and development).

The AFSCME IT Employee Enterprise Group has responsibility for three major areas:

—Connectivity

—Cooperative processing environment

—Ensure data integrity and dissemination

Within these primary focus areas, we want to provide technological leadership by:

—Keeping up with technology changes and trends,

—Implementing new technology

—Activating and efficiently operating the Iowa IT Enterprise

Further, the IT Enterprise can and should become an infrastructure provider and serve as a learning site. In order to achieve our vision, it is critical that employees be supported with human resource management practices that provide for a flexible, adaptable management structure requisite to achieve our mission and goals. Our report is an "inside" perspective of some current processes, practices and procedures. While it may not be as in-depth as that of the outside consultants it is a "value added" piece that must not be overlooked. The human resource aspect of the enterprise is its most unquantifiable and valuable facet.

In March of 1992, A Strategic Plan For Information Management was produced by the Department Director's Executive Committee. The plan included several recommendations for implementing, funding and managing technology for the State of Iowa It stated, "...in today's environment with rapidly changing technology and shrinking resources a proactive approach is needed to effectively and efficiently manage information technology. This proactive approach requires defining how information technology can be used as a strategic resource to make the management of state government more effective."

"The Strategic Information Plan is designed to address the concerns identified in the Executive Strategy Session, support the mission statements of the Departments, and address the critical issues in the Iowa Futures Agenda. This plan provides the foundation for pursuing the strategy identified in the "Technology" section of the Futures Agenda. The Strategic Information Plan includes recommendations designed to address these and other related issues and concerns."

In October 1994, the Information Management Committee produced Data Processing classification system recommendations from the IMC Position Classification Subcommittee. It recommended new flexible classification series for Information System and Information Technology personnel in State government. It stated, "The current state personnel classification system for data processing professionals has existed in much the same form for over two decades. However, the environment in which the system operates is changing. This change is being driven by such factors as rapid change in technology and the evolution to greater end user participation in all phases of projects which seek to apply information based solutions. Revisions are needed in the current classification system to permit it to meet the requirements of information management professionals in the future."

These efforts of internal innovation and improvement are yet to be implemented. These recent recommendations would improve the delivery of services and provide a more flexible methodology for defining the classifications of the IT staff. Guidance and leadership with an IT Enterprise approach will be required to fulfill the vision of the plans. Iowa's technology functions need it, require it, and deserve it. It would position the IT Enterprise to take advantage of the technological advances the industry has produced and promises.

The recommendations contained in this plan summarize practices that reinforce the flexibility, fluidity, and innovative strategies needed to help us achieve all of long-range Enterprise goals in a joint partnership manner.

Autonomy and Entrepreneurship

The new idea either finds a champion or dies...No ordinary involvement with a new idea provides the energy required to cope with the indifference and resistance that major technological change provokes...Champions of new inventions display persistence and courage of heroic quality.

—Edward Schon, M.I.T.

A Bias For Action

"But above all try something."

—Franklin D. Roosevelt

Iowa IT Enterprise

1. A. Iowa IT Enterprise Virtual Team
1. B. Mobility Assignments
1. C. Application Development, Information Engineering methodologies and CASE Tools
1. D. Standards
1. E. Training and Research/Development Center
1. F. Technical Library
1. G. Mentor Program

2. A. Iowa IT Enterprise Connectivity
2. B. One Stop Shop Service
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8. Conclusions

9. AFSCME IT Employee Team

1. A. Iowa IT Enterprise Virtual Team

The State of Iowa has an invaluable asset in its Information Technology human resources. An inventory of the IT Enterprise hardware and software can be assembled and made available to the IT Enterprise. Likewise, an inventory of Iowa's vast and varied skills residing in its IT staff needs to be assembled and made available to all users of the IT Enterprise. This inventory of IT skills can then be available for any of Iowa's project needs. It would become part of the foundation for the IT Enterprise.

The concept of an Iowa IT Enterprise Virtual Team is an internal innovation that will create a level of flexibility to assist in implementing the prior studies that recommended an enterprise view of IT. A centralized repository of knowledge, skills and experience will be a valuable asset for the IT Enterprise. Iowa has a tremendous diversity and wealth of knowledge resident in its IT staff. The recent technological advancements and the investment that Iowa has made in its equipment and software is matched by the human resources required to manage and operate it. The investment in training and experience can be utilized to its fullest extent by a system that will ensure that the best fit is made for the task at hand.

IT knowledge and skills are quite mobile, especially if they can be applied in a structure that can be standardized. Many functions are quite similar and the only training required would be familiarization with the idiosyncrasies of the equipment or software used. Also, many of the functions performed by each agency are similar. The application of the knowledge and skills gained through experience in one agency can be transferred to other agencies in need of those assets.

Work loads vary over time between agencies. Skill levels and work force size are variable during project development, implementation and operation. A static work force in an agency may not be the best fit consistently. An IT Enterprise work force could respond to volatile work load demands.

A team of IT professionals can be assembled from the inventory of skills required to meet the customer's needs. They are available to function throughout the IT Enterprise to fulfill development or maintenance needs for short or long term projects. Few can disagree with the observation that State employees are hard working, knowledgeable about their jobs, dedicated and caring. They share a common methodology, are familiar with the equipment, standards and procedures in the IT Enterprise, and share a common purpose of providing the best product to their shared customers in a timely fashion. A Virtual Team is an innovation to respond to the need to make government more efficient and productive.

A Virtual Team is flexible, able to respond quickly and successfully to assist in the development of projects with short deadlines, or unanticipated projects. It can offer the value added productivity for a 21st century State government. They can handle production maintenance and enhancements to existing system as well as new development. This team can be used as a tool to plan projects,

allocate human resources, set priorities and develop schedules for small and large projects and tasks. This Virtual Team is the best fit for any particular application or project.

1.B. Mobility Assignments

The Iowa IT Enterprise should use mobility assignments as one way of creating the fluidity and flexibility necessary to allocate human resources in an efficient manner. Additionally, mobilities provide:

---Ability to move quickly in finding employees to fill a need.

---Opportunity to research the need and level of responsibility for a project/product.

---Ability to fill a position strictly on a temporary basis.

---Availability of job enhancement opportunities for employees.

The organization should develop and apply a consistent philosophy toward mobility assignments so that all work groups feel this opportunity is equitably treated throughout the organization. There are specific groups within the State and AFSCME that can identify issues in further detail; however, some tools which can be applied to assist in fostering mobility assignments include:

---Developing a philosophy statement surrounding mobility assignments that is uniformly applied in determining:

1) When to use mobilities.

2) Attitudes toward the use of mobilities

3) Standardized procedures relating to budget, filling behind, etc.

Implementing a standardized checklist of issues pertaining to the mobility would be completed by the supervisor of the position and be made available to all applicants. In some instances, the answer to a particular issue may be "do not know". However, this information should be available to all applicants to assist them in their decision of whether or not to apply for a mobility. The employee should be given a checklist of issues to discuss with their supervisor prior to accepting a mobility assignment pertaining to shift availability, work assignment upon return, etc.

It is not the intent of these recommendations to create unnecessary restrictions or paperwork. This tool is meant to create a more fluid structure within which to operate; however, employees should receive consistent information pertaining to these opportunities.

Retaining the use of the Iowa IT Enterprise Virtual Team has the inherent advantage of utilizing factors that cannot be measured, yet are essential for building a long term organization of

dedicated professionals. They share a sense of mission and loyalty, maintain high morale, retain knowledge of the IT Enterprise applications, have a pride of ownership, and will provide a consistency in their work. The cost differential between an IT Enterprise Virtual Team and hired consultants is minimal. In most cases, the existing staff total cost would be less. The current rate from DGS for Systems Analysts is $46.36, and the rate for Computer Programmers is $38.12. These compare favorably with the current contracted costs.

The long term advantages for using the IT Enterprise Virtual Team has to be considered strongly. For agencies who have reached their staffing Full Time Equivalency or point limits, the charges for using the IT Enterprise Virtual Team will affect the budget expenditures the same as the support costs for non-state consultants.

1.C. Application Development, Information Engineering Methodologies and CASE Tools

Information engineering tools provide a framework for the use of sophisticated tools and techniques that automate and provide structure to the systems development process. Such tools include: Computer Assisted Software Engineering (CASE), fourth generation language (4GL) and Expert Systems. Studies have shown significant long term savings in time, staffing and cost when application development uses these tools in conjunction with a well defined information engineering methodology.

By creating an application development environment that combines the latest technologies and tools with effective methodologies, the State can respond more rapidly to its business needs. When the IT Enterprise combines it efforts, it can acquire multi-site licenses for the development tools and share those resources. Standards will need to be established for the development application solutions. Some application development tools are currently being used by some agencies. Other needed development tools can be obtained from other states, be purchased as packaged software, or be developed by the IT Enterprise. These shared resources will mean an increase in the efficiencies of the total operation, will protect the overall investment in systems by extending their useful life, and reduce the overall cost of application development and maintenance.

1. D. Standards

A standard is a set of rules or a model commonly accepted or adhered to by the participants in a system. It is a criteria set for usage or practices. Standards are usually set formally , but some standards emerge due to their predominate usage.

State agencies are now beginning to function in an environment where there is an increasing need to share information across the IT Enterprise and with local, federal and other state governments. To accomplish this, there must be a coordination and standardization of information technology in the IT Enterprise.

The value of the technology investment in Iowa's agencies is enhanced by providing a vision with strategic information planning. Information technology plays a critical role in communicating, coordinating and the delivery of services to our customers. Requirements to integrate information resources are growing rapidly. Standards provide the foundation for this needed information integration.

When an enterprise uses the same standard delivery technology for a range of services, the support costs for systems can be diminished. Standardized Network Operating Systems for LAN's and WAN's and their application software will allow access to data and the distribution of functions across the IT Enterprise. Providing barrier free access to information and avoiding redundancy and duplication can minimize the need for retraining users and technical experts and minimize the recruiting costs for unusual or specialized skills.

1. E. Training and Research/Development Center/Partnerships

It is critical that a well organized, sequential training and development program be conducted for employees on a regular basis. Training and development needs should be assessed at least annually. This could logically be tied into the performance negotiation program.

Iowa and the Midwest as a region has acquired an outstanding reputation for its innovative, high-technology business and educational institutions. These entities are known for being leaders in quality, productivity and innovation. The Iowa IT Enterprise should form partnership's with these organizations to help design employee development and training programs. The value of tapping into many major local high-technology organizations as a resource should not be overlooked.

To support the Iowa IT Enterprise Virtual Team, greater emphasis must be placed in a Training and Research/Development Center. Each data center now has training to support their own configurations and systems. A critical factor in supporting the concept of the IT Enterprise is the training that will be required for implementing the standard development methodologies, software tools, operating systems and equipment.

The IT Enterprise Training Center will be able to take advantage of a focused training facility and techniques. It can use the training sites on the ICN (Iowa Communication Network) for multi-site training. As field offices become more sophisticated in their technology, there will be a greater need for distributed training. CD ROM disks hold a tremendous amount of material and they are currently available with technical journals and other reference materials. The IT Enterprise Training Center can become a state wide library for resource material.

Additional avenues for training need to be pursued. By connecting to the Regents institutions, there could be shared training and materials available enterprise wide. The IT Enterprise will also be able to take advantage of partnership arrangements with vendors to utilize training opportunities offered by them. The IT Enterprise Training Center staff will also be able to develop and promote IT support groups and professional organizations.

The IT Enterprise Training Center could be used to provide time, equipment and training for employees to research new technology, hardware, and software in a laboratory atmosphere. This would educate and inform employees about new technologies before they are implemented into production settings. A full investigation could be made of proposed solutions to find the best fit for the various agencies. Valuable staff time would not be consumed by experimentations with sophisticated solutions individually.

1.F. Technical Library

Iowa should strive to have the most advanced, state-of-the-art technical library in the region, with heavy emphasis on serving its diverse customers.

---The library should subscribe to on-line search services pertaining to information technology and management. It should also upgrade and enhance its collection so that customers have a full service technical library available to them.

---IT Enterprise should research alternative means of financing library services, such as partnering with the Universities and other educational institutions, pursuing federal grants, seeking endowment, or linking with other "think tank" research organizations.

1.G. Mentor Program

The Iowa IT Enterprise should consider establishing a formal mentor program for its employees. Organizations that are fluid in terms of their structure make good use of this concept, since an employee may work for long periods of time on projects as part of other work teams which do not fall under their direct supervisor's jurisdiction. A mentor program would assign employees to a "sponsor" responsible for showing them "the ropes". This person is someone to ask questions of, who is proactive in seeing that career development is fostered, and who acts as an advocate. Management and the Union assess the benefits of such a program and the specific responsibilities of a mentor. Informality of structure and strong follow-through would both be required to make the program successful.

2. A. Iowa IT Enterprise Connectivity

Currently agreements are negotiated between different agencies; and vendors and agencies to achieve products for its customers. Taking this one step further, the IT Enterprise will have to determine how to support and sustain the current customers. It is essential that business plans be circulated throughout the Enterprise during the early stages of plan development. This will be due to the "interconnectivity" of technology and work planning of IT applications and development, systems support, LAN's and WAN's. Early review and comment by stakeholders can result in better coordination of work efforts, resulting in the best delivery of services. Also, in a pool of finite funding dollars it would allow the enterprise to move cost to users instead of relying on Federal and State appropriations for primary funding streams.

Connections are currently installed between the three State mainframes at DGS, DES and DOT. A further step to consolidate the mainframes either physically or logically needs to be pursued. IT information storage and system development would then occur on the mainframe containing the appropriate tools and space available for the application. The IT Enterprise customers would use cycles and space on any mainframe that is available. They would then have access to all the software and tools on all the mainframes.

2. B. One Stop Shop Service

The IT Enterprise System would be able to integrate information from various agencies to provide a one-stop-shop environment for the citizens of Iowa. The tax paying customer would be able to obtain information for various services (IE child support, tax refunds, drivers license, FIP eligibility, etc) at one location. This approach would enable customer convenience and eliminate delays in providing required services. Instead of being specialists in single agency systems, the staff would consist of generalists with knowledge of the consolidated systems of the IT Enterprise. To accomplish this goal, inter-agency barriers would need to be overcome.

2. C. Single Source Help Desk

A single source for technical assistance and trouble reporting needs to be established for an IT Enterprise. The center would have to be able to receive calls from all the IT Enterprise customers. They would have to handle the needs for software, PC's, LAN's and WAN's across the breadth of the IT Enterprise. A single source for handling all the assistance needs is a service feature that will become more apparent as the diversity and distribution of the applications, equipment and software continues.

2.B. Advisory Group/Operations Research Team

The State Enterprise should investigate the need for a full-service, high-technology advisory service. This service could be formed through the matrix/project approach utilizing inter-disciplinary teams and could serve as an excellent employee development tool. This group could provide:

---Expertise on a consulting basis for information management and operations research, in terms of technology and applications, as well as improved efficiency and productivity.

---Employees could serve as "umbrella" project managers, utilizing research team members from within the organization as well as college interns.

---This type of service would be more cost efficient compared to outside firms, and it would ensure greater "interconnectivity" within the statewide architecture.

2.C. Entrepreneurial Program

If the IT Enterprise is to cultivate and reward innovation and risk-taking, it must have some means whereby employees are allowed to experiment in a supportive environment.

---The IT Enterprise should establish a research and development mechanism which sanctions experimentation and development of new ideas. A method for doing this would be to allow grants of time, money, or other resources on a project basis to any employee with a viable idea, even if it does not match his/her job description. This would allow employees the opportunity to work on any project which may help the State Enterprise accomplish its mission and goals.

---In order to encourage innovation, the enterprise should incorporate an awards program in support of this cultural element. One method would be to have a monthly or quarterly innovation trophy awarded to the division, work team, or individual showing the most innovation and creativity in providing service to their customers.

2. D. Time Management and Project Management

A uniform Time and Project Management package will need to be accessed by all staff in the IT Enterprise. It will have to be capable of tracking numerous projects, time projections allocated to each project, time spent on the projects, and the funding streams that will be charged for the expenses. The funding accounting will need to be incorporated into the system so that the proper federal, state and other sources can be charged appropriately.

2. E. Security and Confidentiality

A uniform security system would be established for the IT Enterprise system. A security administration staff would be responsible for entering uniform security identifications for the various types of customers throughout the state. This would include access to TSO, Production CICS, Test CICS, Test Base Base and Office Vision. A uniform security system would allow for access to the IT Enterprise system based upon the needs of the customer.

A second level of security, dependent upon the application needs, would be administered by an authorized security officer for the individual agency. They would be responsible for handling requests for access from their agency customers.

All data that is contained in the IT Enterprise would retain its necessary level of confidentiality. The data handled by the various agencies contains sensitive data about our citizens. All the agency staff who have access to the IT Enterprise equipment, data and systems, will need to agree to confidentiality standards.

LAN and WAN security would also be administered by the IT Enterprise security administration staff. This would ensure uniformity among the various networks within the IT Enterprise. This would also relieve the agencies of the complexity of handling the LAN and WAN security software intricacies.

2.F. Organization Report Card

While it is very important for an organization to have a clear mission, values, goals, and strategies, in order to be truly effective it must periodically assess itself. Any IT Enterprise must take a critical look at itself and become intimately aware of its strengths and weaknesses. Once identified, these "weaknesses" can then become the "challenges", but only after they have been clearly and honestly identified. This becomes the organization's "gap analysis."

IT providers should develop tools to assess customers' values and satisfaction levels. It is not enough for the organization to look at itself in the mirror. If IT truly wants to be committed to customer satisfaction, it must go directly to its customers for this evaluation. This information can serve as the focus of periodic all-staff meetings, or an organization report card.

3.A. Iowa IT Enterprise Software Inventory

The IT Enterprise System would facilitate greater control of software inventory. Currently agencies are independently researching and procuring software solutions for the same solution or function. Technology provides methods to handle the many requirements demanded by the agency customers or for their own administrative purposes. The same software is functioning in several agencies, or different software that performs similar functions can be found in different agencies.

The IT Enterprise will focus on the inter-dependency of State agencies to share data, staff and functions. When all software procurement has the IT Enterprise attribute, they will have multi-site license arrangements so that the total functionality can be determined for greater cost savings to the State and the people of Iowa. Sharing procurement, resources and training for the various software packages will reduce costs.

The IT Enterprise would merge information and communication technologies. It would use multi-site arrangements so that agencies can share technology advances on one or several agency computers. By establishing IT Enterprise standards, the procurement process would be handled by experts knowledgeable in the technology, relieving the individual agencies of the need to recruit and retain expertise for sophisticated systems.

4. A. Iowa IT Enterprise Hardware Procurement

The economies of scale will give the IT Enterprise an advantage when procuring equipment, software and services. Vendor prices will have to stay very competitive in order to win state-wide contracts. The volume discounts will drive costs down.

At one time the procurement process was centralized. A staff of IT procurement specialists and inter-agency committees were available to assist each agency in their technology needs. The options, features and variety of vendors available in the modern world of technology is increasing exponentially. Each agency is no longer capable of investigating all the potential solutions, of developing a technically competent expertise of their own, and being assured that the procurement decisions are the best fit for themselves and the IT Enterprise. Some agencies, due to shortage of staff or time, choose a particular vendor and then only pursue the options available from that single source. The solutions could be appropriate, but if Iowa now chooses to become the IT Enterprise, the procurement decisions will have to be made for the entire enterprise and not a single agency. Procurement decisions need to be made for the long term benefit of the entire enterprise.

When justifications for procurement are made, the equipment from the vendor lists are traditionally ordered. In some cases, new equipment is not necessary to fulfill the requirements. Research into the use of the secondary market of used IT equipment should be part of the procurement process.

The equipment is refurbished and guaranteed available for Original Equipment Manufacturer maintenance. The cost may be as much as 50% to 75% less than new equipment and would perform the necessary function required in the procurement justification. A prudent use of this procurement option could save the IT Enterprise budgeted funds that could be redirected into other priority areas.

4. B. Hardware Maintenance

The State of Iowa has made a substantial investment in IT equipment. Some of the equipment has remained in useful service for several years and will retain its beneficial functions into the future.

When this equipment was initially procured, it usually included a warranty period. As the warranties expired, a decision for retaining the equipment on a maintenance contract needed to be made. The most common decision for maintenance has been to acquire the services of the Original Equipment Manufacturer. The cost, by industry standard, is approximately 15% of the purchase price.

Several different vendors are now required to service the variety of equipment located throughout the State of Iowa. The level of coverage, the response time, and replacement parts stocked by the vendors varies greatly. Also, since some of the equipment is integrated with other pieces of

equipment, the vendor responsible for the loss of service is not always obvious. As a result, some calls for service are made to the incorrect vendor.

Each agency is responsible for the maintenance agreements for their own equipment. Some agencies, in cost savings decisions, do not have maintenance coverage for some or all of their equipment. This philosophy of risk management through self insurance may operate successfully in larger agencies. The risk may not be cost effective for smaller agencies. One major malfunction can cost more than the total cost for annual maintenance for a unit of equipment and can cause a substantial drain in their support budget.

Some agencies have negotiated a single source maintenance agreement. All the equipment including terminals, printers, control units and multiplexers from all the suppliers are covered. They are a multi-year agreement prepaid at the beginning of the fiscal year. The coverage is 24 hours each day, seven days a week. A four hour response with a 24 hour fix or replace option is also available. This type of agreement could be expanded to include personal computers, LAN and WAN equipment. There are also vendors available for ongoing software maintenance and assistance.

The Economy of Scale in the agreements meant an immediate savings of 20% to 25% in the maintenance cost and resulted in better service. The maintenance service provider placed their own replacement equipment in some remote offices. It was used to swap for faulty equipment until the field engineer could arrive to fix the problem.

If an Iowa Enterprise maintenance service contract is negotiated, it would reduce the cost of maintenance, provide better service and cover essential equipment that is now self insured by individual agencies.

5.A. Iowa IT Enterprise Disaster Recovery

The floods of 1993 made us all aware of the potential for disasters. Very little has been done beyond developing a cold site for the major mainframes and developing back-up strategies for the data. The Iowa IT Enterprise must have a Business Recovery Plan. A planning team of experts must be staffed to assist all the agencies in developing needed plans.

The team would develop an IT Enterprise Disaster Recovery Plan to ensure timely recovery of all information systems. The plan would include mainframe, LAN/WAN and PC operating systems and data. The STARC Armory site is an excellent beginning. It must now be followed by the necessary recovery plan because we never know when the next disaster may occur.

6.A. Iowa IT Enterprise External Consultants

Iowa has been operating with the mandate to produce more with less for several years. It has been able to respond to the demand for more service through the use of technology. Larger and faster computers, greater processing power on the desks of State workers, computer assisted customer response technologies, and more sophisticated systems are all part of the modern office in State government.

This has all been accomplished with the artificial Full Time Equivalency (FTE) cap. The statistics show that the majority of state technology staff are used to implement and maintain legacy systems. The majority of allocated FTE's are being utilized on production systems.

Development of new technologies and systems cannot be accomplished with the allocated FTE's. Currently, new development requires the utilization of external consultants. Their cost is not reflected in the budget salary for the agencies, but is procured in the support budgets which are more lenient for acquiring needed staff to accomplish the mandated objectives of the agencies. Out-sourcing is not a substitute for past management practices or decision making. The premise that private firms are somehow naturally more efficient than government is the wrong approach. Without changing the vision of the IT Enterprise, the problems will remain and the product quality will not change.

An Iowa IT Enterprise approach would enable the agencies to accomplish both objectives of developing the new applications and yet remain under the FTE caps. When a specific area of technology is required, the IT Enterprise could capitalize on the expertise of external consultants. The consultants services would be used on a short term basis to enable State staff to gain the necessary knowledge required by new trends and technologies. The consultants would be used to mentor State agency staff and to assist in technologies that are new to the IT Enterprise. The development, implementation and long term maintenance would be handled and controlled by IT Enterprise staff.

The current practice in several agencies is to use outside consultants to develop new applications. By utilizing temporary outside consultants for new development and enhancements, State staff must maintain unfamiliar systems, and systems knowledge and expertise is lost when consultants leave. Management appears to believe that the skills and abilities of consultants are superior to that of their own staff, this fosters an atmosphere of resentment and impairs the productivity of the operation. It is the agencies own staff that get stuck with cleaning up bad applications (often during the middle of a night run) in production. Time spent training temporary external consultants is lost when they leave or are reassigned by the contracting firm. Consultants utilize State time and resources conducting personal and company business (IE recruiting, company benefits, gambling, writing memoirs and etc.). Time spent training temporary external consultants is lost when they leave. Each IT team within the agencies has their own standards and procedures for development and maintenance of information systems. Management turf battles and not working together inhibits the utilization of current physical and human resources. Different DP systems and equipment installed in various offices throughout the state are under the control of their agency. DHS installed a network of LANS in 130+ offices without inquiring into services already installed in the local area by other agencies. This type of planning under utilizes existing hardware, software and technology already in place in order to maintain their control. Duplication of efforts exist in regard to: hardware, software, in-house subroutines, productivity tools, training, support services and data stored. For example there are three separate VM systems supporting several OV (Office Vision) applications, and software that is run on the separate processors is currently duplicated where there maybe a saving in multiple site licensing of the same piece of software.

By using the IT Enterprise to staff projects systems knowledge and expertise will reside permanently in-house. State staff will have a pride of ownership in the system they developed. It has been proven that systems designed and the implementation controlled by State employees have fewer problems when put into production. The IT Enterprise can produce a quality product, that provides customer satisfaction, because the personnel used to staff the project will be State employees with a vested interest in the long term success of the project or process. The virtual team concept being proposed should result in cost savings by sharing of resources to get the project done in a timely manner. Consistency within the Enterprise system will improve development efficiency, enable staff mobility, and decrease the time for enhancements. Working together across agency lines will promote cooperation and making all resources available to the IT Enterprise staff within all the agencies. The one stop shop concept that is working in DES and DED that combines state staff and non-state staff in the SDA's (Service Delivery Areas) into a connected work unit, is working by finding common user interfaces to connect their equipment to provide service to their customers. When State employees are given the opportunity to produce a quality product for out customers the atmosphere of resentment will be eliminated and this could be accomplished using the IT Enterprise virtual team concept.

7.A. ORGANIZATION

The Iowa IT Enterprise will need to create an atmosphere that fosters creativity and innovation. The environment should provide for leadership, definitions of responsibility parameters for its employees, and programs which reinforce the achievement of the mission. This should be done by:

---Clearly articulating the vision so that all employees understand the direction the organization is moving.

---Defining broad and flexible areas of responsibility that will define the boundaries within which they operate.

---In partnership with AFSCME identifying and communicating both organization's values and commitment to customer and public service.

One mechanism for introducing the vision and culture to employees is through the delivery of an in-depth orientation program. This program would be tailored specifically to introduce new employees and would compliment the orientation presently conducted by each agency for all new employees. The program, once developed, should first be attended by existing employees and later by new employees. The program should:

---Hold employees' attention

---Introduce the entrepreneurial culture.

---Outline the Enterprise's mission and values and the expectations of employees.

The program should address what an employee can expect from the State of Iowa as an employer, the Union as a partner, from supervisors in terms of leadership and direction--as well as what is expected from them as individuals and active members of the Enterprise.

7.B. Develop a High Profile

If Iowa is to compete with other businesses in terms of qualified and skilled employees, we must establish a high profile within the IT industry and earn a national reputation. Benefits of such visibility include: the ability to attract and retain a highly skilled workforce; job enhancement opportunities for staff; and recognition of Iowa as an active participant in the high-technology environment which is vital to the state's economy and future development. There are many ways to accomplish this:

---Encouraging/rewarding employees to publish in trade publications and professional journal.

---Attending and presenting papers or providing training at national forums and seminars; and joining and actively participating in national and professional associations.

---Acting as a catalyst to form a regional/national consortium of government/private corporation partners to provide information exchange, technical assistance, and forums for training and development. A consortium of this type would foster creativity, shared expertise, and employee development and opportunities (such as presenting papers, chairing task forces, etc.).

---Forming a participating partnership with AFSCME. A benefit of this program would be the exchange of ideas, work ethics, and quality initiatives between the two cultures.

The following business concept, if implemented, would provide that viability as well as job enhancement opportunities for employees.

7.C. Technology "Expo"

Iowa's IT Enterprise could serve as the "Epcot Center" of State government with respect to high-technology innovation.

---Could host continual technology "expos" for its customers.

---The technology "expo" could incorporate displays from vendors--as well as innovations, displays, and story boards educating customers on services.

---This technology "expo" could serve as a marketing museum to display current, planned, and potential services to its customers.

7.D. Recruitment

The IT Enterprise should have a pool of carefully recruited applicants from which to draw, then hire the best available from this pool. Many organizations have found they need to "grow their own" talent from entry level through the highly technical or management career track in order to obtain the employee skills and abilities they need to succeed. Other outreach efforts should include:

---Networking with professional organizations

---Establishing campus relations programs and planning for the recruitment of qualified individuals.

---Establishing a vocational/technical school and college internship program that allows the organization to assess the abilities of future employees while they are students, and at the same time create visibility and positive relations with campuses. The goal of the program would be to establish a national reputation for the division as a "good place to work" and a potential employer of the best and brightest of students. Most highly competitive industries (such as engineering, accounting, law, and other high-technology and consulting groups) start their recruitment efforts when students are one or two years from graduation.

---A major element of the selection process should include panel or rotation interviews among several of the Enterprise managers, supervisors, and work team members to create "buy-in" and commitment to the success of the individuals selected.

---As the Iowa IT Enterprise moves toward a Virtual Team or self-directed work team concept, managers must consider the fact that individuals are hired not only for their division, but also to work with various internal and external partners. Therefore, involving more individuals in the selection process will promote a vested interest to select the best candidate for the organization as a whole.

7.E. Career Development

In discussions with IT employees, it becomes very clear that it is essential to install career paths and reward systems that recognize and reward the performance and skills necessary to achieve the mission of the Enterprise. This plan will heavily support the need for developing a career path for the employees. However, the methods used to design such a path may be considered unique when compared to traditional procedures.

Traditional theory dictates that an organization be arranged along a hierarchy with an administrator at the top of the pyramid, managers reporting to that individual, and several more work units with lines drawn to boxes underneath, containing staff.

Volumes have been written on the issue of span of control (numbers of staff that should be assigned to each supervisor or manager for optimum efficiency and maximum performance), organizational structures, matrix organizations, and so forth. Employee movement upward through the current system has historically resulted in steeper organizations.

---It then seems logical to focus on a structure that will recognize and reward employees for their contributions to the Enterprise

---It should reflect not only the work performed, but also the skill level and competency required to perform the job.

---The State and AFSCME in partnership should work together to ensure opportunity in the structure.

---It should reflect not only the work performed, but also the skill level and competency required to perform the job.

7.F. Rotation of Managers and Supervisors

Many successful organizations periodically rotate supervisors and managers among different divisions and work units. This "succession planning" is done so the organization has a large pool of seasoned, diverse talent to draw for key leadership positions as they occur. It also helps develop future talent for the organization to draw upon when a vacancy occurs, or when someone retires. Several other benefits may be gained from such a program. They include:

---Since a manager's view of the world may depend largely on where she/he sits, many times it is necessary to manage from a different view. One division may get bogged down in old "paradigms" and "why we can't do it that way", and may need a different viewpoint. Another person within the organization may have the ability to assess the work unit's (or division's) challenges from a different perspective.

---If a manager knows that she/he will be moving through the organization, rotation will promote more team work among the players. There will be peer pressure to curtail the tendency to build large exotic structures and systems that someone else will inherit. The result is more information and resource sharing.

7.G. Executive/Management Development Curriculum in Information Management

Iowa Enterprise should include, as part of its curriculum, training courses aimed at the management level of State government.

---These courses would educate this group in learning how to leverage their information resources.

---This type of education and coordination becomes particularly critical as the statewide information architecture--and resulting strategic information planning process--becomes fully operational.

---This type of program will foster a "shared vision" among key leaders, on a very conceptual level, pertaining to information management in the State of Iowa.

---These courses could be designed and taught by IT staff, and would provide additional opportunities for job enhancement.

7.H. Performance Negotiation Program

One method to address both accountability and empowering employees so they are placed in "charge of their own destiny" is setting in place a joint performance negotiation program with AFSCME. The program would be a way to negotiate, up front, responsibility areas and performance criteria (or measures of success). The degree to which this is used will of course, help to foster communication, identify areas of improvement (both system and personal) and create a supportive environment.

8. Conclusions

We believe this progressive and non-traditional approach to the Iowa IT Enterprise can do the following:

---Allow managed growth and development of IT.

---Avoid unnecessary costs and /or duplication.

---Create more value added efforts in IT.

---Improved product and user satisfaction.

---Improve employee morale and performance.

AFSCME IT Employee Team is:

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Michael McCarthy, Department of Revenue & Finance
Leila Neideigh, Department of Human Services
Gordon Wigness, Department of Human Services
Carl Martin, Department of Employment Services
Belinda Curler, Department of Employment Services
Linda Torgesson, Department of Transportation
Martha Lovell, Department of General Services