Groupware Technology Testbed

CTG Project Report 94-2

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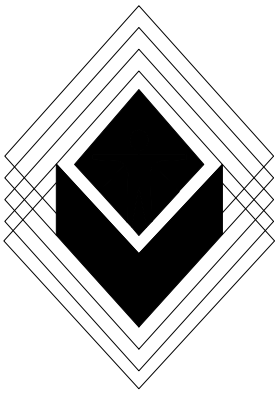

Center for Technology in Government

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Project Report

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Executive Summary

In recent years, both government and business have been experimenting with team-based organizations and work assignments organized around complete service or administrative processes. Since nearly every service follows an implicit order of action steps and information flow, government agencies have become increasingly interested in technologies to support group functioning and process-oriented operations.

The Technology Testbed Program at the Center for Technology in Government was created to offer limited experimentation and rapid prototype development in selected classes of information technologies. The Groupware Testbed was the first such project, carried out from February through October 1994. It investigated new technologies that support work groups and teams. Several state agencies experimented with custom work flow, project management, document management, and meeting support systems using groupware tools.

The Groupware Testbed investigated only a few of the many products on the market: *WordPerfect InForms,* a work flow management tool provided by WordPerfect Corporation, *Lotus Notes* a document database and communications infrastructure tool provided by Lotus Development Corporation, and *DecisionWeb*, an "any time, any place" meeting support tool created at the University of Budapest.

The Groupware Testbed achieved significant results:

Prototype Development

Two prototype applications were completed, one to manage executive correspondence at the Office of the State Comptroller (OSC) and another to assist collaborative work between the Center and the New York State Forum for Information Resource Management. A third agency, the New York State Thruway Authority completed all design work for a system to support customer services in its MIS division and is prepared to begin system development on its own. The Center also tested DecisionWeb as a tool for reducing the time and improving the outcome of organization wide meetings.

Time and Cost Savings

The OSC project produced a prototype InForms application after less than a month of design work and only two weeks of development. Two months later, the agency fully implemented a new correspondence tracking system - nine months ahead of schedule.

Cost and Performance Measures

The Center developed and applied a formal cost-performance model to help identify and evaluate potential cost and time savings that might result from full adoption of a new system. The model was tested with two Testbed agencies and in both cases revealed patterns of use that would be cost-justified as well as patterns that would not justify an investment. These results were strongly influenced by the volume of users, applications, or transactions. CTG strongly recommends the use of similar formal analyses before agencies move forward from prototype to full scale implementation.

Process Improvements

Agencies learned how to evaluate work flow and reduce or eliminate inefficient or ineffective processes. New awareness of these critical steps ensured that the technology would improve rather than merely automate work processes. All participants engaged in work flow analysis and process redesign. For some, understanding and adopting new design processes was the most valuable part of the project.

Technology Awareness

Greater awareness and understanding of groupware technology was gained by technical, management, and program staff in the participating agencies. Moreover, through public demonstrations, the knowledge gained first-hand by a few was shared with over 165 professionals from 52 additional organizations.

Organizational Learning

Participants became more aware of the cross-organizational effects of these technologies. They learned more about what staff in other units do and need and they began to understand how their jobs relate to others both inside and outside the agency. Users and upper management staff became more interested and involved than in previous system development projects in these agencies.

General Lessons

These general lessons also emerged from the Groupware Testbed:

- Any system implementation which affects group functioning or repetitive work flow requires a careful analysis of business processes as a first step.

- In order to enhance group functioning, groupware demands changes in the way individuals work. There is a need for standardization in groupware use that does not exist in software tools designed to enhance individual productivity.

- Groupware systems are embedded in organizational processes. They often affect several organizational units and require acceptance and participation from all users beginning in the design stage and continuing through implementation.

- Groupware as a category of technology covers a broad range of tools and uses. Some groupware tools are far more sophisticated than others. Some work well within a narrow range of application (like DecisionWeb), others are designed to support organization-wide computing (like Lotus Notes). Effective use of any particular tool requires a full understanding of the capabilities and limitations of the product, the organizational needs it will address, and the degree of organizational and technical support which is required to use it effectively.

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1. Project Overview

Introduction to Technology Testbeds

Technology Testbeds at the Center for Technology in Government (CTG) offer limited experimentation and rapid prototype development in selected classes of information technologies. State and local government agencies and related non-profit organizations may propose a testbed investigation of technological issues that are both important to them and of widespread interest to other agencies. The Technology Testbeds are designed to provide practical experience for a few agencies and increased knowledge and awareness for many others.

The supportive, neutral environment of CTG allows agencies to focus entirely on acquiring knowledge about technologies not available to them in their own organizations. Technology Testbeds provide access to the resources of CTG which include full-time professional staff support, expertise and products of corporate partners, and research and technical support from University at Albany faculty and graduate students. In this environment, agency staff can dedicate time and effort to solving a particular problem or testing an application.

The first Technology Testbed at the Center investigated new technologies that support workgroups and teams. Staff from several state agencies investigated and implemented custom work flow, project management, document management, and meeting support systems using groupware technology. The projects focused on issues of work flow analysis, process reengineering, ease of development, ease of use, system efficiency, and interoperability.

The Groupware Testbed proceeded in two phases, with different agencies involved in each. Phase I focused on the investigation of several business problems faced by agencies, using specific products and technologies that offer solutions to those problems. During Phase I, the Office of the State Comptroller used WordPerfect InForms to prototype a system for tracking and routing executive correspondence. The NYS Forum for Information Resource Management and CTG used Lotus Notes to prototype a system for supporting collaborative writing of documents. Finally, CTG itself used a prototype of DecisionWeb to hold "any time, any place" decision conferences on its research activities. Groupware Testbed Phase I ran from late February to late May, 1994.

Phase I culminated in a public seminar presenting the prototypes and the project results. The Groupware Testbed Seminar provided an overview of the technology and a demonstration of the projects prototyped during this initial phase. The seminar was attended by over 165 individuals representing 52 state agencies, vendors, public and private higher education institutions, and local governments. An opportunity for hands-on review was provided in the Center's Government Technology Solutions Laboratory following the presentation.

Phase II began after the seminar and was designed to allow additional agencies to participate in follow-on investigations and to use the demonstrated technologies to address their own agency business problems. CTG received ten applications for Phase II activities. Five were initiated and completed. During Phase II, agency involvement ranged from a single three-hour meeting to a four month project. Phase II was carried out from late May to late October, 1994.

During Phase II, the State Thruway Authority, the Office of Alcoholism and Substance Abuse Services, the Department of Motor Vehicles, and the Commission on Corrections focused on the results of the OSC Phase I project. The Department of Taxation and Finance focused on the results of the CTG/Forum Lotus Notes project, and CTG extended its use of the DecisionWeb prototype to additional meeting types.

Following the development of the Phase II applications, CTG formally evaluated the cost and performance characteristics of two of the prototype applications in order to plan for more fully operational systems. To accomplish this task, formal cost and performance models were developed in conjunction with a team of external analysts and agency managers. In both cases, cost and performance modeling exercises distinguished between cost-justified sets of applications and other sets of applications for which the groupware technology did not appear to be cost justified. By contributing to a more sophisticated understanding of the cost and performance characteristics of the groupware pilots, this final exercise may help guide New York State's investments in groupware toward more cost effective suites of applications. Details of these modeling efforts are discussed more fully under the CTG Decision Web and NYS Thruway projects.

Groupware

Information technologies of the 1990's allow managers to capitalize on the power of information by emphasizing relationships between organizations and their operating environments as well as the information exchanges among various people and organizations (Andersen, et al. 1994). Technology that supports the intersection of electronic communication, information management, and group processes is called "groupware."

Designed to enhance human communication, collaboration, and coordination, groupware encompasses many technologies and targets a broad array of business functions. (Opper, et al. 1994; Chen, et al. 1994). In general, groupware has three characteristics (Currid, Opper, et al. 1994):

- It permits people to communicate electronically, predominately via electronic mail.
- It facilitates the management of the information they use in common.

- It has woven throughout its features the assumption that it will be used by a group to support collaboration.

Messaging and e-mail systems represent the most basic types of groupware but this team is also associated with the following more complex processes:

1. Document management
2. Work flow
3. Business process reengineering
4. Business intelligence
5. Electronic publishing
6. Information base sharing
7. Messaging with intelligent filtering and management
8. Computer conferencing
9. Group scheduling
10. Project-task management
11. Forms processing

Despite its potential to enhance business operations, observers warn prospective groupware users to plan carefully. Identifying the business objectives, picking first targets carefully, and quantifying the benefits to users are three critical planning steps (Gartner Group, 1994; IDC, 1994).

Workgroup computing technologies do not have strict boundaries or crisp definitions. They support administrative processes by filling the chasm between personal productivity applications and enterprise-wide solutions. In order to be successful, workgroup computing must be seen as a pivotal computing approach, not as a fringe concept. It must be tied to the details of doing business and it must have directly quantifiable business benefits (IDC, 1994).

The greatest hurdles associated with groupware are not technical. Using groupware as a means of organizational communication creates a new on-line culture and can have a direct influence on group communication patterns. The organizational implications are enormous because people must change their behavior (Whiting, 1994; Hsu, et al. 1993; Watson, et al. 1993).

Understanding the culture and communication patterns of the organization are key to successful implementation of groupware (Watson, et al. 1994). It takes considerable time and planning to get people to think in group terms and to change the way they operate so that new collaborative systems are successful (Whiting, 1994; Hsu, et al. 1993).

A further challenge of groupware implementation is that management is often less committed to the less expensive groupware applications or features. An organization will not necessarily restructure itself for each new application the way it does for a major new system. In general, an organization may adapt to a large computer system, but a small

application program must adapt to the organization, fitting into existing work patterns and appealing to everyone who must support it. However, groupware use is often facilitated by user familiarity with the computer system already in place and by the relative homogeneity and shared goals of many groups (Grudin, 1994).

Groupware Testbed Results

The Groupware Technology Testbed projects were of two main types:

- Prototype development
- Focused information sharing about the completed prototypes

The activities in the prototype development projects focused on formal coordination of work flow analysis, business process reengineering, and prototype development. For both types of projects, participant groups were able to answer a host of questions related to groupware, including the technical capabilities and effectiveness of the tested products to support group processes, the ease of customization, and the ability of the products to operate within an organization's existing technology architecture.

A multi-method research approach was employed throughout the Groupware Technology Testbed to capture and measure results. Five methodologies were used:

- Archival Analysis
- Participant Observation
- Short Interviews
- Facilitated Evaluation Meetings
- Model Based Decision Conferences

Categories of Results

The research effort identified five categories of results that are summarized in this section and detailed in each of the following project-specific chapters.

Production of a prototype. Two of the agencies who participated in the Groupware Technology Testbed developed prototype applications. One additional agency completed all design and specification work and is prepared to begin development. Agencies became aware of new ways in which to design systems, including careful analysis of work flow and new project management techniques. CTG provided agencies the resources and opportunity to develop a prototype in a short period of time. This limited development time helped answer questions about ease of use and the level of effort that would be required for future development efforts.

Time and cost savings. CTG developed a formal cost-performance model to help agencies identify and evaluate potential cost and time savings that might result from full system adoption. Two agencies used this process. The Thruway Authority identified potential time and cost savings resulting from the automation of reengineered business processes. CTG identified potential savings resulting from replacing certain face-to-face meetings with facilitated online meetings.

Perhaps as important as the ability to estimate the time and costs savings that would be associated with a full scale implementation of these applications, was the identification of sets of applications for which groupware appeared not to produce advantageous performance to cost ratios. In both cases where formal cost and performance models were constructed, the analysis revealed that full scale groupware systems would be justified for some sets of applications but not cost-justified for others. Key cost issues centered on the volume of applications, users, or transactions versus the size of the initial "fixed cost" investment. CTG recommends that formal analyses like these should be conducted before agencies move forward with decisions to acquire full scale groupware systems.

Process improvements. Agencies became aware of the critical steps of work flow analysis and reengineering in the design and development of an information system. Prior to the Groupware Testbed several of the agencies had not included work flow analysis and process reengineering as steps in the design and development process. Agencies learned how to evaluate work flow and reduce or eliminate inefficient or ineffective processes. New awareness of these critical steps ensured that the technology employed would improve, rather than merely automate work processes. For some agencies, understanding and adopting a new design process was as valuable as the prototype system itself.

Technology awareness. All participating agencies identified greater technology awareness as a result of the Groupware Testbed. Insights about using technology effectively were gained not only by the technical staff in the agencies, but also by the management and program staff. Agencies became more familiar with and knowledgeable about new technologies in the low-risk CTG environment before trying to develop their own applications. Moreover, through the public demonstration, the knowledge gained by a few agencies was shared with over 165 persons from 52 other organizations.

Organizational learning. Organizational learning was noted as one of the significant results of the Groupware Testbed project. Participants learned more than just what the technology is or can do. Agencies also experienced new working models and new project management strategies. Agencies learned about work flow analysis and reengineering first-hand by evaluating their own processes in order to develop a prototype system. They became more aware of the cross-division and cross-agency effects of moving to new technologies. Inter-divisional and multi-agency teams provided an opportunity for individuals to learn more about how process changes affect individuals from other organizations or organizational units. Staff within various units of participating agencies learned more about what staff in other units do and need and they began to think about how their jobs relate to others both inside and outside the agency. Agencies also reported that users and upper management became more interested and involved in the testbed process than they had been in previous agency system development activities.

2. Office of the State Comptroller Executive Correspondence Tracking System: How Will We Replace our Legacy System?

The Office of the State Comptroller (OSC), like other state agencies, is experiencing a growing need for computer-based work flow management. Also like many other agencies, OSC has adopted the WordPerfect Office (WPO) e-mail, scheduling, and task management system. InForms, a new product from WordPerfect, promised to support a variety of work flow processes with a minimum of applications development effort. OSC was interested in InForms but uncertain about its ability to meet agency objectives. The OSC project at CTG developed a prototype to address this uncertainty. OSC selected its executive correspondence control process as a typical example of administrative work flow management.

Project Objective

- To demonstrate a customizable work flow management platform based on products already in use in the agency.

- To examine ease of development, interoperability, ease of use, and product capabilities.

Project Definition

OSC is phasing out its IBM System 36 in favor of LAN technology and therefore must replace its existing correspondence control system which runs on the System 36. Originally, the agency planned to prototype a simple database application that would duplicate the functionality of the current System 36 application. However, InForms presented the opportunity to expand the simple tracking functions with agency-wide access and the ability to design a standard work flow system for distributing and tracking assignment of responsibility for correspondence.

The new system had to be able to generate paper routing slips since several of the administrators in OSC are not yet connected to the agency's LAN. The system also needed to be scalable without need for redesign as those administrators get on-line. While the envisioned system would continue to distribute the actual correspondence to all offices in physical form, the agency also wished to evaluate the potential for using document imaging to distribute the correspondence electronically.

Project Story

The NYS Comptroller receives approximately 3,500 items of correspondence a year. The current correspondence flow involves several activities:

- The Comptroller's Correspondence Control Secretary reads and assigns correspondence for action, entering initial descriptive and disposition information on a routing slip.

- The secretary's supervisor reviews the routing slip and then returns it to the Correspondence Control Secretary for entry into the IBM System 36 database.

- The mail is delivered. The secretary updates the database files as correspondence is returned after handling.

- Tracking reports are generated for overdue items.

The project began with a review of the current work flow, as well as identification of how the prototype could meet OSC's objectives. Team members involved in this discussion came from Data Processing, Management Analysis, and the Comptroller's Office. Shortly thereafter, two staff members from OSC's Data Processing Applications Development Group traveled to WordPerfect's corporate headquarters in Orem, Utah to be introduced to WordPerfect Office and InForms. While there, they also participated in preliminary design sessions with WordPerfect's software engineers.

The design and prototype development process at CTG began the next week. A software engineer from WordPerfect was on site at CTG for the first week of development. During that week the OSC project team was introduced to InForms and its capabilities and received some training. In addition to building the forms and creating links to databases, usability tests were performed and some initial exploration with document imaging occurred. It was during this week that team participants decided to collapse the design and development process from three weeks to two. Based on what they had learned about the InForms project during the first week, the OSC project team members felt confident that they could complete the prototype on a shorter schedule. Staff from the State Archives and Record Administration, State Insurance Fund and the Division of Criminal Justice Services also participated as observers in the first week planning sessions.

After the prototype was complete, demonstrations were held for executive staff from OSC. The agency subsequently decided to develop the prototype into a full production system. During the first week of July, 1994 OSC officially moved the tracking of executive correspondence from the System 36 to the LAN-based InForms application.

Project Results

Results from the OSC project were identified through archival analysis of project documents, participant observations, short interviews, and a facilitated evaluation meeting.

Production of a prototype. The OSC Groupware Project developed a prototype work flow management system to support management and tracking of executive correspondence for the Comptroller's Office using WordPerfect InForms. Within two months of completing the prototype, a modified version of this application actually replaced the existing correspondence control system in the agency.

OSC discovered several key advantages to prototyping the correspondence control system. The WordPerfect InForms project was an opportunity to fully investigate the technology prior to selection and purchase. The prototype allowed OSC management and technical staff to discover potential problems before the actual system migration. OSC staff knew that porting applications from the System 36 to a LAN environment would require a change in the applications and the application development process. The prototype development process at CTG allowed them to focus on that issue in an environment that would not be in place at OSC for another nine to twelve months. Other benefits included the opportunity for technical staff to work off-site and focus on the development without day-to-day interruptions. In a less focused environment, the agency would have needed several more months to acquire the same information.

Finally, the prototyping process successfully solved a real business problem and therefore increased optimism and enthusiasm within the agency for the pending move from the old platform to the new.

Time and cost savings. Although a formal cost-performance model was not constructed for this project, time savings were identified as a major benefit.

The four month timeline of a Technology Testbed project requires sharp focus and strict adherence to the project schedule. According to OSC the short time line was one of the benefits of the project. It pressured them to take full advantage of the opportunity and to produce quick results.

Access to a risk-free environment containing the appropriate technical components also contributed to overall time savings. By having access to CTG's lab and corporate partners, OSC did not have to invest the time and money to procure, install, and manage the necessary but (for them) experimental technologies until they were confident that they were making the right choice. The compressed development and training period as well as direct technical support allowed OSC staff to learn about the new tools and development in much less time than usual.

The project accelerated the implementation of the new correspondence system by nine months. Participation in the Groupware Testbed sharply reduced the time it would normally take OSC staff to procure, install, and manage a new technology and learn a new application development environment using the agency's traditional approach to system design.

Process improvements. The OSC project team was a non-traditional workgroup for the agency. The project team had end-user and cross-agency participation. The project participants observed that the project demonstrated the critical importance of customer participation in the analysis of work flow as well as in prototype design and specification. Participants reported that greater understanding of agency activities resulted from cross-agency participation in the project. The new correspondence system has had a positive effect on the working relationships among end-users, system designers, and upper management.

Specifically, the system has changed existing processes in the following ways:

- Amount of manual work required to find and track correspondence was reduced for end users.
- The system is accessible from multiple stations rather than just one station.
- Data access and tracking are easier.
- Training time has been significantly reduced.
- Users report more consistent data forms and improved results on queries due to the use of drop down menus and lists.
- Users attribute the ease of use to the interface and to the involvement of users in the design process.
- Response time on queries has improved.
- It takes less time to get logged into and out of the system.
- There is less use of "workarounds."
- The flexible development environment makes application changes and improvements easier and more likely.

Technology awareness. The project participants reported that the most important outcome of the project was the introduction of new technologies to multiple levels within the agency structure.

The introduction to the new technology and the new system gave management staff not normally involved with the system development process a better idea of how technology can improve operations. The managers involved in the project report that they are now better prepared to choose the correct tool to solve their business problems.

The project provided the mainframe-oriented IS staff with insights into the possibilities of the PC-based LAN environment. They noted that this awareness will facilitate the change process as they move from the System 36 to the new environment and will encourage more complete consideration of PC-based LAN alternatives.

System designers expressed a higher level of optimism for more timely problem resolution than they experienced with previous systems. They attributed this to the ease with which the new system could be changed or modified "on the fly." However, they also recognized that ease of change brings with it a need to establish new procedures for handling version control, backup, change management, and software distribution.

Organizational learning. OSC staff reported that the project enabled them to acquire a clearer picture of where the agency is headed technologically and how a PC-based LAN fits into that future. The knowledge that mission critical applications can be supported in that environment and that WordPerfect InForms is a viable product for this type of application leaves the agency well prepared to extend the use of this new environment to other critical business processes. Since the correspondence tracking system is similar to more than thirty other work flow applications used throughout OSC, the agency already has begun to consider the effect of the technology on these other applications.

A representative of the State Archives and Records Administration (SARA) was present during the design and development of the OSC prototype. SARA is responsible for the storage and archiving of OSC correspondence records. SARA's participation caused records management concerns to be raised during the design and development process rather than after its completion. Prior to this project, the OSC project team had not realized how a new indexing system would affect information storage and retrieval. With SARA's participation, they have taken these issues into consideration from the outset.

3. CTG and NYS Forum: Document Depository and Discussion Databases

The projects undertaken by the Center for Technology in Government are cooperative in nature. A significant number of joint activities and information sharing takes place between CTG and other organizations, especially with the New York State Forum for Information Resource Management. CTG and the Forum work cooperatively to reach out to government participants and to disseminate information about CTG projects.

Plans for demonstrations, projects, reports, information dissemination, and outside contacts are made through close interaction between CTG and the Forum. The public information staff in CTG communicates with the staff at the Forum, exchanging drafts of public and internal documents, reviewing plans, and making comments and revisions. The information shared includes more than just formal documents; it involves interactive discussions, comments on plans, and ideas from individuals in different locations. Typically, when comments or new revisions are needed, drafts are circulated among group participants, with each person adding handwritten ideas or comments.

Project Objective

To investigate new technologies which could simplify and improve the development and distribution of collaborative CTG-Forum work products.

Project Definition

CTG and the Forum were interested in investigating technologies which could simplify development and distribution of joint work. This project evaluated the performance and usefulness of a distributed document repository using Lotus Notes. The prototype involved developing a database of documents on two servers linked by modems. The prototype was designed for the purpose of electronic document interchange, communication, and database management between CTG and the Forum. Its business focus was on the education, information dissemination, and peer review elements of the contract between CTG and the Forum.

Project Story

CTG and the Forum are physically separated and do not have any direct network connections to one another other than e-mail over the Internet. The existing model for document dissemination between the Forum and CTG is to fax or mail documents as needed, or to physically exchange documents during meetings. Phone calls are used extensively. These procedures can be time consuming, labor intensive, and error prone.

The goals for the prototype were to:

- Facilitate faster distribution of information among project participants
- Improve communication and information exchange for a particular project during the growth of CTG (planning the Groupware Testbed Seminar)
- Provide a well structured archive for CTG activities
- Be flexible enough to meet new needs as they arise
- Support a variety of users in geographically dispersed locations
- Provide a repository for work products.

The following functional capabilities were defined for the prototype:

Distributed document database

- CTG and Forum documents would be stored in the database, and associated with source files on Novell Netware servers in the two offices.
- Users would index and search across documents with text stored in Lotus Notes.
- Documents would be viewed by name, user defined category, and author.
- Revision history and author information would be maintained.

Integration of discussions into the database

- Discussion capability would exist in the database for author and reviewer comments on documents in progress.
- Images of previous drafts of documents would be retained.
- Separate views of the database would be available - for example, secure views for internal or draft documents, public views for finished documents.

During the first week, the project scope was defined and approved. The installation of the software and technical training of the developers was accomplished in the second week. The application development was completed at CTG in two weeks by a CTG graduate student under the direction of a staff member who is an experienced Lotus Notes developer. During the application development period and the following month, staff from CTG and the Forum tested the system using actual projects. The prototype was

enhanced, changed, and expanded to three separate Notes applications supporting different types of information in the document repository. The project was completed in six weeks.

Project Results

Results were collected through the use of archival analysis, short interviews, and a questionnaire to project participants.

Production of a prototype. The development of the prototype was completed in two weeks. The implementation of the prototype enabled the Forum and CTG to begin considering the effect of the technology on staff communications and to evaluate the performance and usefulness of a distributed document repository using Lotus Notes. The project participants found that the prototyped Notes applications had a wide variety of uses, were flexible, and were easy to customize.

Process improvements. CTG and the Forum discovered that the Lotus Notes document repository system did facilitate faster information exchange and reduced the need for meetings between individuals. Moreover, review and revision of documents became easier as the staff members were able to concentrate on intensive exchange of information and ideas without worrying about the inconvenience arising from separate locations. By supporting "any time" document collaboration the prototype supported the flexible communication patterns of CTG and Forum staff.

Technology awareness. Notes is a sophisticated framework for organizational computing rather than an add-on feature for an existing office system. The CTG-Forum prototype took advantage of only a few Lotus Notes features involving only a few staff members. The project clearly achieved its limited goals. However, project participants also recognized that this artificially small experiment was not robust enough to adequately explore the product's capabilities. This insight led to appreciation of the underlying structure of the product and of the technical and organizational infrastructure required to fully exploit it.

Organizational learning. The use of the discussion database for project activities resulted in the conclusion that certain meetings, especially for initial planning or problem solving, are more effective when held face-to-face. In addition, staff who met face-to-face regularly found that the use of electronic discussions was sometimes an added burden rather than an efficient communication method.

4. CTG: Any Time, Any Place Electronic Meetings with DecisionWeb

CTG is a small, young organization which is simultaneously managing multiple projects with external customers and developing its own internal work routines and procedures. Recognizing that the number and length of face-to-face meetings threatens to dominate the amount of individual work time available during the week, CTG staff considered a variety of options to reduce the total number of hours devoted to meetings.

Efforts to reduce staff meeting time can often produce the unintended consequence of centralizing organizational decision making by limiting opportunities for participation. To avoid this, CTG chose to experiment with a new and possibly more efficient method of arranging meetings using software (meetingware) for computer-supported conferences. One promising product, DecisionWeb, enabled "asynchronous" (or "any time, any place") meetings in which participants join in an electronic conference at their own convenience.

Project Objective

To determine whether DecisionWeb meetings allowed a more efficient use of staff time while not reducing (and perhaps increasing) the level of participation in organizational decision making.

Project Definition

Several small meetings with a few CTG staff members were arranged using DecisionWeb to check its feasibility, since no one in the organization previously had used this product. These brief electronic conferences, conducted during Phase I of the Groupware Testbed, were easy to arrange, generally convenient to join, and potentially time-saving, although not as self-explanatory as the designers believed them to be. For these reasons, CTG decided to conduct a thorough test by convening a DecisionWeb meeting during Phase II involving the entire staff in preparation for an important strategic planning retreat.

Project Story

The DecisionWeb meeting was scheduled for a four-week period preceding the planning retreat. A copy of the DecisionWeb software was provided to all CTG staff members. Several identical, brief (about 30 minutes) user training sessions were scheduled to insure that all CTG staff members were prepared to join the DecisionWeb meeting.

DecisionWeb was designed primarily for use on the Internet, but it also can be used on a WAN or LAN. For this project, the CTG LAN provided the connection among the

meeting participants. The regular CTG e-mail system was used to communicate messages about the schedule of the meeting and its progression through the three meeting stages: brainstorming, categorizing, and prioritizing.

Every DecisionWeb meeting requires a designated group facilitator in addition to a group leader. The facilitator relieves the group leader from the need to master the software in order to convene a DecisionWeb meeting. The facilitator collects group input, prepares summaries of group work, keeps the group on schedule, and prods less active participants to regularly join in the meeting process. John Rohrbaugh, a professor at the University of Albany and one of the original developers of DecisionWeb, served as the facilitator of the electronic conference for CTG. The Center Director was the group leader.

The question posed to participants by the leader was: "What specific elements of CTG's performance, operations, structure, resources, or environment are critical to our success as an organization? In short, what are our critical success factors?" The purpose of the DecisionWeb meeting was to solicit as many answers as possible from CTG staff members and to prepare a systematic, prioritized list of critical success factors as the foundation for subsequent face-to-face work at the strategic planning retreat.

Stage One - Listing Ideas. The first stage of the DecisionWeb meeting required about two weeks. In that period, participants generated over 120 suggestions for CTG's critical success factors. Ideas initially generated by each participant and forwarded to the facilitator were added to a common list and made available in summary form to the entire group. In the process of reviewing this common list, participants identified missing elements and added new ideas. The group leader and the facilitator sent out reminder messages over CTG's e-mail system encouraging full participation. All CTG staff contributed ideas, several more than once.

Stage Two - Categorizing Ideas. During the following week, each participant independently sorted the full list of ideas into categories to help reduce redundancy and overlap. Each person created his or her own categories by grouping similar items together. The facilitator collected all of the individually generated categories and condensed these judgments into a single set of "clustered" ideas. At the end of stage two, about 30 categories had been identified (some with many similar ideas, some with only one idea).

Stage Three - Prioritizing Categories. In the final week of the DecisionWeb meeting, group members reviewed the categories proposed by the facilitator and indicated their assessment of the relative importance of each category, using a simple numerical rating scale. The facilitator collected all of the individual priority ratings and summarized them statistically in preparation for the strategic planning retreat.

Project Results

Project results were collected using participant observation, archival analysis, and a model based decision conference. The model, designed specifically for use with Technology Testbeds to identify costs and benefits of project activities, was used for the first time with the DecisionWeb project participants. The goal was to determine if the use of DecisionWeb prior to a face-to-face meeting resulted in a more efficient use of staff time. The question of level of participation in organizational decision making, was addressed through participant observation and archival analysis.

Time and cost savings. Upon completion of the DecisionWeb project, a formal cost performance modeling conference was held. At that conference staff members met to forecast what would be the cost and performance implications of having the prototype system adopted on a larger scale. A formal model of time and cost savings as well as incremental costs was constructed. That model revealed that for some kinds of meetings, it would not be cost-effective use DecisionWeb. However, for other kinds, DecisionWeb would be a cost-effective support for meetings. The key factors determining cost effectiveness centered on meeting length, number of participants, and number of meetings. This analysis did not take into account the costs that some organizations might incur to get the whole organization working on a network. All of the applications within CTG involved a full staff familiar with network technology and the entire staff was already working on a relatively sophisticated network.

The Model Based Decision Conference produced an estimate of staff time saved from the use of DecisionWeb. The estimates of time saved from the use of DecisionWeb with three specific types of meetings are shown in the table below:

Costs and Savings of DecisionWeb Meetings

Number of	*Half-day Equivalent*				*Full-day Equivalent*		
Participants	1 Meeting	3 Meetings	5 Meetings		1 Meeting	3 Meetings	5 Meetings
5	($660)	($800)	($1,000)		($675)	($1,025)	($1,375)
10	($880)	($400)	-		($550)	$350	$1,250
15	($1,000)	-	$1,000		($425)	$1,725	$3,875
20	($1,200)	$400	$2,000		($300)	$3,100	$6,500
25	($1,400)	$800	$3,000		($175)	$4,475	$9,125

Cost Savings based on:

staff cost: $250/day/person
half-day time saving: 2 hr/person
full-day time saving: 4 hr/person
initial software cost: $100/person (one-time charge)
facilitator cost: $800/full day ($400/half-day)

Through the conference, CTG estimated that significant cost savings (up to $9,000) could result from the use of DecisionWeb prior to some of its larger meetings. However, using DecisionWeb to support other meetings, especially those of short duration and involving few people, resulted in significant new costs.

Process improvements. One member of the CTG staff noted that "the major advantage of DecisionWeb is that it is untiring in getting more ideas out on the table. If we had done that brainstorming as a group, we would all have been exhausted before even half of the ideas were articulated," and "I think it's important to remember that DecisionWeb only does the first half of the meeting. We still had the face-to-face component, but all of the preliminaries were handled so much better without taking up all the group's time."

The results of the DecisionWeb meeting were believed by the participants to be fully credible, and the face-to-face deliberation that followed built seamlessly upon the work of the preceding electronic conference. In addition, all staff members could participate at a time convenient to them individually and could post their ideas anonymously. Both of these features appeared to increase both the number of ideas to be considered and the degree to which individual staff members were committed to the outcome.

5. NYS Thruway:
VAX and Network Services Request System

The NYS Thruway Authority's Office of Management Information Services (OMIS) is responsible for improving the delivery of computer services to its customers throughout the Authority. OMIS managers saw the results of the OSC InForms project at the Groupware Seminar and asked to conduct a Phase II project to try to adapt InForms to their user services function.

Since OMIS is responsible for the establishment of user accounts on its VAX computer system, the process for requesting VAX and network services was chosen for the prototype project. This request process was ideal for a prototype due to its similarity to many other paper-bound work flow processes within the organization and because it is a simple example of other work flow processes which OMIS hopes to automate. The current application flow for these services is completely paper-bound, labor intensive, and occasionally results in lost requests.

Project Objectives

- To determine if the completion and submission of electronic forms to establish VAX accounts would satisfy customer requests more effectively than the existing process. (Early in the project the objective for the prototype was significantly expanded to include requests for a wide range of VAX and network services.)

- To reduce paper forms, ensure all service requests are completed, and gain experience and knowledge in the use of InForms.

- To provide an example of a successful work flow application to other staff within the Thruway Authority.

Project Definition

The project was originally defined as a prototype development project to improve the quality and effectiveness of services which OMIS provides to its internal and external customers. As the project progressed however, it became clear that the primary benefit to OMIS would be the knowledge and experience gained in work flow analysis and reengineering of VAX and network services request processes. The corporate partner on the project, Executive Systems Planning Inc., brought both WordPerfect expertise (needed for prototype development) and technology and management consulting (needed for reengineering work).

Project Story

The project began with a meeting between OSC and the Thruway project team to get a closer look at the OSC system and to talk with its developers. This meeting helped the Thruway Authority staff understand more about the capabilities of InForms and identified issues to be considered in the development process. The project team then addressed these issues by re-evaluating and reengineering work flow processes. Each step in the service request process was evaluated and scrutinized to determine what value it added to the overall process. In this way, time-consuming and inefficient processes were changed or eliminated.

OMIS staff representing the bureaus of Technical Services and Information Systems Development as well as the Director's office comprised the project team. Guided by consultants from Executive Systems Planning, Inc., they engaged in the following steps:

1. Flowcharting the existing VAX and network services request process
2. Analysis of the existing process for improvements without the consideration of technology
3. Flowcharting the improved process without consideration of technology
4. Analysis of the improved process with consideration of generic technology
5. Analysis of the improved process with consideration of InForms specifically
6. Flowcharting the improved InForms-based process
7. Specifying screen and data relationships
8. Prototyping screen displays.

The analysis of the process resulted in a greater understanding of the integrated nature of the OMIS response to service requests. As a result, the project team decided to expand its evaluation to include a wider variety of VAX and network services. Since the project team had the necessary technical skills to develop the prototype but was inexperienced in business reengineering and its requisite analysis and design activities, the group decided to spend most of its effort on work flow analysis and reengineering activities. At this point, the focus of the project shifted to the system analysis and design process rather to than the actual production of the prototype.

Considerable time was invested in ensuring that the participants understood the work flow analysis and reengineering processes and how they differ from the traditional project development and design processes. The project team recognized that more time and care spent in the analysis, specification, and design phases, resulted a better system design and less follow up maintenance and revision. The project team identified potential trouble spots as well as opportunities to build in quality measures to ensure improved customer service.

Project Results

Results from the Thruway Authority's OMIS project were collected through the use of archival analysis, participant observation, short interviews, a model based decision conference, and a facilitated evaluation meeting.

Production of a prototype. The project produced a design for a VAX and Network Services System (VANSS). This design is now viewed by the members of the project team as the "basic structure to serve the changing needs of the organization." The Assistant Director of OMIS sees the integration of the new system with WordPerfect Office (the existing office automation technology at the Thruway Authority) as extending the range of existing uses of a current investment. He sees the project coordination structure and the prototype design as the foundation for future OMIS service improvements.

Full implementation of the InForms-based VAX and Network Services System (VANSS) at OMIS is expected to have the following benefits:

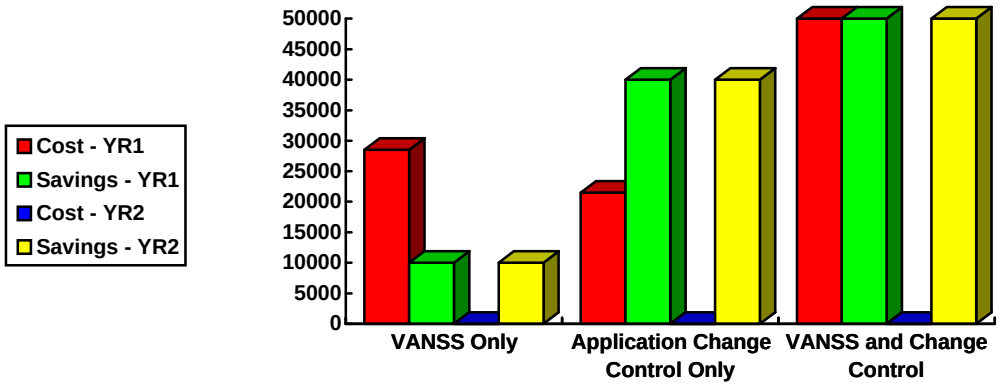
- Extend the range of current technology.
- Increase staff productivity by eliminating manual paperwork.
- Increase staff productivity through a reengineered work flow which allows for parallel processing of requests and up to the minute status reports.
- Time stamp requests to ensure system generated prompts when requests are not completed on time.
- Automatically route requests to appropriate staff.
- Improve OMIS' responsiveness to customers.
- Improve the ability of customers to obtain feedback and status information online.
- Decrease the turnaround time for meeting a request.
- Improve customer productivity by reducing turnaround time from request to service.
- Remove the likelihood of lost or misplaced requests.
- Promote faster and more accurate programming.
- Increase the ability to integrate the prototype application with other customer service systems.

Time and cost savings. The short term goal of the Thruway Authority's Technology Testbed was to investigate the application of groupware to a business process internal to the Office of Management Information Systems (OMIS). The long term goal of the project was to apply the knowledge and technology awareness gained to determine if the technology would add value to all customer-oriented OMIS business processes. The project began with an expectation that time and cost savings for both the OMIS staff and its Thruway Authority customers could be realized by implementing the prototype and follow-on applications. The Application Change Control System was identified as the first follow-on application to be considered for automation using InForms. The results of the Model Based Decision

Conference evaluating costs and performance showed that the relative cost effectiveness of the groupware application was a function of the number of applications. If the Thruway implemented only the VANSS application, the pay-back period would be too long to justify system acquisition. However, a larger suite of applications quickly justified the development cost.

The chart below shows the figures associated with the VAX and Network Service System (VANSS) and the Application Change Control System.

Costs and Savings of Thruway Authority Groupware Applications



Results indicate that if the Thruway Authority implements VANSS only, it will recover the cost of investment in three years. Cost savings of approximately $5,000 per year could begin in year 4. If the Thruway Authority implements the Application Change Control System only it will recover the cost of investment in one year plus achieve $20,000 in first year savings. Cost savings of approximately $40,000 could be begin in year 2. By implementing both systems, the Thruway Authority will recover the cost of investment made into the VANSS prototype project and the Application Change Control system in one year and begin achieving significant recurring savings in year 2.

Although the implementation of VANSS by itself provides a minimal return on investment, the prototype process enabled the Thruway Authority to consider application of groupware technology to another process (Change Control) that could provide a significant return on investment.

At the facilitated closure meeting, additional time savings were identified. These time savings are based primarily on the expectation that the investment in work flow analysis and reengineering made by the project team will save system development time in the long run. In addition, time spent getting the "big picture" right will provide an opportunity for

efficiency through "quick" integration of future systems. Specifically, team members expected to see:

- Savings in future development time due to a fully designed system architecture.

- More accurate estimates of development time due to a vision of the whole system and where it fits in the agency's business processes.

According to the team leader, the project enabled OMIS to address an identified need in a short period of focused activity. Without the opportunity provided by CTG, the effort to improve user services with a new electronic forms system would have been "pending for some time" or would not have occurred at all.

Process improvements. The project resulted in one of the first, cross-bureau, customer-service oriented planning efforts to take place in OMIS. The three perspectives brought to the project by the technical, administrative, and training and user support staff improved the process and ensured that the issue identification and prototype specifications were as complete as possible. The team member responsible for user training at the Thruway, commented that the project has "caused us to rethink the entire [VAX account and Network services] process." The team members agreed that the project allowed them to see the whole system at the beginning of development.

Project coordination was seen as an important aspect of the experience and knowledge gained by the agency. The team leader stated "the project has provided a standard documented process we can share," as well as a "totally different view of how to do work."

Technology awareness. The Thruway Authority project team reported increased confidence in the technology and an understanding of how it could be used to meet specific project and customer service objectives of OMIS. The team is now prepared to develop the prototype applications without the help of CTG.

6. NYS Department of Taxation and Finance: Will We Be Dependent on Programmers Again?

In the coming months, the MIS department at the Department of Taxation and Finance will be implementing a LAN environment to connect three divisions of the agency: Tax Policy Analysis, Taxpayer Services/Technical Support, and the Law Bureau. The three divisions regularly engage in collaborative cross-division document production efforts. The goals for the new LAN include document sharing, document storage, and network access to common data files. To meet general productivity goals, several network based applications have been selected for installation, including WordPerfect, Lotus 123, PC SAS, and Freelance. The Department's MIS staff has recommended Lotus Notes to meet the goals of document sharing, document storage, and access to common data files.

The staff from the offices of Tax and Policy Analysis, Taxpayer Services/Technical Support and the Law Bureau consist of policy and program professionals, few of whom have a high degree of technical experience or expertise. After viewing the demonstration of the Lotus Notes Document Depository and Discussion Database at the Groupware Seminar, the agency asked to meet with developers and to ask detailed questions about the project.

Project Objectives

To gather information to assist in a decision regarding the adoption of Lotus Notes as the tool for inter-division document and data sharing.

Project Definition

The Center for Technology in Government hosted a half-day meeting of CTG staff and ten agency staff from three divisions within the NYS Department of Taxation and Finance. The meeting consisted of a presentation of issues and concerns by Taxation and Finance, a demonstration and discussion of Lotus Notes within the context of the issues and concerns of the agency, a discussion of additional issues and concerns brought out at the meeting, and identification of next steps for the agency staff.

Project Story

The LAN environment at Tax and Finance must support the following steps in the document and form creation process:

- Creation of draft document/form
- Submission of draft document/form to supervisor
- Comments by supervisor on copy
- Return of draft to creator for revision
- Simultaneous submission of revised draft to departmental reviewers
- Coordination of departmental reviews by designated representative
- Easy access to draft and final documents and forms for reference and copying
- Keyword searches on final documents
- Attachment of cover memos to drafts
- Recording of dates of creation and specific comments.

The Tax Department technical staff recommended the use of Lotus Notes for these functions. Agency staff had already attended vendor presentations on Lotus Notes and had held internal discussions which identified common concerns across the three divisions. These concerns focused primarily on the fear of losing their new found independence from MIS. The program and policy staff are primarily microcomputer users who have achieved independent capabilities to customize, manage, and use microcomputing resources. They view this independence from MIS as critical to their performance since the MIS staff must support the computing resources of 5,000 agency staff members. Due to the sophistication of Lotus Notes, the agency policy staff were concerned that a highly skilled programmer would be required to do customization and modifications.

Following the Groupware Seminar, the Department approached CTG for assistance in making its decision. The resulting meeting was designed to answer the following four questions:

1. Why is Lotus Notes desirable?
2. How would it be used in our office environment?
3. Can it be adapted to meet our needs?
4. Assuming no MIS staff involvement, do we have the programming skills to make effective use of Lotus Notes?

CTG presented a demonstration of the Document Depository and Discussion Database prototype developed during Phase I by the NYS Forum and CTG, giving the agency an ideal venue to discuss and evaluate concerns through a demonstration and discussion format.

Project Results

Project results were gathered through the use of short interviews and participant observation.

Technology awareness. The meeting answered many questions and provided further understanding of Lotus Notes and of the organizational commitment involved in implementing it. Follow-up conversations with the agency also indicate that the participants gained greater awareness of Notes capabilities as well as useful tips for effective use. The group also developed a better appreciation for working in a LAN environment.

Organizational learning. Participants reported that the project supported their efforts to acquire neutral advice on the value of a commercial product for their particular work environment. The project participants reported a greater understanding of work flow analysis and its key role in system design, the relationship among different agency functions and divisions, and the value of electronic forms over paper.

Additional meetings were planned within the agency to focus on the decision to adopt, taking into account the new insight gained by the project participants. As of October 31st, the agency had not made a final selection of a product to support the needs of the three divisions.

7. Phase II:
Can We Borrow Your Correspondence Tracking System?

All agencies have a responsibility to manage executive correspondence. Typically, they set up processes to ensure that each piece of correspondence is logged, a timely response is issued, the response is consistent with policy, and the correspondence and the accompanying response is archived.

OSC was able to improve its processes while exploring the migration of its existing correspondence system from the IBM System 36 to Word Perfect's InForm's product on a PC-based LAN in its Groupware Technology Testbed project.

In Phase II of the Groupware Testbed, three agencies visited CTG to share in the experiences and knowledge gained by OSC.

Office of Alcoholism and Substance Abuse Services and Commission on Corrections

The Office of Alcoholism and Substance Abuse Services (OASAS) and Commission on Corrections jointly attended a half-day meeting at CTG. The purpose of the meeting was to receive a demonstration of the OSC system and to speak at length with the agency staff member who developed the system. The agencies had two questions:

1. Can we take this correspondence system prototype and use it in our agencies?
2. What will the technical environment need to be?

The agencies reported an increased understanding of the InForms product and its capability as well as a greater awareness of the technical environment required to support the OSC prototype.

The Department of Motor Vehicles

Staff from the Department of Motor Vehicles (DMV) attended a half-day meeting at CTG to receive a demonstration of the OSC Executive Correspondence Tracking System and to speak with the developer and the primary system user. DMV has a logging and tracking system for executive correspondence but was interested in an alternative PC-based LAN system. This meeting was user-oriented rather than technology-oriented. The attendees were primarily staff from DMV responsible for executive correspondence. The Comptroller's Personal Stenographer walked through the OSC system with several types of correspondence, demonstrating the functionality and ease of use of the system and its integration with the Word Perfect Office environment. This information is helping DMV address costs and issues associated with the integration of imaging technology into its own correspondence tracking process.

Other Phase II Participants

Two additional agencies, the Department of Environmental Conservation and the Division of Minority and Women's Business Development of the Department of Economic Development, contacted OSC directly to review the prototype. Both agencies reported that the imaging components of the tracking system will provide them with added value over their existing system. Each decided to postpone further evaluation until implementation of the imaging components is complete.

Appendix A

Groupware Technology Testbed Participants

1. Executive Correspondence Tracking System

Office of State Comptroller

Data Processing

Douglas Williams, Director of Network Planning and Development
Anthony DiVirgillio, Supervisor of Data Processing
Peter Prusko, Senior Computer Programmer Analyst

Management Analysis

Barbara Ash, Associate Administrative Analyst
Daniel Crowe, Administrative Analyst

Comptroller's Office

Ronnie Crow, Management Analyst
Cheryl Hazzard, Personal Stenographer to the Comptroller

Word Perfect Corporation

Philip Barney, InForms Product Manager
Steven Carter, Director, InForms Strategic Positioning
Jeffrey Fowler, Enterprise Account Manager for State & Local Government
Gregory Hall, Manager, InForms Special Projects
Rod McCloskey, Government Account Manager

Center for Technology in Government

Peter Bloniarz, Lab Director
Donna Berlin, Facility Manager
Deborah Andersen, Graduate Assistant
Lydia Kong, Graduate Assistant
Mark Nelson, Graduate Assistant

Guest Observers

Thomas Ruller, Center for Electronic Records, State Archives and Records Administration
Marsha Moore, NYS Division of Criminal Justice Services
Ted Shippey, NYS Division of Criminal Justice Services

2. Document Depository and Discussion Databases

NYS Forum

Rebecca Buchner, Executive Assistant
Claudia Carroll, Research Associate/Liaison to CTG
Karen Geffert, Information Resource Manager
Terrence Maxwell, Executive Director

Center for Technology in Government

Donna Berlin, Facility Manager
Peter Bloniarz, Lab Director
Sharon Dawes, Director
Sally Goodall, Administrative Assistant
James Igoe, Graduate Assistant
Lydia Kong, Graduate Assistant
Mark Nelson, Assistant Project Coordinator
Eliot Rich, Research Associate

Lotus Development Corporation

Kevin McKelvey, NYS Account Manager

3. Any Time, Any Place Decision Making Using DecisionWeb

University at Albany

John Rohrbaugh, Professor, Public Administration and Policy

Technical University of Budapest, Hungary

Pal Danyi
Laszlo Magyar

Center for Technology in Government

All Staff

NYS Forum for Information Resource Management

Claudia Carroll, Research Associate, Liaison to CTG

4. NYS Thruway VAX Account and Network Services System

Office of Management Information Systems
Dick Bauman, Assistant Director of OMIS
Patrick Beaudoin, VAX Systems Administrator
Ann Currier, Administrative Analyst
Patricia English, Administrative Analyst
Amy Freinberg, Senior Information Processing Trainer
John Steele, PC Support Coordinator

Center for Technology in Government
Peter Bloniarz, Lab Director
Mark Nelson, Assistant Project Coordinator
Theresa Pardo, Project Coordinator

Office of the State Comptroller
Peter Prusko, Senior Computer Programmer Analyst

Executive Systems Planning
Edward Diez, President

5. NYS Department of Taxation and Finance

Office of Tax and Policy Assessment
Michael Hylan, Assistant Deputy Commissioner
David Boughtwood, Tax Policy Analyst I
Sharon Cupoli, Tax Policy Analyst II
William Witzleben, Econometrician II

Taxpayer Services/Technical Support
Marilyn Kaltenborn, Director, Taxpayer Services
Doris Bauman, Director, Technical Services
John Bartlett, Chief of Tax Regulations
Richard Garrison, Tax Technician II

Law Bureau
Patricia Brumbaugh, Associate Attorney
John Michaelson, Attorney II

Center for Technology in Government
Eliot Rich, Research Associate
Mark Nelson, Assistant Project Coordinator
Theresa Pardo, Project Coordinator

6. NYS Office of Alcoholism and Substance Abuse Services

James Tansey, Manager for Systems
Paul Maguire, Manager for Planning
Ray VanEpps, Supervisor of Data Processing
Joseph Knych, Management & Information System Unit
Chris Welton, Associate Programmer Analyst

Commission on Corrections

JoAnn Bomeisl, Director of Data Processing
Jeff Brucker, Associate Programmer Analyst

Office of State Comptroller

Peter Prusko, Senior Computer Programmer Analyst

Center for Technology in Government

Mark Nelson, Assistant Project Coordinator
Theresa Pardo, Project Coordinator

7. The Department of Motor Vehicles

Commissioner's Office

Cheri Foland, Customer Service
Tina Galligan, Safety/Regulations
Lisa Kedik, Exec. Dep. Commissioner's Office
Linda MacPherson, Administration
Holly New, Governor's Traffic Safety Committee
Karen Olthaus, Data Processing
Sandra Riccio, Administration
Sally Staunch, Counsel's Office
Robin Vasil, Commissioner's Office
Lynn Wagner, Reinventing DMV

Office of Critical Initiatives

Gigi Chenette, Technical Support
Diane Dimond, Administration

Office of the State Comptroller

Peter Prusko, Senior Computer Programmer Analyst
Cheryl Hazzard, Personal Stenographer to the Comptroller

Center for Technology in Government

Mark Nelson, Assistant Project Coordinator
Theresa Pardo, Project Coordinator

Appendix B

Timeline

February 20	Testbed I Definition Meeting
March 1	Phase I Begins • OSC Correspondence Tracking System Prototype Development • NYS Forum and CTG Document Depository and Discussion Database Prototype Development • CTG DecisionWeb Prototype Evaluation
May 25	Public Seminar and Demonstration of Prototypes
May 26	Phase II Begins • Thruway VANS Prototype Development Project • Thruway meets with OSC Correspondence Tracking System Developer for Demonstration and Discussion • Taxation and Finance meets with CTG Document Depository and Discussion Database Developer for Demonstration and Discussion • OASAS meets with OSC Correspondence Tracking System Developer for Demonstration and Discussion • Application and Evaluation of DecisionWeb to additional CTG Planning Process
August 16	Facilitated Closure Meeting with OSC
September 9	Model Based Decision Conference with CTG DecisionWeb
September 16	Facilitated Closure Meeting with Thruway
September 27	Project Meeting with OASAS and Commission on Corrections
October 12	Project Meeting with DMV
October 13	Model Based Decision Conference with Thruway
October 28	Phase II Ends Testbed I Ends
November 21	Groupware Technology Testbed Final Report Completed

Appendix C

Selected Groupware Bibliography

Items have been selected for inclusion in this bibliography based on the following criteria:

1. Focus on groupware definition, discussion of issues, and case studies

2. Non-marketing orientation

3. Availability and accessibility of the publication to i state agencies

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Andersen, David A., Salvatore Belardo, and Sharon S. Dawes, "Strategic Information Management: Conceptual Frameworks," *Public Productivity and Management Review*, Summer 1994, Vol. XVII, No. 4, 18 pages.

Offers a guide to help public managers envision service innovations and choose appropriate technologies to support them. Proposes two specific frameworks that can help managers think about information systems in strategic terms.

Austin, Tom, "The State of the Groupware Industry," A Presentation at the Center for Technology in Government Groupware Technology Testbed Public Seminar, May 25, 1994.

Presents an overview of groupware, what is the industry, what is driving it, what is groupware, where's it going, what's it good for, what's wrong with the picture, winners, losers and others, and deployment issues. Makes predictions about the groupware industry over the next 15 years.

Chen, H., Hsu, P., et al., "Automatic Concept Classification of Text from Electronic Meetings," *Communications of the ACM*, October, 1994, Vol. 37, No. 10, 17 pages.

Notes the advantages to meeting software and presents research study on a new approach to assisting the complex process of idea organization.

Eldred, Eric and Tim Sylvester, "A Groupware Duet with Gusto," *Client/Server Today*, July 1994, 10 pages.

Reports the results of a test on two client/server groupware products. Identifies issues for consideration in reviewing groupware technology.

Ellis, C.A. Gibbs, S.J., and Rein, G.L. "Groupware: Some Issues and Experiences," *Communications of the ACM,* January 1991, Vol. 34, No. 1, 20 pages.

Explores groupware as a class of applications for small groups and for organizations arising from the merging of computers, large information bases, and communications technology. Presents an overview of groupware in terms of a group's common task and its need for a shared environment, a taxonomy of groupware systems, and a wide range or perspectives of those who build these systems. Introduces some common groupware concepts and examples.

Grudin, Jonathan, "Groupware and Social Dynamics: Eight Challenges for Developers," *Communications of the ACM*, January 1994, Vol. 37, No. 1, 22 pages.

Presents the origins of groupware, describes eight problem areas, and examines groupware successes in search of better approaches to supporting work in groups.

Hsu, Jeffrey and Tony Lockwood, "Collaborative Computing; Computer-aided teamwork will change your office culture forever," *Byte*, March 1993, 5 pages.

Discusses the potential of collaborative computing technologies and organizational acceptance and resistance of the integration of groupware technologies

International Data Corporation, "Workgroup Technology: Tying technology to Business Objectives," *White Paper Program*, undated.

Workgroup computing is not a fringe concept, but a pivotal computing approach that has the potential, when well applied, to provide a distinct competitive edge. Presents two case studies of groupware application in the private sector. Presents a list of key features, identifies benefits of workgroup computing and presents an implementation checklist.

Kobielus, James, "The Time is Ripe to Pick Groupware," *Network World*, August 9, 1994, 6 pages.

Presents a buyer's guide to group collaboration tools. Focus is on high-end or multi-functional groupware products network dispersed project teams and reengineer business processes.

Murphy, John A. "Software Improves Work-Group Productivity," *Today's Office*, Nov. 1990, 2 pages.

Presents a discussion of the two main categories of groupware: general group dialogues and application specific group dialogues. The groupware available today primarily addresses the general group dialogues, the e-mail, calendar-scheduling, and teleconferencing aspects of office work.

Newcombe, Tod, "Workflow: The Force Within Imaging," *Government Technology*, Vol. 7, No. 4, April 1994, 3 pages.

Presents a discussion of the potential of the integration of work flow applications and imaging technology.

Opper, S. and H. Fersko-Weiss, Technology for Teams: Enhancing Productivity in Networked Organizations, Van Nostrand Reinhold, NY, 1992.

Examines the concept of groupware and presents approaches to using groupware to achieve maximum return on investment in networking infrastructure. Addresses both technical and human aspects of groupware including who should use it, how to implement it, how to change the way people work, and how it affects human interaction in an organization. Case studies are used.

Otten, Klaus W., "A Changing Information Environment Challenges Public Administration," *Information Management Review*, 1989, 4(4), 7 pages.

Describes new information handling techniques, the impact of these new techniques on our administrative environment and suggests strategies for meeting the challenge.

Radding, Alan, "Groupware: For Some, It's Simply a Good Way to Get a Conference Room. For Others, It's an Entree to Streamlining the Business," *ComputerWorld*, December 13, 1993, 7 pages.

Presents summary of four industry leaders. Discusses the components of groupware. Provides a "before you buy" check list.

Reinhardt, Andy, "Smarter E-Mail Is Coming; Rebuilding your business processes to take advantage of E-Mail promises dramatic productivity gains," *Byte*, March 1993, 11 pages.

Presents discussion of electronic mail as an enabling technology and urges the understanding of the role of the messaging infrastructure as a foundation for work flow applications such as information routing, task automation and decision support.

Simpson, David, "Variations on a Theme," *Client/Server Today*, July 1994, 10 pages.

Presents a definition of and a framework for thinking about groupware.

"The Emergence and Importance of Groupware," Gartner Group, *Inside Gartner Group This Week*, August 17, 1994, 2 pages.

Discusses groupware as the heir to electronic mail, LAN-based file sharing, personal productivity suites, and office automation systems. Posits that groupware will become the dominant work-group and departmental computing model during the next five years.

Watson, Richard T., Teck Hua Ho, and K.S. Raman, "Culture: A Fourth Dimension of Group Support Systems," *Communications of the ACM*, October 1994, Vol. 37, No. 10, 10 pages.

Focuses on culture, a fourth dimension of group support system (GSS) research, and its effect on GSS supported meetings. The other three dimensions are group size, member proximity and task type.

Whiting, Rick, "Not for Workgroups Only, *"Client/Server Today*, July 1994, 8 pages.

Discussion of how some companies are using groupware technology to solve enterprise-wide problems and key-turning new ways of doing business. Provides statistics on the groupware environment.

Appendix D

Testbed Theme and Project Selection

Themes to be considered for testbed projects must be of particular strategic or immediate practical importance to the agencies served by the Center.

Ideas for testbed project themes are solicited from a variety of sources:

- The NYS Forum's Standing Committee on the Center
- Formal consultation with the NYS Forum's Special Interest Groups.
- The NYS Forum's annual survey of member interests.
- Common themes identified in the NYS Forum's Information Resource Directory.
- Consultation with associations representing state and local government and not-for profit agencies.

Some of the factors to be considered in selecting a theme are:

- Specific expressions of interest in the technology by agencies.
- Estimates of the relative importance and timeliness of the theme.
- Feasibility of executing the project in the Center.
- Synergy with other Center and Forum activities.
- The availability of the technology and the support of the corporate partners.

CTG staff will develop a set of potential themes and present them to the NYS Forum Standing Committee on CTG for final selection.

Selection of Participating Agencies and Corporate Partners

Announcements of the testbed project solicitation are made through the "Open Forum" and mailings to associations of local government and non-profit groups. Every effort is made to accommodate all agencies that apply to participate, either as a lead agency on a project, or as an active observer of the project activities.

An agency interested in participating must submit a specific proposal to the Center. The proposal, approximately one page in length, will contain:

- A brief problem statement.
- The objectives the agency would like to accomplish in the project.
- The current technical and management environment in the agency.
- The specific technology proposed for the project.
- Agency resources dedicated to the effort (personnel, equipment).
- Additional resources needed to complete the project.

- Proposed timetable for the project.

Testbed projects are typically focused on specific technology products. After potential themes are selected, technology vendors will be invited by the Center to become corporate partners on the projects. The invitation to participate will include a description of potential project ideas submitted by agencies. Selection of corporate partners and themes is then made according to the best fit between projects, resources, and time constraints.

The Center will make the final selection of agencies and vendors to participate in each testbed. Factors that are considered in selecting participants include:

- Resources available for the proposed activities.
- Coverage of a variety of problems and technologies in each project.
- Opportunity for cross-fertilization between projects.
- Involving a mixture of state and local governments, and affiliated non-profits.

As much as possible, we encourage agencies to work cooperatively on the projects. If several agencies propose projects that are related either by a common problem statement or a common technology, we may make an attempt to join those projects into a single project. For example, one agency might be selected to do the initial experimentation, with the others invited to join as observers. Depending on resource constraints the observing agencies may be able to conduct their own experimentation during Phase II of the project.

Appendix E

Public Seminar and Demonstration

A primary goal of CTG is to share experiences and knowledge gained in projects with the broadest possible audience thereby transferring knowledge and spurring replication. The Public Seminar is the event which enables CTG and the project participants to share their experiences with colleagues in state agencies and local governments, with vendors, and with other interested parties.

The Groupware Testbed Public Seminar was held at the University at Albany on May 25, 1994. The program included an introduction to of the Technology Testbeds, an overview of Groupware provided by the Gartner Group, and summary descriptions and demonstrations of each of the three phase I projects provided by the project teams. A opportunity hands-on review was held following the demonstrations.

Evaluations were completed at the closure of the event by fifty-three (32%) of the attendees. Of those who responded, 94% indicated that they understood the objectives and structure of Technology Testbeds. All of those responding rated the briefing informative or very informative and 90% said the event met or exceeded their expectations. Expanding or improving their use of Groupware as a result of the information gathered during the seminar was expected by 20% of the respondents. Sixty-five percent said they would consider using groupware in the near future.

Written comments were provided by respondents on a range of topics. Feedback on the Gartner Group presentation was generally positive and reflected agreement that such overview presentations are necessary. Feedback on the groupware presentations were also positive and indicated that the primary goal of the event, dissemination and sharing of project experiences, had been met.

A sample of comments from the evaluations are indications that the event was successful in providing access to necessary information: "Gave me insight into this area of technology," "in a much better position to discuss it now," and "have gained knowledge as a basis for future decisions or recommendations on the uses of groupware."

Appendix F

Technical Notes

The following set of documents describe in more detail the technical work and environment in which the Technology Testbed took place. Major dataflow diagrams and project specifications from the various projects are included where appropriate. The documents are presented in the following order:

1. **Laboratory Infrastructure**
   The first document in the appendix describes the laboratory infrastructure which was available to the Technology Testbed teams.

2. **CTG/Forum Lotus Notes Project**
   The second set of documents present the technical materials from the CTG and FORUM Lotus Notes project including a sample application designed during the project, a copy of the operating model for the document repository, and a description of the base functionality and hardware specifications for the project.

3. **OSC InForms Project**
   The third set of documents include the technical materials from the OSC InForms project. These include the current system and prototype summaries, a flowchart of the existing correspondence control system and the user manual for the new system.

4. **NYS Thruway Authority InForms Project**
   The final set of documents include the technical materials from the NYS Thruway Authority InForms project. These include a description of the existing VAX account authorization and request process and flowcharts of the system as they progressed through the project.

More detail is available upon request.

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