Remote Management of a Province-Wide Youth Employment Program Using Internet Technologies

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EXECUTIVE SUMMARY

A province-wide network of Community Access Internet sites was supported during the summers of 1996 and 1997 by Wire Nova Scotia (WiNS), a government funded program to provide staffing, training and technical support for these centres. The program was managed remotely from an office in Sydney, Nova Scotia (Canada) using a variety of Internet-based technologies, including email, a web site, conference boards, real-time chat, and mailing lists. Remote management enabled the efficient and low-cost operation of a program involving 67 sites with field placements, plus six regional coordinators and the technical and administrative staff at the hub in Sydney. Effectiveness of remote management was enhanced when employees participated in an initial face-to-face regional training workshop. This training not only familiarized the employees with the communications technologies, but, perhaps more importantly, put a human face and personality to the messages that later came electronically over the Intranet.

[Note: For the benefit of those readers who may not be familiar with Internet technical terms, a brief glossary (Appendix A) is provided at the end of this case.]

BACKGROUND

Remote management as a key strategy for enabling new kinds of enterprise and other cooperative endeavours has emerged from the necessity of creating networked organizations to deal with the complexity and fluidity of the Information Age society. In the business world, the companies who are able to create effective virtual teams, particularly if they are able to collaborate with other companies that have complementary resources, are the ones who are thriving. For example, in 1995, three "arch-competitors" in the magazine business, *Men's Health, Esquire,* and *Rolling Stone* discovered an opportunity to collaborate on a bid for a significant advertising contract, and in three short weeks managed, via rapid and effective use of electronic communication and virtual team

building, to put together a bid that beat out the media giant, Time, Inc. for the contract. In Denmark, government policy encouraged small enterprises to create collaborative networks, and this has resulted in a significant increase in the success of these businesses (Lipnack & Stamps, 1997).

Note that it was not just that electronic media created more efficiency or enabled existing projects to be done more effectively. It created the possibility for an entirely different way of doing business. As Marshall McLuhan (1964) has told us, "The medium is the message." Even if our initial motivation in using electronic media is to simplify or speed up existing routines, the nature of the medium inevitably generates secondary effects (Grundy & Metes, 1997), changing the way we work, the way we think, and the way we relate to other people and organizations. One impact of working virtually is that the old hierarchical models of the Industrial Age become transformed into a more interdependent networking model, where access to information and participation in decision-making is not limited to the upper echelons.

> *Instead of asking, "What is the information that matters and how do we most effectively manage it?" companies must start asking, "What are the relationships that matter and how can the technology most effectively support them?" — Michael Schrage, The Wall Street Journal, March 19, 1990 (cited in Johnson-Lenz & Johnson-Lenz, 1995).*

This creates a need to develop new management and leadership styles, new ways of training workers to collaborate effectively, and a readiness to work across organizational boundaries, whether in commerce (e.g., Sieber & Griese, 1998) or in not-for-profit organizations (e.g., James & Rykert, 1997). Moreover, the network that is built must be constructed in anticipation of rapid change, able to respond immediately to new realities and new opportunities (Metes, Grundy, & Bradish, 1998).

In the case described below, the initial motivation for using remote management via use of an intranet was to create a cost-effective way of coordinating a province-wide program, delivering technical support, and receiving reports. However, once the network was created, it became clear that it also had potential to enable types of collaboration that would not have been practical with conventional organizational structures. Despite the fact that there was a nominal hierarchical structure in place, with both central and regional levels of coordination, the universal access to information and to communications tools enabled both fieldworkers and regional coordinators to operate with a high degree of independence, and were able to use the intranet communications to brainstorm, plan and implement collaborative activities involving multiple sites. The existence of the communications network encouraged and enabled formation of temporary regional action networks, which have the potential to evolve into more permanent Community Enterprise Networks (CENs), described below (see also Gurstein & Dienes, 1998). Such secondary effects of remote management have great potential and should be considered in both the planning and evaluation stages of a project.

Governments, educational institutions and non-profit community organizations are increasingly becoming involved in partnerships for sharing information systems and intranets for collaboration and for delivering services. One excellent example is the Missouri Research and Education Network (MORENet). "The primary mission of MOREnet is to provide collaborative networked information services to its members and customers in support of education, research, public service, economic development and government" (http://www.more.net). Resources on their web site include technical support, discussion lists, and access to tools such as online databases. Its link to the Missouri Express project for supporting Community Information Networks (CINs) provides an online newsletter as well as contact information, instructions and templates for creating a CIN.

The Wire Nova Scotia (WiNS) case described below incorporates these ideas into its intranet, and adds the element of remote management of staff, including monitoring, reporting, documentation of the project, collaboration on inter-site projects, and technical support.

SETTING THE STAGE

In the summer of 1996, the associate chair in the Management of Technological Change (MOTC) at the University College of Cape Breton (UCCB) in Sydney, Nova Scotia, Canada opened

the Centre for Community and Enterprise Networking (C\CEN). C\CEN's function was to research, develop and incubate ways of using the emerging Information and Communications Technologies (ICT) to promote local economic development in non-metropolitan regions, linking university, government and private resources with local needs. C\CEN followed the ongoing traditions of community-based economic development of the Antigonish Movement, which began in the Cape Breton area, and the mission of UCCB, which is to provide support to the economic and social development of the Cape Breton region. (See also the C\CEN web site, located at <http://ccen.uccb.ns.ca>.)

C\CEN had no core funding, so staffing and facilities would grow and shrink based on the particular projects it was funded to run at any given time. Because of this, its organizational structure was continually in flux. While this was at times confusing, it did create a climate of openness to experimentation with different management and organizational strategies. Base staff included the director, administrator, administrative assistant, systems administrator, and a technical support officer. A project leader would be hired for each new project, along with additional secretarial and technical support as needed, and staffing specific to the project. Project coordinators were given latitude to innovate and implement creative solutions to issues as they arose, generally reporting directly to the Centre's director. As the number of projects grew, a technology coordinator was appointed to oversee the incubation of new projects. Later this function was taken over by two assistant directors, one responsible for project development, the other for project implementation. Often staff roles and job descriptions would change to adapt flexibly to the needs of a new configuration of projects. The ability to share common technical and administrative expertise and resources between projects enabled a more cost-effective solution to staffing needs.

In its first year of operation (June 1996 to June 1997), leveraging an initial $165,000 grant into almost one million dollars via various partnerships and sponsorships, C\CEN was responsible for the creation of 140 person-years of skilled technically intensive work in non-metropolitan Nova Scotia, primarily in Cape Breton.

Cape Breton is suffering from the effects of a depleted resource-based economy, with the former mainstays of fishing, coal and steel no longer able to provide sufficient employment for the local population, resulting in outmigration and increased poverty. C\CEN piloted several information-based employment-generating projects with a view to encouraging the formation of a cluster of activity in this sector in the region, which, once it reached a "critical mass", would be self-sustaining. In particular, C\CEN encouraged the development of the network of Community Access Internet sites initiated by Industry Canada's Community Access Program (CAP), which provides a one-time-only grant on a competitive basis to organizations in up to 10,000 communities across Canada to support public Internet access. (For more information on CAP, see <http://cap.unb.ca>.)

Each CAP site is operated autonomously by a local community board. In isolation, such sites are unlikely to be economically viable, much less stimulate economic development in their area. However, as a coordinated network of centres (a Community Enterprise Network), they can serve as a distribution system for value-added facilitated access to various government and commercial information services (e.g., Job Banks, health information, on-line banking) and also as a coordination network for distributed production and joint marketing of local products and services to the global marketplace, using the flexible networking model (Piore & Sable, 1984; Gurstein, 1998a).

In order to stimulate the development of the CAP network in Nova Scotia, and to encourage communication and cooperation between the CAP sites, C\CEN developed a project called Wire Nova Scotia (WiNS) to coordinate and support summer staffing of the sites. (For a description of the WiNS program see the Case Description below.)

One key aspect of WiNS was to demonstrate that a province-wide program such as this could be administered from Cape Breton using appropriate communications technologies, as easily as it could from the central provincial administrative hub in the capital, Halifax. Instrumental to this was the development of an effective, inexpensive system of remote management. It is this system that is the subject of this case study.

Prior to developing the WiNS program, the C\CEN office was working with a small Windows95

Local Area Network (LAN), connected to the Internet via dial-up modem using WinGate software, plus a Unix server, located at UCCB, which hosted a web server as well as SMTP, POP-mail and Majordomo mailing list services. Internet connectivity for the Unix server was through UCCB's pipeline. Dial-up connectivity for the LAN was donated by MT&T Sympatico. All CPUs were Pentium 100 or 133mhz.

With these simple tools, the Centre managed an impressive array of projects, including creating an on-line bilingual real-time interface to the Access'96 conference held in Sydney, NS in November, 1996. Participants on the Internet could view real-time summarized transcriptions of ongoing presentations and seminars, simultaneously translated into English and French. Questions and comments from Internet participants would be directed to the speakers for immediate reaction.

Some examples of other projects include:

- **Environmental Web Project**: Web-based index of all organizations in Cape Breton with the capacity to provide services in the Environmental sector.
- **The Cape Breton Music Centre On-line**: Web site for the promotion and preservation of Cape Breton music, with an events calendar, resource directory, links to musicians' sites, etc.
- **Technical Support Group**: Offering on-line technical support to Community Access sites, First Nations sites, etc.
- **Electronic Democracy Project**: Providing a web site and email lists for open discussion of election issues in Nova Scotia.
- **Student Connection Program**: This was a province-wide program in which students were hired to train small businesses in use of the Internet.
- **ANGONET**: A Government of Canada project, "NetCorps" is being designed to link Canadian youth with technology-based projects in developing countries. As a pilot, C\CEN sent two young Cape Bretoners to provide technical support for ANGONET, Angola's Internet Access Network.

Many of these projects, particularly Student Connection, ANGONET, and the Technical Support Group included a remote management aspect, and experiences with various communications modalities led to a better understanding of what worked and what did not. This experience enabled C\CEN to design an effective remote management system for WiNS.

CASE DESCRIPTION

WiNS'97 Project Description

Industry Canada's Community Access Program (CAP) has supported Community Access sites by providing startup funds as well as funding for summer youth workers. These workers help staff the sites and also encourage involvement of local businesses, government and community groups. The Wire Nova Scotia Project (WiNS), developed and piloted in 1996 by C\CEN, in collaboration with the Nova Scotia Community Access Committee, was an enhancement to this program. WiNS assisted Community Access sites and summer youth workers in Nova Scotia to reach their potential through coordinated training, management and administration, including on-line technical support. The program was open to any site providing community access to the Internet, not only the CAP sites.

The WiNS pilot was subsequently adopted by Industry Canada as a national model. The following summer, C\CEN was asked to implement WiNS '97, which served 67 access sites across Nova Scotia directly, and many others indirectly. This effort included helping sites to strategize with school boards, libraries, regional development authorities, federal agencies and corporate sponsors to work towards the creation of local collaborative networks, with a view to creating long term sustainability.

In addition to the site workers, there were six regional coordinators with management skills. These staff helped to coordinate the efforts of sites in their area, facilitated provision of training and

technical support and provided regular supervision or intervention where necessary.

WiNS is a medium for community capacity building. Community Access and a trained workforce are both critical to the infrastructure for other initiatives that will follow. They provide the groundwork for a new commercial sector—Rural Informatics, and the structures to enable rural enterprises to be both competitive with, and appropriate collaborators for, their urban counterparts.

The development of WiNS involved the investment of many partners including:

- Industry Canada
- Enterprise Cape Breton Corporation
- Human Resources Development Canada
- Nova Scotia Department of Education & Culture
- Nova Scotia Department of Economic Development and Tourism
- University College of Cape Breton
- MT&T / Sympatico
- Nova Scotia Regional Libraries
- Regional Development Agencies
- Acadia Centre for Small Business and Entrepreneurship
- Strait East Nova Community Enterprise Network
- Chebucto Community Network

In order to satisfy the various reporting requirements to these bodies, detailed records of fieldworker activity and site usage had to be kept.

One fieldworker was assigned to each participating Access Site. Precise job descriptions would vary with the specific needs of each location, but in general, the fieldworkers' tasks would include:

- staffing the Access Site in collaboration with local volunteers to maximize hours open.
- promoting the Community Access site to the community at large and marketing its services.
- providing training on Internet and related services to representatives of community organizations, business people and individual citizens.
- providing technical support to the Community Access site.
- outreach to neighboring communities to promote the Community Access concept and encourage others to develop proposals for the CAP program.

Funding for the fieldworkers' salaries was designated for the 16-30 age group, so most workers were young students with limited experience. This created a greater need for supervision and technical support. Complicating the management process was the fact that the workers had a dual-reporting relationship. The workers were interviewed and hired by the local CAP site committee, and a local site supervisor was assigned to them. Depending on the site, these supervisors were more or less accessible during the summer months. Since payroll was managed directly through C\CEN-UCCB, and the funders had specific expectations for outputs during the work term, the fieldworkers also reported to their WiNS regional coordinator, each of whom supervised between 10 and 25 sites. When the agendas of the site committees and the funders clashed, it was up to the WiNS coordinators to mediate the situation.

Overview of the Remote Management System

The newest meaning of "virtual" attests to forces that are fast moving teams into an altogether different realm of existence—virtual reality—or more precisely, digital reality. Electronic media together with computers enable the creation of spaces that are real to the groups that inhabit them yet are not the same as physical places. The eruption of the World Wide Web in the last decade of the millennium has allowed virtual teams to create private electronic homes. These interactive intranets—protected members-only islands within the Internet—signal a sharp up-tick in the human capability to function in teams. (Lipnack & Stamps,1997, Chapter 1, Section 2).

Human resource management is a critical component to a successful project. Limited financial resources and a large geographical area require that traditional methods be adapted to adequately monitor, administer and manage a large and widely dispersed group. Using a storehouse of available knowledge and skills, developed from the projects described above, C\CEN was able to institute a form of Virtual Management. Using a Web site, O'Reilly's WebBoard™ software, e-mail, electronic mailing lists and IRC chat, the project was managed "on-line," with a formal reporting structure implemented and a variety of support functions available to assist the fieldworkers in their responsibilities. Five regional coordinators and one community network developer were placed across the province. These staff used the virtual management process to coordinate supervision of field workers in their region, as well as communications and cooperation between the regions and with technical and administrative support staff from C\CEN.

Needs

To be an effective system, the following management functions had to be implemented online:

- **Reporting**
  Weekly work summaries of fieldworkers
  Weekly site usage statistics
  Weekly regional reports from regional coordinators
- **Documentation/Archiving**
  Permanent record of reports accessible online
- **Conferencing**
  Several distinct online asynchronous discussions, threaded by subject
- **Announcements**
  Read-only announcement board
- **Problem Solving**
  Ability to form virtual task forces and workgroups to solve emerging problems
- **Tech Support**
  Online technical support for CAP sites, fieldworkers and regional coordinators.
- **Shared insights/experience/idea building**
  Free flow of information between all workers
- **Regional collaboration/planning**
  Coordinating local multi-site projects and efforts
- **On-line real-time meetings**
  Real-time chat (IRC) in a secure environment allowing workers to meet "virtually" to brainstorm projects and plan joint activities

In addition, the communication media had to have the following characteristics:

- **Flexible participation**
  Multi-modal access to communication services (via email, web and IRC).
  Both synchronous and asynchronous communication modalities.
- **Access control**
  Access to resources contingent on status, function and regional location within the organization. Signal to noise ratio (i.e., information versus socializing) appropriate to each channel of communication.
- **Cost-effectiveness**
  Resources had to be available at a cost easily affordable in terms of both central server and connectivity requirements and local workstation specifications.
- **Ease of use/User-friendliness**
  Even non-technical users should be able to use the system with a minimum of training.

Solutions

When the Web first got started, threaded discussions and live chat were interesting diversions

on Internet sites and corporate intranets, but little more. Not any longer. Today online conferencing has moved to the forefront of many web sites. Some of the Web's most highly trafficked sites are devoted to live discussion areas. And workgroups in small and large companies alike have discovered the productivity advantages offered through Web-based collaboration. (<http://webboard.oreilly.com/wb3/product_info/index.html>, [July 12, 1998]).

The interactive capacities of the World Wide Web give rise to applications that enable a radical shift in communications options for organizations. Initially, the Web was used primarily as a giant bulletin board, but now is fast becoming a set of interconnected virtual communities. Secure interfaces allow for controlled access to information and communication resources, at the same time as allowing access from any terminal connected to the Web, provided the user has the appropriate access codes.

What this means is that organizations with small budgets can take advantage of the existing infrastructure of the Information Highway with only a modest investment in hardware and connectivity costs. Fieldworkers can access the organization's intranet from home, from a work site, or from a public access terminal. Regional coordinators with a notebook computer and a cell phone can travel anywhere in their region and do not necessarily require the expense of a branch office. The head office can be located anywhere, freed of the high rents of urban locations and able to bring jobs to non-metropolitan areas. These are the underlying concepts of the WiNS intranet: flexibility, accessibility, low cost, and effectiveness.

To manage the WiNS'97 project, two new P-150 NT servers were added to C\CEN's network: one to run an expanded LAN at the central office, and one to host the WebBoard and NT-Mail (to provide email service for staff). The main components of the WiNS Intranet were:

1) WiNS Web Site (<http://ccen.uccb.ns.ca/wins97>) housed on the C\CEN Unix server.
   This was the "front end" of the Intranet, providing a gateway to the other features and a public face to the world. There were six main sections to the site:

   a) Project Information Area
   This was the public interface, which gave an overview of the project and links to the other areas on the site, including contact information. The WiNS general information flyer was available. Prospective employees could find out requirements for qualified applicants and sites could learn how to apply for a summer worker. Success stories from the previous year were highlighted. Press releases and updates about program innovations were posted as they became available. Links to other relevant sites provided information about the broader context of the project. These included links to the Nova Scotia Community Access Committee, the Community Access Program, the Strait East Nova Community Enterprise Network, the main C\CEN page and all other funders and partners of the project.

   b) Technical Support Area
   This area gave a description of services that were offered (as well as clear statements about services that were NOT offered!), a Frequently Asked Questions (FAQ) file, based on the highest volume queries dealt with by the technical staff, links to other technical resources on the Web, and, most importantly, a link to the Technical Support WebBoard conference, described below in the section on the WebBoard.

   c) Regional Resources
   A clickable map of the province, colour-coded by regions, gave quick access to resources of relevance to each particular region. These included a map of the region, showing all the access sites, and contact information for each site, each fieldworker, and the regional coordinator. These coordinators were encouraged to develop their own information resources for their region to add to this area. Graphic components were made available via FTP so that the regional sites thus developed could have a similar "look and feel" to the central site. Some regional sites were hosted on regional servers (such as local Community Network servers) rather than on the C\CEN server. Decentralizing development and hosting of regional web sites enabled local creative control over

content and design, thus giving local workers more "ownership" of the site and making it more likely for them to use it. It also decreased the workload of the central technical team, enabling them to put more attention on technical support rather than on web design and maintenance.

d) Fieldworker Resources

This area gave an overview of fieldworker responsibilities, examples of specific tasks that workers would undertake, information on how to get help or technical support, and instructions on using their personal Web conferences for regular reporting purposes.

e) Conference Area (WebBoard) (See description of WebBoard below.)

f)Contact Information

Phone, fax, email and mail addresses for the central office, regional coordinators and technical support were posted. Links also were provided by region to a list of all participating sites, their WiNS fieldworkers and their contact information. This gave a simple, accessible method of reaching anyone in the organization.

2) E-Mail

For those staff who did not already have email accounts, C\CEN provided this service. [Note: With the new availability of free web-based email services, such as HotMail or EudoraMail, this would no longer be required.] Whereas the WebBoard was used for reporting, announcing and group discussions, email provided a medium for one-to-one correspondence, particularly for arranging meetings, dealing with personnel problems, or getting quick feedback. It also provided a mode for social interaction between the workers, a key aspect of maintaining high morale, particularly in situations where workers were staffing sites alone much of the time.

3) WebBoard

While the web site was the matrix that integrated the various communications modalities, the WebBoard was the "heart" of the system. (See Peck & York, 1998 or <http://www.oreilly.com/webboard> for a detailed description of the WebBoard software.) WebBoard provides web-based on-line discussion conferences that are accessible to anyone with a web browser and Internet access. A key feature of the WebBoard is the ability to restrict access to each individual conference depending on the status of the user within the organization.

WiNS used four types of conferences: general, regional, staff and personal, incorporating the functions of reporting, planning and coordination, problem-solving, documenting, socializing, idea generation and technical support.

a) General conferences were open to all employees and served a variety of purposes.

i) The *Announcements* conference was a read-only conference to which only senior staff could post but all could read. This created a zero-noise board that everyone would check regularly for important updates without having to plow through any chaff.

ii) The *Business Development* conference was an idea-generating and sharing medium for people to brainstorm methods of using the access sites to generate income, to support local business, or to create new businesses, using the ICT tools.

iii) The *Technical Support* conference provided answers to a variety of technical questions on hardware, software, networking, training, etc. Technical support was made available to any access site worker or supervisor, not just the WiNS worker. Anyone could sign themselves up to the WebBoard and automatically be given access only to the Technical Support and Business Development conferences. A particularly useful aspect of using a web conference rather than one-to-one email was that, in addition to getting information from the technical support officers, participants could assist each other and share expertise they developed as they solved problems locally. This created a broader pool of expertise and reduced the workload for the technical support staff. It also reduced the tendency for field workers to develop too much dependence on the central technical support, encouraging them to develop their own skills and share them with others. The technical staff would of course monitor the answers provided by other employees to ensure that they were not giving inappropriate advice.

iv) The *General Discussion* conference provided a medium for anyone to raise issues, talk to

groups from other regions, chat, etc. This was an informal environment that facilitated socializing, networking, and resource sharing across the whole project. Providing a forum specifically catering to informal interaction helped to keep the other fora more focussed and productive. It is important to provide a variety of communication venues so that people of a wide variety of personalities and communication styles will feel comfortable using the on-line medium.

b) Regional Conferences served each region, enabling planning of joint ventures between nearby access sites, region-wide projects, coordination of promotion and advertising campaigns, announcements of regional on-line real-time chat meetings, and sharing of resources and expertise between people who had met at regional training sessions. Regional conferences were readable by anyone involved in the WiNS project across the province so that others could learn from innovations in other areas, but generally only participants from that region would post to the regional conference.

c) The **Staff Conference** was restricted to the senior staff: the WiNS coordinator, the WiNS administrator and the regional coordinators. It was used for weekly regional reports and for discussion of any problems involving sites, fieldworkers, or policies. Having this as a web conference rather than a one-way report to the WiNS coordinator enabled regional coordinators to learn from one another's experiences, and to offer support as appropriate. Coordinators had a variety of distinct expertise. For example, one may have training in community development, another in technical issues and another in business development. The staff conference made these skills available to all as problems and solutions were brainstormed.

d) Personal Conferences were the primary reporting method for all fieldworkers. Each fieldworker had his or her own personal conference that was used to file weekly reports and site usage statistics. This conference was viewable only by the fieldworker, their regional coordinator, and the WiNS coordinator. This gave the WiNS coordinator a log of activities and problems encountered by all staff. He could get a "snapshot" of any given site for any period by simply reviewing the weekly logs of the site worker. The absence of a log would point immediately to a potential trouble spot, and this could be addressed before the problem was exacerbated. These logs (in addition to the regional weekly reports) provided a rich source of data for compiling success stories and for writing the final report on the project.

4) On-Line Mailing Lists

C\CEN provided three email lists of relevance to this project. One was a general discussion list ("centre") for those working at the central hub in Sydney, allowing exchange of ideas between people working on different projects; another was a general discussion list for all the Community Access sites in Nova Scotia ("CA-NS"), providing a medium for sharing problems and solutions, new grant or income generating possibilities, upcoming workshops, conferences and training opportunities, etc. In addition, there was a list for general discussion of community access issues across Canada, with a particular focus on universal access to the Information Highway ("UA-C"). Originally run on majordomo software, the latter two are now functioning using LISTSERV. Archives of these lists can be found at <http://ccen.uccb.ns.ca/archives>.

5) IRC Chat

Internet Relay Chat (IRC) enables multi-user real-time text-based interactive communication. Individual users' typing is identified by an alias name at the beginning of each line they send, and each participant sees comments from all others as they scroll up the monitor screen. IRC-based meetings work best when there is a designated moderator and a predetermined agenda or set of questions about which participants are prepared to dialogue.

Chat functions were available for WiNS through the WebBoard or via IRC client software. Most sites used the MIRC shareware software for this purpose, as the chat capabilities in version 2 of WebBoard were limited. (Note: This limitation has been addressed in version 3 and private chat lines can operate within the WebBoard environment.) Use of chat for regular regional meetings was at the discretion of the regional coordinators. Fieldworkers could also set up chat meetings at any time, for example to coordinate multi-site activities (such as creating content for a booth

representing area Community Access sites at the local county fair).

There were mixed opinions as to the usefulness of the medium. Some felt that it was important for fieldworkers to interact in real-time, as this built a sense of community and provided an environment for brainstorming or for sharing immediate issues. Others found the medium somewhat ponderous, especially for those without fast typing skills, preferring the asynchronous modalities of email or web conferencing, which allow participants to reflect on their messages before posting and to respond at whatever time they happen to be free.

6) Face-to-face regional orientations and training sessions

a) Prior to the fieldworkers' start date, the WiNS coordinator held an orientation and training session attended by all regional coordinators. In addition to familiarizing these staff with the policies, procedures and communications technologies of the WiNS project, the session afforded the opportunity to get to know one another, identify one another's skills and resources and, perhaps most importantly, put a human face to the email addresses that would be the primary source of communication throughout the project.

b) Each regional coordinator later held a one or two day orientation and training workshop for their fieldworkers, covering issues parallel to those described above. Those who for whatever reason were unable to attend the training session were harder to integrate into the WiNS team, regardless of the amount of technical training they were given. The lesson seems to be that, for this population at least, it is difficult to build a sense of teamwork and community, or to create a desire for on-line socialization, without some prior face-to-face contact. Whether this would be true for people who have much more experience working virtually is an open question.

CURRENT CHALLENGES/PROBLEMS FACING THE ORGANIZATION

Funding cutbacks

Funding for C\CEN expired in March, 1998, and at this point it seems unlikely that it will be resurrected. The 1998 summer staffing program for Community Access sites was operated directly from the MOTC office with reduced staff and for a shorter time. While there were insufficient funds to engage in development work to create new opportunities and modalities for rural Community Access, the remote management system (now using WebBoard™ v.3) enabled implementation of a similar program despite the much-depleted central resources.

Community Enterprise Networks (CENs)

One challenge facing emerging CENs is to adapt the remote management model for business purposes. Issues include higher security (encrypted email, secure servers, etc.) and secure web interfaces to dynamically updated databases such as inventory, contact lists, etc. Depending upon the nature of the particular enterprises fostered by the CEN, unique solutions would have to be designed. The needs of a distributed production network are quite different from that of an information service or technical support delivery network, for example.

SUMMARY

The coordination of the program using remote management via the Internet worked well. The web-based, password-protected Intranet enabled workers and staff to keep in touch with one another, track activities in other regions, collaborate on group projects, and create an automatic archive of all reports and discussion for future analysis. The on-line technical support service was particularly useful, as it allowed not only for rapid response from the technical staff at C\CEN, but created an open forum where WiNS participants could answer one another's technical questions and learn from watching the solutions unfold. The WebBoard™ allowed for management of the information flow such that, for example, fieldworkers' reports were accessible only to themselves, their regional coordinator and the WiNS coordinator, but regional discussion conferences were accessible to all staff. The WiNS Staff conference was accessible only by coordinators, creating a secure forum where confidential issues (such as personnel problems, etc.) could be discussed. One challenge with the

system is that it required more training than anticipated, and a more user-friendly interface may be sought for future projects. Overall, the system saved considerable amounts of money on travel and phone costs, and it leaves an archive of all correspondence and worker logs, enabling future programs to learn from previous experience.

APPENDIX A: GLOSSARY OF TERMS

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Browser
A Client program (software) that is used to look at various kinds of Internet resources.

Client
A software program that is used to contact and obtain data from a Server software program on another computer, often across a great distance. Each Client program is designed to work with one or more specific kinds of Server programs, and each Server requires a specific kind of Client. A Web Browser is a specific kind of Client.

E-mail
(Electronic Mail) — Messages, usually text, sent from one person to another via computer. E-mail can also be sent automatically to a large number of addresses (Mailing List).

FTP
(File Transfer Protocol) — A very common method of moving files between two Internet sites. FTP is a special way to login to another Internet site for the purposes of retrieving and/or sending files. There are many Internet sites that have established publicly accessible repositories of material that can be obtained using FTP, by logging in using the account name anonymous, thus these sites are called anonymous ftp servers.

Home Page (or Homepage)
Several meanings. Originally, the web page that your browser is set to use when it starts up. The more common meaning refers to the main web page for a business, organization, person or simply the main page out of a collection of web pages, e.g. "Check out so-and-so's new Home Page."
Another sloppier use of the term refers to practically any web page as a "homepage," e.g. "That web site has 65 homepages and none of them are interesting."

Host
Any computer on a network that is a repository for services available to other computers on the network. It is quite common to have one host machine provide several services, such as WWW and USENET.

HTML
(HyperText Markup Language) — The coding language used to create Hypertext documents

for use on the World Wide Web. HTML looks a lot like old-fashioned typesetting code, where you surround a block of text with codes that indicate how it should appear, additionally, in HTML you can specify that a block of text, or a word, is linked to another file on the Internet. HTML files are meant to be viewed using a World Wide Web Client Program, such as Netscape or Mosaic.

Internet

(Upper case I) The vast collection of inter-connected networks that all use the TCP/IP protocols and that evolved from the ARPANET of the late 60's and early 70's. The Internet now (July 1995) connects roughly 60,000 independent networks into a vast global internet.

Intranet

A private network inside a company or organization that uses the same kinds of software that you would find on the public Internet, but that is only for internal use. As the Internet has become more popular many of the tools used on the Internet are being used in private networks, for example, many companies have web servers that are available only to employees. Note that an Intranet may not actually be an internet — it may simply be a network.

IRC

(Internet Relay Chat) — Basically a huge multi-user live chat facility. There are a number of major IRC servers around the world which are linked to each other. Anyone can create a channel and anything that anyone types in a given channel is seen by all others in the channel. Private channels can be (and are) created for multi-person conference calls.

LAN

(Local Area Network) — A computer network limited to the immediate area, usually the same building or floor of a building.

LISTSERV®

The most common kind of maillist, "LISTSERV" is a registered trademark of L-Soft international, Inc. Listservs originated on BITNET but they are now common on the Internet.

Login

Noun or a verb. Noun: The account name used to gain access to a computer system. Not a secret (contrast with Password).
Verb: The act of entering into a computer system, e.g. Login to the WELL and then go to the GBN conference.

Maillist

(or Mailing List) A (usually automated) system that allows people to send e-mail to one address, whereupon their message is copied and sent to all of the other subscribers to the maillist. In this way, people who have many different kinds of e-mail access can participate in discussions together.

Network

Any time you connect 2 or more computers together so that they can share resources, you have a computer network. Connect 2 or more networks together and you have an internet.

Node

Any single computer connected to a network.

Password

A code used to gain access to a locked system. Good passwords contain letters and non-letters

and are not simple combinations such as virtue7. A good password might be: Hot$1-6

POP

(Point of Presence, also Post Office Protocol) — Two commonly used meanings: Point of Presence and Post Office Protocol. A Point of Presence usually means a city or location where a network can be connected to, often with dial up phone lines. So if an Internet company says they will soon have a POP in Belgrade, it means that they will soon have a local phone number in Belgrade and/or a place where leased lines can connect to their network. A second meaning, Post Office Protocol refers to the way e-mail software such as Eudora gets mail from a mail server. When you obtain a SLIP, PPP, or shell account you almost always get a POP account with it, and it is this POP account that you tell your e-mail software to use to get your mail.

Posting

A single message entered into a network communications system. E.g. A single message posted to a newsgroup or message board.

PPP

(Point to Point Protocol) — Most well known as a protocol that allows a computer to use a regular telephone line and a modem to make TCP/IP connections and thus be really and truly on the Internet.

Server

A computer, or a software package, that provides a specific kind of service to client software running on other computers. The term can refer to a particular piece of software, such as a WWW server, or to the machine on which the software is running, e.g. Our mail server is down today, that's why e-mail isn't getting out. A single server machine could have several different server software packages running on it, thus providing many different servers to clients on the network.

SMTP

(Simple Mail Transport Protocol) — The main protocol used to send electronic mail on the Internet. SMTP consists of a set of rules for how a program sending mail and a program receiving mail should interact. Almost all Internet email is sent and received by clients and servers using SMTP, thus if one wanted to set up an email server on the Internet one would look for email server software that supports SMTP.

Terminal

A device that allows you to send commands to a computer somewhere else. At a minimum, this usually means a keyboard and a display screen and some simple circuitry. Usually you will use terminal software in a personal computer - the software pretends to be (emulates) a physical terminal and allows you to type commands to a computer somewhere else.

UNIX

A computer operating system (the basic software running on a computer, underneath things like word processors and spreadsheets). UNIX is designed to be used by many people at the same time (it is multi-user) and has TCP/IP built-in. It is the most common operating system for servers on the Internet.

URL

(Uniform Resource Locator) — The standard way to give the address of any resource on the Internet that is part of the World Wide Web (WWW). A URL looks like this:
http://www.matisse.net/seminars.html or telnet://well.sf.ca.us or news:new.newusers.questions

etc.

The most common way to use a URL is to enter into a WWW browser program, such as Netscape, or Lynx.

WWW

(World Wide Web) — Two meanings - First, loosely used: the whole constellation of resources that can be accessed using Gopher, FTP, HTTP, telnet, USENET, WAIS and some other tools. Second, the universe of hypertext servers (HTTP servers) which are the servers that allow text, graphics, sound files, etc. to be mixed together.

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