

INNOVATIONS

The Center for Technology in Government

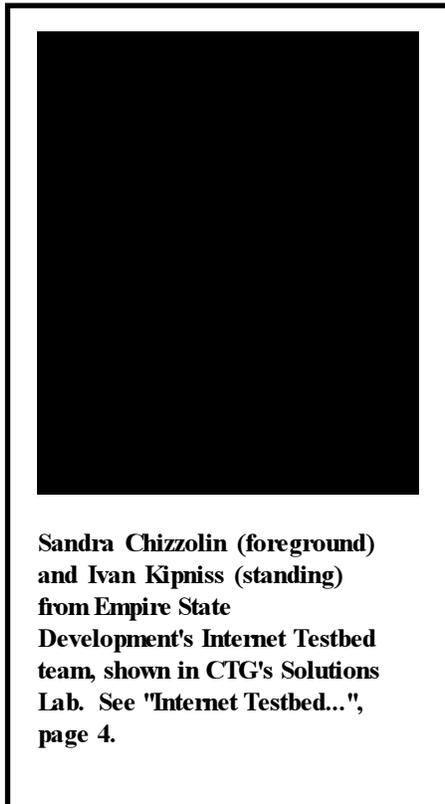
1995 Innovations in American Government Award Winner

Security on the Internet

You've finally built your Web site, but don't breathe a sigh of relief too soon. First, ask yourself if the Web site has enough security to keep it safe from intruders. Experts warn that security breaches are costly, not only in real dollars, but in loss of credibility and reputation.

How can government organizations reach a good balance between solid security and ease of access? Laura Iwan from the NYS Department of Health has good advice for the security conscious:

- ◆ Maintain logs — and review them! Observe odd behavior and repeated attempts to log on.
- ◆ Use security devices — routers separate internal network traffic from Internet traffic; firewalls are software used to prevent intrusion; bastion hosts are highly secured machines that are the main point of access to the system.



Sandra Chizzolin (foreground) and Ivan Kipniss (standing) from Empire State Development's Internet Testbed team, shown in CTG's Solutions Lab. See "Internet Testbed...", page 4.

- ◆ Stay current — browse among Internet sites devoted to security [see the list on p. 2].
- ◆ Employ digital signatures — to authenticate mail.
- ◆ Understand cracker tools — SATAN is a security analysis tool for auditing networks used

both for security and by crackers. Find hacker information that should also be monitored by system administrators at <http://www.thecodex.com>

Dave Dumas, Senior Security Consultant at Digital Equipment Corporation, suggests using one-time only password generators. At a bare minimum passwords should be changed frequently. Dumas also says that having dedicated servers, each with one function (e.g. firewall, FTP server), can foil hackers.

Frank Wickham, Sun Microsystems Senior Systems Engineer, believes that illegal modification of data can be far more potentially damaging than loss of data. Sun itself uses double firewall security. Wickham recommends using firewalls from different manufacturers so that the same security holes don't exist in both.

For more information on firewalls, visit <http://www.incog.com> & <http://www.checkpoint.com>

Hidden Threats



Hackers and crackers may not be the main threats to system security. Internal threats are invisible, but they are as sinister as anything from the outside. Dave Dumas, Senior Security Consultant at Digital Equipment Corporation, says that it is not unusual to discover that a system was brought down by the system administrator. Although it can be accidental, it can also be a way for system administrators to gain job security. Disgruntled employees and layoffs provide another security problem, especially in organizations that are downsizing. Altogether, 10% of attacks come from outside the firewall, says Dumas, and 90% from the inside through modems, physical access to workstations, routers, laptops, etc.

The easiest way to get access to a system can be through social engineering. 'Social engineering' is a term that means getting people to do what you want them to do. Individuals often do research on an organization to find the names of employees, their email addresses and other information. They will then call the system administrator and "talk their way" into the system by pretending to be an employee. So-called "social engineers" will say that they can't remember their passwords, that they are using a different computer that doesn't have the password automatically keyed in, or they give some other plausible story. The systems staff member then divulges the password, and at that point intrusion becomes easy.

Michael Fogel and Michael Jones of UNIFIED Technologies offer three solutions to the security threats: an internal firewall, authentication on dial-in lines, and call back.

Encryption is another security solution, according to Tal Saraf, Senior Systems Engineer and Internet Technologies Expert at Microsoft Corporation. Public key encryption works with email or other applications. It is also possible to use channel encryption, so that packets of information are encrypted. Digital signing is an industry standard and an accepted security solution used like a handwritten signature to verify the identity of the signer. A digital signature is like "shrink wrap" for Internet code.

It's necessary to be aware of both internal and external threats to security. Building a security plan for Internet sites and Intranets requires analysis, planning, and staff education. Fogel and Jones say that "a true security solution is just part of the infrastructure; security solutions must facilitate use of the network or people will work around them."

At the CTG-sponsored seminar, "Security on the Internet," Laura Iwan of the NYS Department of Health said "You need to take care of internal housekeeping before you go on the Internet." For an outline of Ms. Iwan's talk, see the Seminar notes and slides on CTG's Web site (<http://www.ctg.albany.edu/projects/inettb/security.html>)



Web Security Sites

In order to learn more about security, visit the list of sites that Iwan provided to seminar participants:

Coast - Computer Operations, Audit, and Security Technology:

<http://www.cs.purdue.edu/homes/spaf/hotlists/csec-top.html>

Site Security Handbook (RFC1244):

<http://ds.internic.net/rfc/rfc1244.txt>

CERT - Computer Emergency Response Team:

<http://www.sei.cmu.edu/SEI/programs/cert/>

CIAC - U.S. Department of Energy, Computer Incident Advisory Capability:

<http://ciac.llnl.gov/>

NIST - National Institute of Standards and Technology. Computer Security Resource Clearinghouse:

<http://csrc.ncsl.nist.gov/>

NCSA - National Computer Security Association:

<http://www.ncsa.com/ncsamain.html>

Firewalls - Internet Firewalls Frequently Asked Questions:

<http://www.greatcircle.com/firewalls/info/FAQ.html>

6 Top Internet Tools

Is creating a Web site an art or a science? Maybe it's just smart business in the accelerated world of digital communication. Since CTG has been working on the Internet Testbeds, six web development tools have caught our attention.

Making Digital Paper with Adobe Acrobat. Providing electronic documents either internally or externally to an organization is often hampered by the wide range of computers and software being used by end users. For this reason, Adobe created the Acrobat line of software. It allows you to publish your documents electronically and read them with any software on any

platform. Acrobat files created with the Acrobat Exchange program, called PDFs, capture the document's text, graphics and formatting just as they were originally created. This PDF can then be viewed and printed with the Acrobat Reader, software available from Adobe. Letterheads, drawings, charts, and fancy fonts will appear on the screen exactly as they did on paper. Currently, Acrobat Reader is available in DOS, Windows, Macintosh and UNIX versions. For more information, check out Adobe's Web site at <http://www.adobe.com>.

Java, Sun's robust, objected-oriented programming language developed by James Gosling, allows the same program to run on any computer regardless of its hardware or operating system. It can deliver multimedia applications, not just text or static graphic information. Another advantage of Java is that it was co-developed with Netscape, the popular Web Browser, and it is widely supported — to date 28

companies support Java. Java application programs, called applets, can be run by using a World Wide Web browser, such as Netscape 2.0 or HotJava. More information can be found at <http://java.sun.com>

Moving Worlds VRML from Silicon Graphics. Many Web site developers are satisfied with static text and simple images, but moving images, animation, or 3-D call for a tool like, Moving Worlds VRML 2.0 from Silicon Graphics. VRML can create scaleable worlds, behaviors, and interactive objects.

The Cosmo software suite goes hand in hand with VRML. It includes Cosmo Create, an integrated hypermedia Web authoring system; Cosmo Code, the first visual development environment for Java and Cosmo MediaBase, the first Web-based intelligent streaming media solution. For more information, visit the Silicon Graphics homepage at <http://www.sgi.com>

What's With Intranets?

The Internet is everywhere, but writer David Strom of Attachmate Corporation says "This focus may be misplaced: it is the intranet...that is the key information technology revolution for the remainder of the century." For organizations that have become used to the Internet as a way of finding information for staff and disseminating information to constituents, intranets can offer a valuable tool for very little additional investment. An intranet is like an internal Internet.

Intranets are groupware used often by companies whose employees are geographically dispersed allowing

them to communicate with each other and with the organization's headquarters quickly and easily. Through intranets employees can work on the same project across the miles.

What are the benefits?
According to Strom, they include:

1. **Low training costs** — Using the same point and click hypertext type technology as the World Wide Web, training costs are minimal.
2. **Low implementation costs** — If an organization has a networking infrastructure of a LAN, a Web Server machine, and Web browsers installed on all PCs, the infrastructure is already in place.
3. **Low maintenance costs** — A great deal of expertise is not needed to create and maintain a single Web

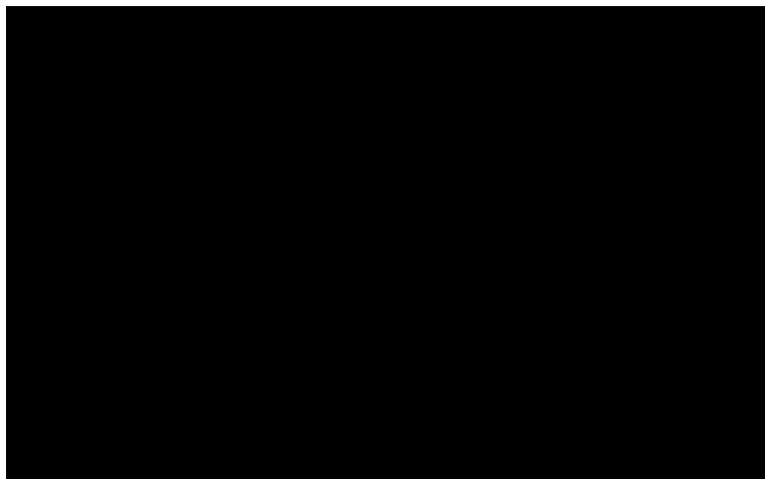
page; internal Web pages are created and maintained like Web pages on the Internet.

4. **Reduced MIS staff time** — MIS staff do not have to update information on the server. Users themselves can update the content of their own Web pages.

5. **"Future Proof" technology** — Intranet technology will not become obsolete. The Internet market will continue to define and deliver new technologies, and since an Intranet uses Internet technologies, new discoveries and applications can be adopted easily for internal use.

For more information, including David Strom's white paper on creating private intranets, visit the Intranet Information Page <http://www.strom.com/pubwork/intranetp.html>

Internet Testbed Makes More NY Information Available



The NYS Division of Housing and Community Renewal's Internet Testbed team, (left to right) Linda Cardona, Bob Kelly, Darryl Green and Audrey Dean work with CTG's Project Support Manager, Ann DiCaterino (standing)

New York will have an expanded presence on the Internet this summer as CTG Internet Services Testbed participants launch fully implemented World Wide Web sites. CTG workshops on customer services, service objectives and a strategic framework for the development of World Wide Web sites helped the teams get started. Recent workshops on Web server options and Web implementation tools have brought the groups up to speed. However, it's the creativity and hard work of the Internet teams that are responsible for the new Internet resources becoming available.

The Governor's Traffic Safety Committee Internet team, led by Ken Carpenter and Anne Dowling see many benefits in having a Web site. One of the Committee's key activities is public information and education. They receive daily requests for information on safety laws and how to comply. The Internet is a more

cost effective approach to inquiries and service announcements. Another plus is that information can become more accessible and more timely through frequent updates and immediate Web availability. The Committee team expects to be able to answer many questions on licensing, rules of the road, accident reporting, and vehicle inspection and repair on-line.

New York's Division of Housing and Community Renewal, under team leaders Linda Cardona and Darryl Green developed a detailed Web site plan with which their site was constructed. The agency is offering access to its policies, laws, codes, court decisions, guidelines, fact sheets, and program applications on-line. Web visitors will also be able to download necessary forms, as well as updated agency software. In the future, the site team plans to offer access to the agency's major databases, such as building and apartment information.

A Real-Life Internet Mystery

Many CTG Internet Testbed participants have been reading *The Cuckoo's Egg* by Cliff Stoll. It's a spy story for the 90's that is all true. Stoll was an astronomer who became a systems manager at Lawrence Berkeley Laboratory. A small accounting error sent him on a worldwide search to discover who was breaking into the lab's system. The book is available in paperback, and it is not only a good story, but also provides some solid information about security issues. Highly recommended for a good summer read!

Is an Intelligent Agent in Your Future?



What is the future of software development? — a question that software developers often face, but can't always answer. The last few years client/server systems have been widely regarded as “the future” — at least for now. The ability to split software into two or more parts has been considered a good way of delivering systems. The growth of, and our understanding of, client/server systems was what led to the popularity of the World Wide Web. Now this network of client/server systems has opened up the possibility of new generations of software.

One type of system that might become important in the further development of the World Wide Web is the so-called 'intelligent agent.' According to Wooldridge and Jennings, an agent is [usually] “a software-based computer system that enjoys the following properties:

- ◆ **Autonomy:** agents operate without the direct intervention of humans or others, and have some kind of control over their actions and internal state;
- ◆ **Social ability:** agents interact with other agents (and possibly humans) via some kind of agent-communication language;

- ◆ **Reactivity:** agents perceive their environment and respond in a timely fashion to changes that occur in it;
- ◆ **Pro-activeness:** agents do not simply act in response to their environment, they are able to exhibit goal-directed behavior by taking the initiative.”

One simple way to picture an agent is to imagine a computerized personal assistant. Some direct applications for intelligent agents include finding information, finding the best prices for products, buying and selling things, and organizing e-mail messages. Expect many of the tasks you do by interacting with a client today to be accomplished by an intelligent agent in the future.

For more information, see M. Wooldridge and N. R. Jennings. (Eds.). “Intelligent Agents,” Proceedings of the 1994 Workshop on Agent Theories, Architectures and Languages. Springer-Verlag:1995.



Future MBA's Learn Through Computer Conferencing

MBA information systems students at the University at Albany are learning about the importance of a multi-disciplinary approach to information systems in a course that includes cognitive psychology, educational psychology, ethics, and philosophy, as well as the traditional roles of computer science and management. Professor Sal Belardo, CTG faculty associate, and Information Science Ph.D. students Eliot

Rich & Carole Sweeton, and 30 MBA students used CTG facilities and software to prototype ‘learning organizations,’ where information technology is used to promote organizational growth. Students are using Lotus Notes to elicit, classify, and disseminate ideas leading towards understanding and solving problems. One such problem studied was the effectiveness of the MBA program.

To Crypto or not To crypto . . . That is the question

RSA, PGP, DES, NSA, the Clipper Chip...it's hard to avoid the stories in the news about cryptography. The development of modern-day cryptography is a fascinating story, with technologies that have affected the course of history (see David Kahn's *The Codebreakers*). Spy vs. Spy intrigue, government intervention, and clever applications of mathematics to practical problems — it's such a compelling area that many people know more about the merger of RSA Data Security and

Security Dynamics than they do about the war in Bosnia.

The more important question is "Who cares?" To this point, cryptographic techniques have been applied in focused areas such as military work and in securing login passwords. With the explosion of the Internet and the World Wide Web, the need to communicate privately over an insecure communications medium has become household conversation (well, at least in some households). As long as ambitious students can grab a Visa number from their floormates to purchase something on the net, the Internet will fail to be a ubiquitous effective communications medium.

The beauty of the Internet is that it is an INTERNET, where anyone connected can send information to anyone else. While firewalls can create islands of secure communica-

tion, the ease with which information can be shared on the Internet is a strong driver to develop methods for conducting private communications. If New York State builds an Intranet, there will still be a need to communicate confidential information such as client records or bid proposals with non-profits or private companies.

At this point, those who want to use encryption to communicate securely, are faced with a daunting array of incompatible technologies. Help is on the way, though, as groups such as the recent Internet Mail Consortium's "Workshop for Resolving Email Security Complexity" push for secure transmission of electronic mail and general inter-process communication standards. It's a development to which many are looking forward. You can expect to see a lot more developing in this area in the near future.

University Students Play Key Role

Graduate students from the University at Albany work with CTG staff on solving technical problems and doing research. They benefit from on-the-job learning, and CTG benefits from their energy and intelligence.

Jihong Zeng is a first-year graduate student in the Information Science (INF) Ph.D. Program. She comes from the beautiful city of Beijing, China. Jihong holds a Bachelor's degree in Library and Information Science from Nankai University and a Master's degree in Library and Information Science from Peking University. Jihong is interested in information technology, networks, and the organization of knowledge-based information systems. Currently, she

assists with Internet information searching at CTG, coordinating the CTG/INF Brown Bag lunch seminar, and the construction of the Information Science Ph.D. Web page.

Christian Harris hails from Jonesboro, Arkansas. He received his Bachelor's degree with honors in computer science from Arkansas State University where he wrote a senior thesis called "Some Formal Specification Methods for Programming Problems." He also completed an internship at Argonne National Laboratory. Christian's research interests are in formal methodology for software development and automated reasoning. He is also studying formal verification of communication protocols and hybrid systems, that is, systems in which a computerized controller interacts with a real-time component. Christian says the most fun job he's ever had

was as a columnist for the Arkansas State University Herald, but he has also enjoyed his work as a teaching assistant and summer instructor at the University at Albany. His vote for the best working environment is in his current position as UNIX system administrator at CTG.

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Editors:

Claire McInemey & Sally Goodall

Contributing Writers:

Peter Bloniarz

Christian Harris

Kai Larsen

Ursula Markus

Mandy McCord

Eliot Rich

Ranjana Syam

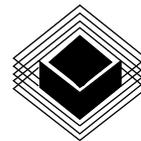
Jihong Zeng

Phone: (518) 442-3892

Fax: (518) 442-3886

Email: info@ctg.albany.edu

WWW: <http://www.ctg.albany.edu>



Making Connections

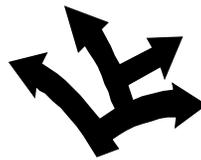
Research Director Peter Bloniarz recently worked with the Russian Federation in Moscow to develop plans for modernizing the economic forecasting capabilities of the Russian government. The team, consisting of two international experts in economics, Dr. Bloniarz, and officials from the Russian government and research institutes, developed a four-year plan to strengthen the institutional capabilities for a country that has undergone tumultuous changes in recent years. The planning mission was funded by the United Nations Department for Development Support and Management Services.

April

CTG Director Sharon Dawes moderated a panel discussion on "Public Access to Government Information and Services" at the Annual Institute of the Capital Area Chapter of the American Society of Public Administration. Panelists included Gladys Ann Wells (NYS Library), David Walsh (NYS Senate), Fran Pinto (NYS Office of Real Property Services), and Colleen Ryan (CRISNY).

Sharon Dawes participated in the April 30 meeting of the Advisory Committee for the State Office for the Aging's "Aging Services Network (ASNET)," a project funded by the U.S. Department of Commerce to foster community use of telecommunications services.

Theresa Pardo, CTG Project Coordinator, gave an overview of CTG to the SARA Region 3 Local Government Records Services Advisory Committee.



May

Peter Bloniarz and Sharon Dawes met with the staff of the U.S. Nuclear Regulatory Commission Technology Center to compare programs and discuss possible collaboration. While in Washington they also had a similar meeting with the staff of the Information Technology Support Center (ITSC), a public-private partnership to improve employment security programs nationwide sponsored by a grant from the U.S. Department of Labor to the State of Maryland.

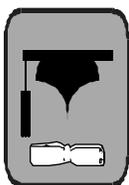
Sharon Dawes and University at Albany faculty member Jeryl Mumpower presented the results of the OMH Psychiatric Assessment Tool project at the spring conference of the Institute for Operations Research and the Management Sciences (INFORMS) in Washington, DC.

Kristine Kelly, CTG Research Associate, and John Rohrbaugh University at Albany faculty member gave a presentation "Using Group Modeling Approaches to Estimate the Impacts of Technology Intensive Innovations in the Public Sector" at the INFORMS conference.

Center staff hosted a visit from representatives of the Commonwealth of Massachusetts to discuss CTG experiences in light of similar needs in Massachusetts state government.

CTG also hosted a visit from a research team from the University of New Mexico who are studying university-based research centers as mechanisms for technology transfer.

Theresa Pardo presented a session "Coordinating Public Information Access" to the New York State Local Government Information Technology Directors Association's Spring Meeting in Cooperstown.



CTG is saying farewell to three loyal student assistants who graduated with Bachelor degrees from the University at Albany this spring.

Michael Kersten, from Worcester, MA received his Bachelor's degree in Biology this May. He plans on a career studying marine mammals. Michael is also interested in Russian literature, and he wrote a short story that was published in the Lorelei, the University's literary magazine.

Tiara Miller, from Queens, NY, majored in both Africana Studies and Sociology. She has been

working at CTG since she was a sophomore. After graduation Tiara plans to attend graduate school in School Psychology at either Columbia University or the University of Baltimore.

Michelle Molina received her degree in Mathematics from the University at Albany. Michele is from the Bronx, and she will return to the city in order to study for her Master's degree in Information Systems at Pace University.

"Partnerships & Technology" Video Available

As part of the Innovations in American Government award, CTG has produced an eight minute video that shows how the Center works. The video features the Adirondack Park Agency Project, the Office of Mental Health Psychiatric Assessment Tool, and the Internet Testbed Projects. The creative work and photography on the project was completed by the electronic media firm Current-Rutledge (<http://www.rutledge.com>). Please call or email us if you would like to borrow a copy of the video.

WWW Starter Kit Available

CTG is conducting an Internet Services Testbed project that generates many requests for help from state and local agencies who want to get started with Web-based services. Since we are too small to help everyone individually, we've devised a "WWW Starter Kit" and placed it on our Web site. It's designed to help prevent beginners from getting terribly lost in the vast array of topics, tools, and issues that are involved in Web site development and management. It's not a full-blown guide to web site development, just a helpful way to begin. Please visit our site <http://www.ctg.albany.edu/projects/inettb/startkit.html> and let us know if you find this useful and how we might improve it.

Open House

CTG conducts a monthly open house designed to introduce the Center to government managers, corporate representatives, and members of the academic community. The open houses are held from 3:30-5 p.m. on the second Thursday of each month in our Government Technology Solutions Lab.



UNIVERSITY AT ALBANY
STATE UNIVERSITY OF NEW YORK

Center for Technology in Government
University at Albany, SUNY
1400 Washington Ave PAC 264
Albany NY 12222