Connect
Information Technology at NYU
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Spring 2000

12: Music from Montréal

Internet Access in Timbuktu

Graphics Applications in Turkey

Around the World in 80 Kbps
Connect
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Connect: Information Technology at NYU is edited and published by New York University’s Information Technology Services (ITS). Its scope includes information about computing, networking and telecommunications across NYU’s various schools, departments and administrative units, as well as developments in information technology outside the University.

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You can also read Connect online, through NYU Web, at the URL www.nyu.edu/its/connect.

We welcome your comments about the articles in this issue, as well as suggestions for future issues. Contributions are invited for consideration by the editor.

Opinions expressed in the articles in this publication are those of the authors and not necessarily those of Information Technology Services or of New York University.

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Cover: Arches designate “wired” NYU programs abroad; lines connect Washington Square to videoconferencing locations. Inset photos: downtown Montréal, Canada; mosque tower in Timbuktu, Mali; ruins in Aphrodisias, Turkey.

Cover art by Jason Michael Varone (IFA). Photos courtesy of George Sadowsky and Aphrodisias Excavations.
# Contents

## About ITS
Connecting at NYU and Beyond
   A Balanced Move Toward Interdependence
   By Marilyn McMillan  
   "Hello! Client Services —
   How Can We Help You?"
   By Kenneth M. Fauerbach

## Around the World
To Timbuktu, and Onto the Internet
   By George Sadowsky
Return To Aphrodisias
   Computers Aid an Archaeological Site
   By Christopher Ratté

## Wagner Worldwide
Creating Global Academic Partnerships
   with Interactive Televideo Conferencing
   By Dennis Smith
Making Music with McGill
   By Philip Galanter

## Libraries
Real Research with Virtual Text at The Studio
   By Jennifer Vinopal
A Universe of StatisticsOpens Up
   By John Hernandez

## Classes and Talks
Spring Schedule — Center Pullout

## Networks
Wandering Around the AirPort with your iBook
   By Kathy Bear
Lower Latency, More Bandwidth
   Update on Internet2 and NYSERNet 2000
   By Bill Russell
ITS Receives $1 Million Gift from Sun Microsystems
   By David Ackerman

## On-Campus
International Repetitive Strain Awareness Day
   Because Work Shouldn’t Hurt
   By Trina Semorile

## Academics
Using Audio Computer-Assisted Self-Interview in AIDS Risk Research
   By Rachel Jones and Ewaryst Jedrasik
FireWire, Media Convergence, and your Future Home Network
   By Philip Galanter
Databases in SPSS and Access
   By Frank LoPresti
I'll admit it. When the weather turns nasty in Washington Square, we at Connect start to dream of distant lands. We consider jaunting off to Turkey to explore the excavated ruins at Aphrodisias (page 10), with state-of-the-art maps, geophysical scans and signs to guide us to the wonders that the archaeological dig there has revealed. Or maybe a trip to far-off Timbuktu is in order, to observe a developing Internet culture (page 7).

The fact is, we can still get away even without a plane ticket, thanks to developing technologies and connectivity services right here at NYU. Internet2 brought a Canadian orchestra to the Cantor Film Center with amazing sound quality (page 15). Dennis Smith’s videoconferences obviate many business trips (page 13). If you look at the map on the cover, you can see that he’s set up conferences with four continents!

Thanks to technology, the world is truly becoming smaller. But, as Marilyn McMillan points out on page 3, this increased connectivity must not be achieved at the cost of personal privacy or security. A balance must be maintained as we build our global community.

I may not have actually jetted off to Turkey, but I did get to make one trip. In November I went to Denver to attend the Association for Computing Machinery’s annual conference for University and College Computing Services (SIGUCCS). I was there to accept an award for Connect in the Competitions for University and College Publications. We at Connect are very proud of this achievement, and we promise to continue to strive for excellence in our future issues.

— Joan Charlotte Matelli
Editor
Wasn’t it excellent to watch the wave of celebrations sweeping around the world on New Year’s Eve? We watched with alternating anxiety and hope, as each time zone struck midnight, for hours. We were anxious that the lights might go out there, that the communications links might go down, that a crisis might begin. When they didn’t, hope took over — hope that the arrival of 2000 in the next time zone westward, and eventually in ours, would be as festive and otherwise smooth.

Isn’t it wonderful that hope prevailed?

That’s not so surprising to all the folks who’ve been working for years, and even more so in 1999, to get systems and services ready for this special new year. This wasn’t blind hope or unfounded anxiety. It was well informed, and it energized individual contributions and collaborative endeavors. Worldwide progress resulted from the millions of personal and organizational choices we made in preparation.

Similar combinations of individual and collective efforts have promoted the rapid evolution of network connectivity in recent years. Whether you look within NYU, around the higher education community, or throughout the world, you see the activities and decisions of individuals and groups instigating the surging expansion of connectedness and the proliferation of things to do online — both useful and otherwise.

We’re in a situation similar to water lilies that double in volume every year, until the pond is covered. In the cautionary tale, the lilies choke the rest of life out of the pond. However, in this case, optimists look forward to the global pond filling with networked lilies. Hope runs high for continuing improvements in all sorts of interactions.

Nevertheless, we’re seeing enough evidence of network disruptions, intrusions and impacts on other patterns of interaction to know that a certain level of anxiety is also justified. Will someone overwhelm the bandwidth of a service and prevent me from getting to it? Will a virus compromise the files on my desktop computer? Will my privacy be invaded or my finances affected? Will my neighborhood bookstore shut down? What form of attack will I need to worry about next? Maybe it’s safer staying offline.

Though it may feel thoroughly modern, connectedness is not a new concept. In fact, the Oxford English Dictionary cites 1603 as the first appearance of the term...
— connexity — meaning the quality of being connected. From the outset, this quality has had a dual nature — both the promise and the risk of interdependence. Regardless of how much technology facilitates connexity, it is fundamental that autonomy and dependence be balanced in all sorts of situations.

The Internet is no exception. Since its beginnings, the participants have worked to identify the nature of their interdependencies and reach agreements on how to fulfill them. Mechanisms for discourse, as well as the policies and practices for interaction, have evolved over time. While the management and governance of the Internet has become more formal, the basic balancing goal persists.

NYU has been actively engaged in the Internet balancing act for the better part of two decades at the global, national, regional and local levels. For example, as one of the founding members of NYSERNet (www.nysernet.org), the statewide education and research network, NYU has been a leader in continually improving connexity within the higher education community and beyond. Today, as a charter Internet2 university, we enable NYU faculty and staff to explore the possibilities of institutional links at the next generation levels of speed, capacity and functionality across a broad range of applications.

Connexity within the University reflects a similar effort to balance local autonomy with institution-wide viability. Since 1984, the Data Communications Task Force (DCTF) comprised of representatives from the schools and the central networking staff, has been a coordinating mechanism to work out the interdependencies. Up to now, the DCTF’s work has been informal, with voluntary participation and no formal mandate. Nevertheless, the group has been very productive, guiding the evolution of NYU-NET and the promulgation of policies about its use (see www.nyu.edu/its/standards). Of course, the DCTF will not be the sole channel for advice on policy.

However, the technical expertise and operational experience of its members are crucial elements in ensuring the evolution of policies and practices that work for NYU.

As NYU-NET has evolved into a production network upon which critical functions of the University depend, the existing model for DCTF needs some improvement. This fall, DCTF members collaborated to draft a new charter. The new charter recommends a revised structure, including representation from all University units with significant networking. The new charter sets out a twofold mandate for the group: to provide both policy and operational advice about NYU network operations to the Chief Information Technology Officer, and to disseminate and enforce network operating rules and policies about decentralized elements of the network to their schools and departments.

We’re embarking now to implement this charter with a technical review of NYU’s network-related policies. This activity brings us directly into the autonomy-dependence balancing act, with new technological parameters to consider almost daily. As you can imagine, hopes and anxieties intermingle and animate our discussions. It’s an age-old process in modern dress. I’m confident the result will be progress for NYU. We welcome your thoughts and comments, and we’ll keep you posted.
“Hello! Client Services — How Can We Help You?”

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In the Fall issue of Connect, Marilyn McMillan wrote about Moments of Truth when dealing with a service organization. ITS Client Services wants to create those moments — Moments of Relief when you have a problem; Moments of Understanding when we help you feel confident about doing something new; Moments of Satisfaction when we ensure that you receive our services in a timely fashion.

ITS Client Services is a new department within a fairly new division. However, it is composed of some familiar areas: the Accounts Office and the Publications group, which were within Academic Computing Facility; the ACF HelpCenter, which is now called the ITS Client Services Center; and the University switchboard operators. Client Services is more than just the name of the group; it is what we hope to excel at. While customer service was always an element of ITS’s predecessor organizations — ACF, Telecommunications and the University Computer Center — it is the sole focus of ITS Client Services.

Our staff is now concentrating on enhancing and optimizing the means by which our clientele — the students, faculty and staff of NYU — can have easy and timely access to the full range of ITS services. The operating principle of the Client Services Center is to provide a central point of contact for any questions you may have or information you may need from ITS. This will also be the place to order new services or to report problems with ITS-related technologies. The goal of the Client Services Center is to resolve as many problems as possible when you first come to us. If the problem needs to be dispatched to other tiers of ITS support, the Client Services Center will track the problem and follow it until it is resolved.

The initial job of the Center staff will be melding the help desk functions of the former Telecommunications, UCC and ACF. We hope to develop this single ITS service center by the end of the spring semester. Also, during the
last two months, the former ACF Accounts Office became a part of the Client Services Center. As the functions of these two offices merge, there will be one point of contact for all e-mail accounts and services.

Thereafter, the Client Services Center will seek to become the front door to all basic ITS services. By next fall, new orders for all routine services will flow through the Client Services Center. These service orders will receive the same focus on timely completion as does any service problem. The idea of a unified service point, which provides a coherent process for new orders and trouble resolution, is necessary and compelling from the client’s perspective, and we embrace it. With the input of administration, faculty, staff and students, we hope to develop a truly flexible and rational service process.

The Publications group will broaden its focus to encompass writing and editing services for all areas of ITS. This will also include the preparation of both print and online versions of the University directory. The Publications group will continue to produce Connect and the NYU-NET CD. The Client Services Center and the Publications group will continue to develop and provide general courses on web-related topics and common computer applications.

Last year, the University switchboard operators received over 630,000 calls. They will, of course, strive to continue to provide the best service possible to all our callers.

Client Services begins with you, our clients, and ends with the services we help provide. We fully intend to make it not just a name, but a philosophy.
While in Mali recently, I had an opportunity to see how knowledge about the Internet is spreading, in part due to the Internet Society and the training workshops that they run. The spread of knowledge about the Internet is proceeding in a number of ways and is decentralizing nicely.

Part of my work involved a weekend trip to Timbuktu. In the West one tends to think somewhat of Timbuktu as near the end of the world, and for many years it was that way in terms of access. My trip was to visit the new Telecentre that had just been created as a model for others in Mali.

On the way from Bamako we stopped at Mopti to refuel; all passengers were herded into the airport building, where we were targeted by the multitude of local venders of bracelets, necklaces, field hats and long, sharp, sheathed swords. After reboarding the plane, a man ahead of me heard us discussing the Internet, turned around and asked in French how one could implement voice over the Internet. He was from Senegal, had heard of such techniques, and wanted to implement them.

Arrival in Timbuktu was unique. A band of drummers and clappers stretching across the front of the terminal, drums and hands moving wildly, creating a cacophony with bursts of unfamiliar sounds. It was the welcoming party for a newly married couple arriving home. We all moved inside the small open-
air terminal, where one of the welcomers, a woman dressed in flowing robes, was chanting a long speech to the crowd in her native language, with people occasionally giving her money. We found out she was an oral historian, paid to maintain the history of these particular people, chanting to replay the story of the history of their families in Timbuktu.

A boy of about 13 years approached me; I was sure he had his share of swords, blankets and other supplies to try to sell me. But I was surprised, for in pretty good American English he said, with only occasional hesitation, “My picture has appeared in Wired Magazine. Do you read Wired Magazine? Do you know John Perry Barlow? John Perry Barlow is my friend. Do you use the Internet? I use the Internet. My name is Hama.”

The story did revert to type; he later offered me a
Tuareg wife for the night, and he did have a supply of Timbuktu 2000 tee shirts at the "lowest prices in town." But for a few moments I thought that perhaps, as far as our goal of spreading the Internet was concerned, we could have just declared victory and gone home.

The Mayor of Timbuktu, Ibrahim Mohamed, was waiting for us at the airport, and took us to the Chef de Cabinet's house for a formal welcome. We then visited the Telecentre, where the Mayor proved adept in showing how he uses e-mail. He had been corresponding by e-mail with his sister city of Tempe, Arizona, and was visiting there the next month.

He took us to his office, where he demonstrated his new scanner and color printer. So I pulled the PC card out of the digital camera I was using, plugged it into his laptop, and voila! Pictures of his Telecentre appeared on the screen. It was the first time he had seen such a thing, and he became very excited. He had a sheep killed in our honor, and at twilight a group of about eight of us, some wearing desert robes, almost all speaking French with touches of Arabic and the local tongue, had a picnic on top of a dune in the desert. We pulled the roasted sheep body apart with our bare hands and ate it while several Tuareg helpers circled the group, serving cold drinks and different flavors of Tuareg tea.

It was a unique and unforgettable weekend.

A religious school in Timbuktu.
Figure 1.
APHRODISIAS
CP 8
CITY PLAN WITH
GEOPHYSICAL INFORMATION

H. MARK, 1999
Return to Aphrodisias
Computers Aid an Archaeological Site

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Since the publication of “Archaeological Computing at Aphrodisias, Turkey” in the Summer 1998 issue of Connect, the Aphrodisias Excavations project has progressed in its use of computers in research, mainly with graphic applications. For example, three different kinds of drawings completed in the last year and a half illustrate our developing knowledge of the site.

Geophysical Survey of Unexcavated Areas

The earlier excavations at Aphrodisias concentrated on the public buildings in the center of the city. In 1994, as discussed in my earlier article, a geophysical survey was begun of the unexcavated areas north and south of the city center. This survey was completed in the summer of 1998. Its most important finding was the detection of a grid-pattern of streets, showing that Aphrodisias was a planned town, laid out on a street system fundamentally similar to Manhattan’s. Figure 1, shown opposite, is a computer image showing the results of the survey in the context of the site as a whole. TIFF files of the survey data were manipulated in Adobe Photoshop (brightness and contrast were adjusted for maximum legibility), and linked to an Adobe Illustrator drawing, made by tracing scans of old hand-drawings of the excavated buildings. The different parts of the drawing were adjusted and fitted together at a uniform scale with the help of HotDoor CadTools. In the areas which could not be surveyed (because of dense vegetation or modern construction), the paths of the streets detected in the geophysical survey are reconstructed in dotted lines.

Restored Plan of City Center

The geophysical survey not only clarified the relationship between the excavated buildings of the city-center and the rest of the city; it also provided the key to understanding the organization of the city-center itself. Thus the Agora or main public square, for example, is two blocks by six blocks in area, and is accordingly bisected along both its north-south and its east-west axes by street-lines. The Adobe Illustrator drawing in Figure 2 on the next page shows central Aphrodisias as it appeared in about A.D. 200. As in Figure 1, the underlying framework of the map is based on tracings of scans of old hand-drawings. Some of the advantages of the computer drawing are infinite scalability and easy introduction of modifications such as shading. In this image, we used shading to distinguish between streets and open areas (white), residential blocks (light gray), and public buildings (darker gray).

Tourist Signs

In addition to drawings for study and publication, in 1999 we produced the first of a planned series of new signs intended to guide tourists through the site. The signs are Illustrator drawings, printed with a Light Jet printer on photographic paper, dry-mounted on a PVC board, and encased in custom-made aluminium frames. We expect to have to replace the signs every two or three years, so we decided to use this rather than a more traditional method such as etched steel. The quality of the image is much higher and the replacement cost is relatively low — approximately $150. Of course, our understanding of this city is always changing, so we are also glad to have to update the information given to visitors on a regular basis!
Figure 2.
APHRODISIAS
RESTORED PLAN OF CITY CENTER

CONTOUR INTERVAL, TWO METERS

H. MARK, 1999
Wagner Worldwide
Creating Global Academic Partnerships with Interactive Televideo Conferencing

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To be a truly global university as we enter a new millennium requires more than sending NYU students abroad and enrolling international students. The vital mobility and diversity of New York University's community of scholars and students will undoubtedly be enhanced by expanding our presence beyond Europe, with new centers in Latin America, Africa and Asia. Nevertheless, for NYU or any other university to be truly connected to the world of universities and learning opportunities requires a vast expansion of ties to partner institutions through the full use of modern communications techniques.

Many individual students and faculty members, through their use of the World Wide Web and e-mail, are already linked globally in a way that the institutions that host them should follow.

The frequency and effectiveness of global linkages can be greatly expanded and enriched through the use of digital interactive televideo conferencing for classes, conferences and support for scholarly projects. The Wagner School's use of televideo conferences in pursuit of its several-year-old International Initiative illustrates the possibilities of this technology.

Wagner's first major televideo link developed from a 1996 meeting in Mexico City between NYU President Olivia and other leaders of the League of World Universities. This meeting focused on the potential of technology to strengthen academic interchange among its members. In the fall of 1996, the Wagner School and the Universite Libre d' Bruxelles (ULB) first offered what is now an annual course comparing political and economic integration in Europe and the United States. This semester, the "European Union / American Union" course will focus on patterns of multi-level governance. Students will meet weekly for two hours by televideo conference in a jointly taught course. Planned and coordinated by e-mail, the course's reserve reading room is a website jointly maintained by NYU and ULB, with links to a wide range of U.S. and European Union document centers. Using e-mail across the Atlantic, students collaborate on course projects and papers. At the conclusion of the first year of the course, NYU and ULB joined the Central European University in Budapest in a four-hour televideo conference that was attended by 400 participants including European and American officials.

Since then, the Wagner School has offered a course on "Comparative Health System Reform" with the University of Paris, a lecture series on the EU with University of Manchester, and executive management training sessions with the Seoul National University. We have also used televideo conference sessions as components in Wagner courses offered at the Graduate School of International Studies of Korea University and the National School of Public Works in Lyon, France. This semester the Wagner School has scheduled...
"The Changing Role of the State in a Global Perspective," which will be taught by a former diplomat and senior U.N. official from Pakistan, simultaneously here and to a class at Korea University. In this case, time zones are favorably aligned. Our evening course occurs at a scheduled course time — on the next calendar day in Seoul.

A new faculty and student exchange agreement with the University of Santiago, Chile was negotiated by televideo conferencing, supplemented by e-mail. The School has also used televideo conference to explore a collaborative effort in nonprofit management education with a university in Buenos Aires. In December, we will inaugurate a faculty development project with the Institute for Society and Administration at Eduardo Mondlane University in Maputo, Mozambique. Faculty member from Mozambique will come to NYU for summer courses and Wagner faculty will teach intensive courses there in that U.S. government-funded project, but the technological link is vital for the continuity of connection required to achieve its ambitious goals. Similarly, through the televideo facility at the U.S. Mission in Kiev, the Wagner School faculty will participate in an orientation program for Ukrainian officials who will visit the United States and the European Union in a program that focuses on democratic policy formation.

Fortunately, NYU Telecommunications Services, under the direction of Charles Kuhlman, has two excellent facilities for televideo conferences and a very competent and accommodating staff. They have encouraged the development of this communication technology and even provided partner institutions with technical assistance when developing facilities on their campuses. Their flexibility has enabled the Wagner School to host demonstrations of NYU global televideo academic exchanges on short notice for visiting official delegations, including one led by the First Lady of Egypt, Susan Mubarak, and another by the Prime Minister of the Ivory Coast.

Recently, a Wagner international capstone team wanted to undertake consulting projects for a client organization located in Washington, D.C. that offered exciting international field work. The seemingly insurmountable problem of coordinating with their client at a remote location was solved by the use of televideo conference meetings between the student team at NYU and the professional staff in Washington. The accessibility of the Telecommunications Services video lines made such study opportunities possible.

Stern and the Law school, among other NYU units, have also used televideo conferencing for conferences and courses. In November, when Professor David Denoon of the Politics and Economics faculty was asked to provide a briefing to the Thai government, he discussed U.S. foreign policy with senior government officials in Bangkok in a two-hour televideo seminar, and didn't have to travel halfway around the world.

In the Wagner school's experience, the use of modern technology to link our programs with academic partners around the world has not resulted in diminished faculty and student travel abroad, or visits to NYU by our partners. On the contrary, these links have stimulated more mobility, but at times and in ways that result in more effective collaborations.

Clearly, we have only begun to fathom the potential of the new modes in global communication. Just as clearly, however, the Wagner School could not begin to achieve the goals of its International Initiative — to globalize the curriculum and to form learning partnerships with similar academic programs around the world — without the added connecting options provided by interactive televideo. With this tool, we can regularly engage students and faculty, at a fraction of the cost in time and money of traditional forms of academic exchange.
Making Music with McGill

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The Audio Engineering Society serves as the pivotal force in the exchange and dissemination of technical information for the audio industry, with members throughout the United States, Europe and Asia. In late September 1999, over 20,000 audio professionals from around the world descended on the Jacob Javits Center to attend the 107th Convention of the Audio Engineering Society. As part of this world-class event, NYU collaborated with McGill University and Dolby Labs to present the first successful Internet2 demonstration of real-time Internet multi-channel audio transmission.

Convention attendees were brought by shuttle bus from the Javits Center to NYU’s Cantor Film Center for the demo. A DVD-quality surround sound audio signal was streamed from a live performance by the McGill University Swing Band, playing in Montréal, to an audience in the 300-seat cinema. A live video feed of the swing band was simultaneously streamed and projected on the cinema’s screen. In addition, Renata Celichowska, an NYU student in the School of Education Dance Education program, performed onstage to the music.

Dolby Digital Sound
The McGill Swing Band performance was streamed live in a 5.1 multi-channel surround-sound format. Microphones were placed to capture not only the direct sound, but also the ambience of the performance space. The Dolby Digital format reproduces this ambient space by using three speakers in the front (left, right and center) and two speakers in the rear (left and right), as well as a sub-woofer speaker system for low-frequency tones and effects.

The Dolby Digital format used for this demonstration is commonly used for major Hollywood motion pictures shown in commercial theaters. Dolby Digital immerses the audience in an aural environment where sounds can come from any direction.

The Internet2 Connection
Internet2 is the U.S. initiative to create next-generation Internet resources in support of robust digital media and other high bandwidth applications not currently possible on the original Internet. (For more information about Internet2, see Bill Russell’s article on page 24 of this issue.)

In order to connect NYU to McGill, this demonstration used not only Internet2 resources, but also the high-speed CA*net 3 network developed by CANARIE in Canada. The streaming sound and video data had to traverse a number of gateways, each of which had to be tested and debugged to prevent bottlenecks that might break up the real-time audio and video.

Software and Technical Details
The high-speed connectivity provided by Internet2 and CA*net 3 alone would accomplish very little. Virtually all new Internet2 services require the creation of application software to actually execute the intended function. The underlying software for these demos was developed at McGill University by a programming team led by McGill professor Jeremy Cooperstock.

At the performance space in Montréal, the six-channel mix of 48 kHz 16-bit surround sound was encoded using an off-the-
shelf Dolby DP569 encoder unit at 640 kbps. The Dolby Digital stream was encapsulated within an industry standard AES/EBU stream at 1.5 Mbps. This stream was then input to a Silicon Graphics Indy with a standard S/PDIF digital audio connector. The Indy, running software developed at McGill, encapsulated the AES/EBU stream within standard Internet UDP packets.

Once the six-audio channels were reconstructed, they fed the Cantor Center theater-quality sound system.

Using a pair of independent Intel based Windows NT systems, video was transmitted in a distinct 1.5 Mbps stream using Cisco’s IP/TV system with MPEG-1 compression.

As described by Professor Cooperstock, “When you combine multi-channel Internet audio transmission with high fidelity video, it creates an environment that replicates the same sorts of interactions that occur in the physical classroom.”

The Demo Results

The event was not only a technology demonstration, but also an experiment in pushing the known limits of the network. The first of four demonstrations used a 23-second buffer against network congestion, while the other three used a far less conservative three-second buffer. No effort was made to limit unrelated network activity, other than disabling the incoming Usenet news feeds at both universities in the first three demonstrations.

During the final demo, the NYU news feed was switched back on, subjecting the program to intense competition for bandwidth. Nevertheless, at no time in any of the demonstrations was the Dolby Digital sound audibly interrupted. To further check for anomalies, digital recordings made at NYU of the streamed audio are being compared bit-for-bit with recordings made simultaneously at McGill.

Professor Robert Rowe, the Associate Director of the Music Technology Area in the School of Education, was NYU’s lead faculty person in the collaboration. He noted, “The event was a compelling demonstration for us and the AES delegates that the time for high-quality surround sound over the Internet has arrived. As a consequence of this project, I have become vice-chair of the AES technical committee on Networked Audio, and we look forward to continuing this work at NYU.”

Professor Wieslaw Woszczyk, Director of the McGill Graduate Program in Sound Recording and Chair of the AES Technical Council, remarked, “This technology opens the way for people in entertainment, business, education or research to collaborate live online. It will be much more appealing than the current teleconferencing telephone model because it will offer an experience more like a movie theater. For collaborative musical performances and compositions over the Internet, it will be like a virtual classroom.”
Are you looking for a poem by a certain African-American poet from the late 18th century? Do you need to search all of Nietzsche’s works for references to the concepts of “truth,” “morality,” and “God”? Do you want to quickly skim all of Shakespeare’s plays for quotes on “melancholy”?

How will you find these things when your poet is long out of print, Nietzsche’s works are 15 print volumes, and you’ve got more than 35 Shakespeare plays to thumb through? What if you could type your author, search words or phrases into a computer and have the results displayed on your screen in seconds?

Fortunately for NYU humanities scholars, this is not a futuristic fantasy. In fact, you can find hundreds of full-text, digitized titles (or electronic texts) in The Studio at Bobst Library.

What is an electronic text?

An e-text is a machine-readable text, or often a corpus of texts. Machine-readable text is in digital form — those 1s and 0s that can be read by a computer and displayed on a computer screen either in ASCII (plain text) or marked up in SGML, HTML, XML or some other way. It can be read, searched, cut and pasted into other documents, downloaded, or otherwise electronically used or manipulated. A few examples of text in machine-readable form are a document displayed in a word processor, a web page, a text file on a floppy disk or CD, or the to-do list in your PDA.

What is the Studio, and what can I find there?

The Studio is a new computing facility, adjacent to General and Humanities Reference at Bobst Library, that provides scholarly electronic resources and librarian support for computer-assisted research in the Humanities. The Studio has nearly 30 CDs that contain hundreds of English and foreign-language texts. These include fiction, drama, poetry, historical documents, philosophical works, musical treatises, versions of the Bible, as well as ancient Greek, Latin and Hebrew texts. See The Studio website for a full list of titles and descriptions, at www.nyu.edu/library/bobst/research/etc.

At the Studio you can:

- get advice and assistance from a librarian specializing in your subject area;
- use a PC or Mac to view and search in more than two dozen CDs containing hundreds of e-texts;
- print or download your search results;
- copy your results and edit in a word processor;
- connect to your NYU-NET account or the Internet;
- ftp results to your NYU-NET account.
How can e-texts help me in my research?
Certain types of textual or historical study, nearly impossible using only print sources, are fast and relatively easy with digitized text. Scholars can exploit the quick processing power of computers to locate words or concepts in one or many e-texts simultaneously. In addition, users can focus their searches by specifying only part of a text (say, only Hamlet's and Macbeth's speeches) or only a certain type of text (perhaps only searching among sonnets in the American Poetry Database). Consequently, searching can be as broad or as narrow as needed, which facilitates research. For example, some scholars claim that two of Virgil's Eclogues are more political in nature than the others and contain specific references to the Emperor Augustus. A scholar interested in how often and in what contexts the words “Roma,” “libertas,” “patria,” and “finis,” and their inflected forms, occurred in Virgil's Eclogues could use the PHI 5.3 (Latin Literature) CD for a quick answer to the question.

Can't I find e-texts on the Web?
At present, CD-ROMs make up the bulk of The Studio's collection and can only be consulted at the library. However, Bobst also makes several e-text corpora available on the Web to the NYU community. Two excellent web-accessible titles are the Patrologia Latina Database, and ARTFL (American & French Research on the Treasury of the French Language), with over 2,000 French literature and history titles. There are more and more e-texts available for free on the Web, but you must be very careful in assessing the quality of these resources.

When can I use the Studio?
The Studio is available when the Humanities Reference desk is open (Monday through Thursday, 10 a.m. to 9:45 p.m.; Friday, 10 a.m. to 6:45 p.m.; Saturday, 11 a.m. to 5:45 p.m.; and Sunday, 1 p.m. to 7 p.m.). First-time users must make an appointment for an introduction to The Studio, after which they may use the facility on a walk-in basis during reference hours.
For an introduction to the Studio and advice on e-text resources at Bobst or on the Web, contact us at 998-2522, or send e-mail to the author at jennifer.vinopal@nyu.edu, or to Ann Butler at butlera@elmer4.bobst.nyu.edu.

In your message, please include:
• your name;
• your telephone number or e-mail address;
• your department;
• the title(s) you wish to use, or a short description of your project;
• the dates and hours you are available.
The Studio is located in the Bibliography Room, adjacent to General and Humanities Reference on the first floor of Bobst Library.

Is This Web E-text Any Good?
Here are a few criteria for evaluating the quality of electronic text on the Web.

How reliable is the website?
• When was the last time the site was updated? Is it as old as the Web, or does someone tend to it on a regular basis?
• What are the credentials of the person who made it?
• Is that person a specialist in the field?

How reliable is the data?
• Does the site give bibliographical information about the source edition for the electronic version? If not, it may be plagiarized — be careful!
• Is that source edition reliable?
• Is there any scholarly editorial apparatus (notes, variants, etc.)?
• Are there typographical mistakes in the text (always a bad sign)?
# Classes and Talks

Information Technology Services — New York University

The full contents of ITS Classes and Talks is on NYU Web at www.nyu.edu/its/classes/

## Spring '00 Schedule

### Alphabetical Listing

<table>
<thead>
<tr>
<th>Category</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABCs of Computers</td>
<td>C-3</td>
</tr>
<tr>
<td>Academic Research on Web</td>
<td>C-5</td>
</tr>
<tr>
<td>Active Learning</td>
<td>C-6</td>
</tr>
<tr>
<td>Arts Technology</td>
<td>C-4</td>
</tr>
<tr>
<td>Authoring Tools</td>
<td>C-6</td>
</tr>
<tr>
<td>Basic Computer Security</td>
<td>C-4</td>
</tr>
<tr>
<td>Choosing Your Computer</td>
<td>C-3</td>
</tr>
<tr>
<td>Copyright (Digital, Web)</td>
<td>C-4</td>
</tr>
<tr>
<td>Course Website Design</td>
<td>C-6</td>
</tr>
<tr>
<td>Designing a Website</td>
<td>C-6</td>
</tr>
<tr>
<td>Digital Copyright</td>
<td>C-4</td>
</tr>
<tr>
<td>Digital Resources for Artists</td>
<td>C-4</td>
</tr>
<tr>
<td>Discussion Software (Lyris)</td>
<td>C-6</td>
</tr>
<tr>
<td>E-mail and Internet</td>
<td>C-5</td>
</tr>
<tr>
<td>Electronic Library Resources</td>
<td>C-7</td>
</tr>
<tr>
<td>File Transfer (NYU Software)</td>
<td>C-5</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>C-4</td>
</tr>
<tr>
<td>Geographical Info Systems</td>
<td>C-4</td>
</tr>
<tr>
<td>Humanities Computing</td>
<td>C-4</td>
</tr>
<tr>
<td>Instructional Technologies</td>
<td>C-6</td>
</tr>
<tr>
<td>Internet &amp; E-mail</td>
<td>C-5</td>
</tr>
<tr>
<td>Internet &amp; NYU-NET</td>
<td>C-5</td>
</tr>
<tr>
<td>Intro to the Library</td>
<td>C-6</td>
</tr>
<tr>
<td>Introduction to the Web</td>
<td>C-5</td>
</tr>
<tr>
<td>Library (Intro)</td>
<td>C-6</td>
</tr>
<tr>
<td>Library Resources (Electronic)</td>
<td>C-7</td>
</tr>
<tr>
<td>Lyris: Discussion Software</td>
<td>C-6</td>
</tr>
<tr>
<td>Learning Strategies</td>
<td>C-6</td>
</tr>
<tr>
<td>Mac: Understanding Your Mac</td>
<td>C-3</td>
</tr>
<tr>
<td>Mac: Using a Mac at ITS</td>
<td>C-3</td>
</tr>
<tr>
<td>NYU-NET Software</td>
<td>C-5</td>
</tr>
<tr>
<td>PC: Understanding Your PC</td>
<td>C-3</td>
</tr>
<tr>
<td>PC: Using a PC at ITS</td>
<td>C-3</td>
</tr>
<tr>
<td>Portfolios for New Instructors</td>
<td>C-6</td>
</tr>
<tr>
<td>Powerpoint</td>
<td>C-6</td>
</tr>
<tr>
<td>Research Strategies</td>
<td>C-6</td>
</tr>
<tr>
<td>ResNet</td>
<td>C-5</td>
</tr>
<tr>
<td>SAS</td>
<td>C-7</td>
</tr>
<tr>
<td>Scientific Computing &amp; Visualization</td>
<td>C-7</td>
</tr>
<tr>
<td>Scientific Computing (Intro)</td>
<td>C-7</td>
</tr>
<tr>
<td>Security in Computing</td>
<td>C-4</td>
</tr>
<tr>
<td>SPSS</td>
<td>C-7</td>
</tr>
<tr>
<td>Statistics and Data Analysis</td>
<td>C-7</td>
</tr>
<tr>
<td>Teaching Effectiveness</td>
<td>C-6</td>
</tr>
<tr>
<td>Teaching Portfolios</td>
<td>C-6</td>
</tr>
<tr>
<td>Understanding Your Computer</td>
<td>C-3</td>
</tr>
<tr>
<td>UNIX: Intro</td>
<td>C-5</td>
</tr>
<tr>
<td>Virus Protection &amp; Backup</td>
<td>C-3</td>
</tr>
<tr>
<td>Web Browsing and Publishing</td>
<td>C-5</td>
</tr>
<tr>
<td>Web Page Creation (Basic)</td>
<td>C-6</td>
</tr>
<tr>
<td>World Wide Web (Intro)</td>
<td>C-5</td>
</tr>
<tr>
<td>World Wide Web and Academic Research</td>
<td>C-5</td>
</tr>
</tbody>
</table>

### About Classes & Talks

All members of the NYU community are welcome at ITS’s and Bobst’s classes and talks. There is no charge, but participants should have a valid NYU Card.

**Seating capacity:** To avoid overcrowding, we have listed maximum seating capacities for each class. We recommend that you arrive a few minutes early in order to secure a spot.

**Classes by arrangement:** Faculty members may arrange special ITS classes for a specific course or research group. These do not have to be given at an ITS site. For classes in statistics, call Frank LoPresti (998-3398); for other applications, call the ITS Innovation Center (998-3044). For specialized Library classes, see Advanced Research Classes, p. C-7.

**Additional information:** A list of ITS locations and phone numbers, and pointers to further information about ITS resources, can be found on page C-8.

— Vincent Doogan

Academic Computing Services

vincent.doogan@nyu.edu
<table>
<thead>
<tr>
<th>Date</th>
<th>Session Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, January 26</td>
<td>Intro to the Library</td>
<td>C-6</td>
</tr>
<tr>
<td>Tuesday, February 1</td>
<td>Research on the Web</td>
<td>C-5</td>
</tr>
<tr>
<td>Using a Mac at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Wednesday, February 2</td>
<td>Intro to Internet and E-mail</td>
<td>C-4</td>
</tr>
<tr>
<td>Using a Mac at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Thursday, February 3</td>
<td>Using a Mac at an ITS Lab</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Intro to the Library</td>
<td></td>
<td>C-6</td>
</tr>
<tr>
<td>Friday, February 4</td>
<td>Choosing your Computer</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Saturday, February 5</td>
<td>Using a Mac at an ITS Lab</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Monday, February 7</td>
<td>Electronic Library Resources</td>
<td>C-7</td>
</tr>
<tr>
<td>Tuesday, February 8</td>
<td>Basic Computer Security</td>
<td>C-4</td>
</tr>
<tr>
<td>Using a Mac at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Introduction to SPSS</td>
<td></td>
<td>C-7</td>
</tr>
<tr>
<td>Wednesday, February 9</td>
<td>Using a Mac at an ITS Lab</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>NYU-NET Software (PC)</td>
<td></td>
<td>C-5</td>
</tr>
<tr>
<td>Introduction to SPSS</td>
<td></td>
<td>C-7</td>
</tr>
<tr>
<td>Thursday, February 10</td>
<td>Using a Mac at an ITS Lab</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Introduction to SAS</td>
<td></td>
<td>C-7</td>
</tr>
<tr>
<td>Friday, February 11</td>
<td>Understanding Your Mac</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Saturday, February 12</td>
<td>Using a Mac at an ITS Lab</td>
<td>C-3</td>
</tr>
<tr>
<td>Using a PC at an ITS Lab</td>
<td></td>
<td>C-3</td>
</tr>
<tr>
<td>Tuesday, February 15</td>
<td>Digital Resources for Artists</td>
<td>C-4</td>
</tr>
<tr>
<td>Intro to GIS Packages</td>
<td></td>
<td>C-4</td>
</tr>
<tr>
<td>Wednesday, February 16</td>
<td>Electronic Library Resources</td>
<td>C-7</td>
</tr>
<tr>
<td>Intro to Internet and E-mail</td>
<td></td>
<td>C-4</td>
</tr>
<tr>
<td>Intro to the Web</td>
<td></td>
<td>C-5</td>
</tr>
<tr>
<td>Thursday, February 17</td>
<td>Intermediate SAS</td>
<td>C-7</td>
</tr>
<tr>
<td>Friday, February 18</td>
<td>Understanding Your PC</td>
<td>C-3</td>
</tr>
<tr>
<td>Tuesday, February 22</td>
<td>Active Learning Strategies</td>
<td>C-6</td>
</tr>
<tr>
<td>Computing for the Humanities</td>
<td></td>
<td>C-4</td>
</tr>
<tr>
<td>Intermediate Topics in SPSS</td>
<td></td>
<td>C-7</td>
</tr>
<tr>
<td>Wednesday, February 23</td>
<td>Virus Protection</td>
<td>C-3</td>
</tr>
<tr>
<td>NYU-NET Software (Mac)</td>
<td></td>
<td>C-5</td>
</tr>
<tr>
<td>Intermediate Topics in SPSS</td>
<td></td>
<td>C-7</td>
</tr>
<tr>
<td>Thursday, February 24</td>
<td>Advanced SAS</td>
<td>C-7</td>
</tr>
<tr>
<td>Friday, February 25</td>
<td>Choosing your Computer</td>
<td>C-3</td>
</tr>
<tr>
<td>Monday, February 28</td>
<td>Research on the Web</td>
<td>C-5</td>
</tr>
<tr>
<td>Tuesday, February 29</td>
<td>Intro to Scientific Computing</td>
<td>C-7</td>
</tr>
<tr>
<td>Wednesday, March 1</td>
<td>Introduction to Powerpoint</td>
<td>C-6</td>
</tr>
<tr>
<td>Intro to Internet and E-mail</td>
<td></td>
<td>C-4</td>
</tr>
<tr>
<td>Intro to the Web</td>
<td></td>
<td>C-5</td>
</tr>
<tr>
<td>Advanced Topics in SPSS</td>
<td></td>
<td>C-7</td>
</tr>
<tr>
<td>Friday, March 3</td>
<td>Electronic Library Resources</td>
<td>C-7</td>
</tr>
<tr>
<td>Discussion Group Software</td>
<td></td>
<td>C-6</td>
</tr>
<tr>
<td>Digital Copyright</td>
<td></td>
<td>C-4</td>
</tr>
<tr>
<td>Basic Course Website Design</td>
<td></td>
<td>C-6</td>
</tr>
<tr>
<td>Wednesday, March 8</td>
<td>NYU-NET Software (PC)</td>
<td>C-5</td>
</tr>
<tr>
<td>Friday, March 10</td>
<td>Understanding Your PC</td>
<td>C-3</td>
</tr>
<tr>
<td>Wednesday, March 22</td>
<td>Intro to Internet and E-mail</td>
<td>C-4</td>
</tr>
<tr>
<td>Research on the Web</td>
<td></td>
<td>C-5</td>
</tr>
<tr>
<td>Thursday, March 23</td>
<td>Electronic Library Resources</td>
<td>C-7</td>
</tr>
<tr>
<td>Friday, March 24</td>
<td>Understanding Your Mac</td>
<td>C-3</td>
</tr>
<tr>
<td>Tuesday, March 28</td>
<td>Teaching Portfolios</td>
<td>C-6</td>
</tr>
<tr>
<td>Wednesday, March 29</td>
<td>NYU-NET Software (Mac)</td>
<td>C-5</td>
</tr>
<tr>
<td>NYU-NET Software (PC)</td>
<td></td>
<td>C-4</td>
</tr>
<tr>
<td>Wednesday, April 5</td>
<td>Intro to Internet and E-mail</td>
<td>C-4</td>
</tr>
<tr>
<td>Wednesday, April 12</td>
<td>NYU-NET Software (PC)</td>
<td>C-4</td>
</tr>
</tbody>
</table>
Choosing Your Computer (Mac and PC)
This talk is intended to help you select the best personal computer for your needs. It will cover the basic components of a computer, as well as the other hardware required for various tasks. We will also discuss how you can assess your particular needs to establish criteria for selecting computer tools.
NYU Computer Store Staff.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.

Fridays 12:00-1:30
February 11
March 24

Using a Mac at an ITS Computer Lab
A hands-on introduction to the Macintosh computer. Topics include working with the graphical user interface, understanding the file system, launching software applications, and choosing printers, file servers and other devices, as well as the ergonomics of proper computer use. ACS staff.

Education Building, 2nd floor
Seating capacity: 15; first come, first served; hands-on class.

Thursdays 6:00-7:00
February 3, 10
Saturdays 11:00-12:00
February 5, 12

3rd Avenue North Residence Hall, level C-3
Seating capacity: 15; first come, first served; hands-on class.

Wednesdays 11:00-12:00
February 2, 9
Thursdays 5:00-6:00
February 3, 10

Protecting Your Files: Anti-Virus and Backup Strategies (Mac and PC)
This talk will focus on strategies to protect classwork, research project data and other documents. Viruses will be explained and use of virus protection will be demonstrated. Various backup strategies will be outlined. Howard Fink.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk/demonstration.

Wednesday 12:00-1:30
February 23
Basic Computer Security for Students, Faculty and Staff
With ResNet, DIAL accounts, public terminals and roaming laptop hookups in Bobst, students have more connectivity options than ever before. These options bring vulnerabilities, many of which can be lessened or avoided with the proper precautions. This class will cover why thinking about security is important, what to look out for, and some simple tips to make your use more secure.
Jane DelFavero, William Spears.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.
Tuesday 2:00-3:30
February 8

Digital Copyright
www.nyu.edu/webguide/
With the growth of the World Wide Web, copyright-protected material is now more accessible than ever. This class will investigate appropriate uses of original material on web sites in the NYU domain. Our speakers will also discuss guidelines on how you can properly incorporate the works of others in your web pages. Jane DelFavero and Joan Charlotte Matelli.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.
Tuesday 2:00-3:30
February 8

Arts Technology
www.nyu.edu/lts/atg
Digital Resources for Fine Artists
Oriented towards arts faculty and graduate students, this session will provide a broad state-of-the-digital-arts overview and update, as well as a focused presentation of ITS/ACS and other University resources available to artists working with digital media. Topics will include high-resolution film input and output, color management, tools for video and audio production and installation, alternatives for digital print output, electronic painting, 2-D and 3-D animation, and art on the World Wide Web. Shelly J. Smith, Philip Galanter.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.
Tuesday 6:00-7:30
February 15

Humanities Computing
www.nyu.edu/lts/humanities
Computing Resources for the Humanities
An introductory overview of computing applications in the humanities, with demonstrations of software and projects. No computer experience is necessary, and after the presentation there will be time to discuss how the techniques presented could be applied to personal research and teaching. Lorna Hughes.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk/demonstration.
Tuesday 2:00-3:30
February 22

Geographic Information Systems
www.nyu.edu/lts/socsci
Introduction to GIS Packages Available at ITS Academic Computing Services (UNIX, Windows)
An introductory discussion describing and comparing the four Geographical Information Systems (GIS) packages available at ITS Academic Computing Services. These are ArcInfo, MapInfo, Atlas GIS and GRASS. The use of these tools for research will also be covered. Frank LoPresti.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.
Tuesday 6:00-7:30
February 15
Internet and NYU-NET Services

Introduction to the Internet and your NYU Internet Account (NYU-NET, UNIX)

This talk/demonstration will introduce new and prospective holders of NYU-Internet Accounts to the many ways connections can be made to NYU-NET from campus locations (such as office, computer lab, NYU ResNet or Bobst Library connections) and via off-campus methods (e.g., NYU DIAL, commercial ISP or NYU ICE). Popular Internet services available through this account, such as e-mail, web browsing, newsgroups, connecting to other computers and file transfer, will be explained and demonstrated. Tracey Losco.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk/demonstration.
Wednesdays 12:30-2:00
February 2, 16
March 1, 22
April 5

NYU-NET Software

This talk is intended for those who have an NYU-NET office connection or NYU ResNet connection, or who use NYU DIAL from home or while traveling. Four popular Internet applications for use with these connections will be explained and demonstrated. The software to be discussed includes Netscape, Eudora and Fetch/WS-FTP. Sana Odeh.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.

1. For Mac Users
   Wednesdays 2:00-3:30
   February 23
   March 29

2. For PC Users
   Wednesdays 2:00-3:30
   February 9
   March 8
   April 12

World Wide Web Browsing and Publishing

The World Wide Web is a hypertext interface system for publishing documents containing text, sounds and images, to browse with software such as Netscape and Lynx. Hypertext Markup Language (HTML) is the mechanism for preparing home pages and other Web creations. Vincent Doogan, Jeffrey Lane and Marybeth McCartin.

1. Introduction to the World Wide Web
   Lynx and Netscape are programs that allow you to browse World Wide Web servers — repositories of digital images, sounds and text. The evolution of these easy-to-use browsing tools has made it possible for even novice computer users to locate desired information resources from across the Internet. This talk will feature a demonstration and explanations of basic concepts and commands.

Warren Weaver Hall, room 313
Seating capacity: 25; first come, first served; talk.
Wednesdays 2:30-4:00
February 16
March 1

2. Using the Web for Academic Research
   An incredible amount of information is available on the World Wide Web whenever and wherever there is a computer and Internet connection. But how much of this information is useful for academic research? This class will review how to search for information on the Web using directories, search engines, metasearch engines and other services. We will focus on strategies for tracking down and evaluating information that is appropriate for academic research.

Electronic Resources Center (ERC), Bobst Library B level.
Seating capacity: 18; call 998-2513 to register. Hands-on session.
Tuesday 10:00-11:30
February 1
Monday 10:00-11:30
February 28
Wednesday 6:30-8:00
March 22

ITS Classes and Talks  Spring 2000  C-5
Instructional Technologies

Introduction to Instructional Technology Tools

New, powerful web-based software applications provide opportunities for teaching and learning to extend beyond the time and space boundaries of the traditional classroom. Developed for faculty, this series will focus on strategies for effective use of online discussion, and for the creation and delivery of web-based course content. Pedagogical issues will be discussed. Vincent Doogan, Joseph Hargitai and Jeffrey Lane.

1. Discussion Group Software (Lyris)
   www.nyu.edu/lts/lists
   An introductory talk on the use and value of discussion in the educational process, and the software available at NYU to support online discussion among students and faculty.

   Location TBA
   Seating capacity: 30; first come, first served; talk.
   Friday 11:00-noon
   March 3

2. Software for Creating Web Sites for Courses (CourseInfo by BlackBoard)
   www.nyu.edu/lts/ic
   An introductory hands-on workshop on the use and value of web-based software for creating course web sites. There will also be discussion on tips and strategies for its use. CourseInfo is currently in use at NYU as a convenient way to create course web sites, which can be used as ancillary to classroom instruction. The features of this software include: restricted access, threaded discussions, chat, e-mail, file sharing, whiteboards, online tests, assessment tools, use of multimedia formats, search tools, student home pages, and course administrative tools. Call 998-3044 or e-mail ic@nyu.edu for reservations.

   Location TBA
   Seating capacity: 20; call 998-3044 to register.
   Friday 2:00-3:00
   March 3

Teaching Effectiveness Workshops

1. Active Learning Strategies: From Enhancing Lectures to Using Learning Groups in the Classroom
   We will explore several ways to engage and involve students in their learning, no matter the size of the class or the subject matter. Stephanie Nickerson, EQUAL.

   Location TBA
   Reservations required; lunch available; call 998-2200 or e-mail equal@nyu.edu to register.
   Tuesday noon-2:00
   March 28

2. Introduction to Powerpoint
   This hands-on workshop will introduce you to PowerPoint, a presentation software that helps you create professional-looking visuals — incorporating text, color, images, charts and graphs, animation, and slide transitions — that will enhance your presentations and class lectures. Hands-on session with limited seating. Marybeth McCartin, Bobst.

   Location TBA
   Reservations required; lunch available; call 998-2200 or e-mail equal@nyu.edu to register.
   Wednesday 10:30–noon
   March 1

3. Teaching Portfolios for New Instructors
   This short workshop will provide new instructors with enough information on developing a teaching portfolio so they can devise their own. Stephanie Nickerson, EQUAL.

   Location TBA
   Reservations required; lunch available; call 998-2200 or e-mail equal@nyu.edu to register.
   Tuesday noon-2:00
   March 28

Research Strategies

www.nyu.edu/library/bobst/

Introduction to the Library

A brief tour of Bobst Library will be followed by a hands-on session acquainting you with BobCat, the Library's online catalog, and
BobCatPlus, the web-based version of the online catalog. Meet at the Information Desk on the main floor of Bobst Library.

Bobst Library main level.
Seating capacity: limited; call 998-2513 to register. Hands-on session.
   Wednesday 10:00-11:30
   January 26
   Thursday 6:30-8:00
   February 3

Using Electronic Library Resources at NYU
Finding the information you need in today's electronic library requires important computer-based search skills and an ability to critically evaluate information. This hands-on class will suggest strategies for selecting the most appropriate electronic resources for your research topic, and for evaluating the information you find. We will review Boolean keyword searching — the most effective method of searching online catalogs, research databases and the Web — and explain how to access library resources from remote locations. Library staff.

Electronic Resources Center (ERC), Bobst Library B level.
Seating capacity: 18; 998-2513 to register.
   Monday 6:30-8:00
   February 7
   Wednesday 10:00-11:30
   February 16
   Friday 10:00-11:30
   March 3
   Thursday 6:30-8:00
   March 23

Using the Web for Academic Research
See entry under World Wide Web Browsing

Scientific Computing and Visualization
www.nyu.edu/its/science

Introduction to Scientific Computing & Visualization
An overview of local and remote computing and visualization resources. Presentation will include available software, workstations, color printing and videographics devices. Frances Bauer.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.
   Tuesday 2:00-3:30
   February 29

Statistics and Data Analysis
www.nyu.edu/its/socsci

SAS (Windows, UNIX)
This series will progress from the basic description and operation of this statistical package to advanced concepts and usage. Robert Yaffee.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.
   Tuesday 6:00-7:30
   February 8
   Wednesday 6:00-7:30
   February 9

   1. Introduction to SAS
      Thursday 6:00-7:30
      February 10

   2. Intermediate SAS
      Thursday 6:00-7:30
      February 17

   3. Advanced SAS
      Thursday 6:00-7:30
      February 24

SPSS (Windows, UNIX)
Statistical Package for the Social Sciences (SPSS) is a comprehensive, integrated system for statistical data analysis. These presentations will use either the Windows or the newer UNIX version, but the programming concepts are applicable to all versions of SPSS. Frank LoPresti, Robert Yaffee.

Warren Weaver Hall, room 313
Seating capacity: 30; first come, first served; talk.

   1. Introduction to SPSS
      Data input, transformations of variables, creation of system files and other manipulations of data will be discussed.
      Tuesday 6:00-7:30
      February 8
      Wednesday 6:00-7:30
      February 9

   2. Intermediate Topics
      Tuesday 6:00-7:30
      February 22
      Wednesday 6:00-7:30
      February 23

   3. Advanced Topics
      Wednesday 6:00-7:30
      March 1
Important Dates for Users of ITS Services

(For updates to this list, please check NYU Web at www.nyu.edu/its/notices/.)

Jan. 3 — Fall '99 Class Accounts expire.
Jan. 17 — Martin Luther King, Jr. Day *
Jan. 18 — Spring '00 semester begins; ITS labs’ regular hours begin.**
Feb. 21 — Presidents’ Day.*
Mar. 13 – 18 — University’s spring recess**
Mar. 20 – Apr. 21 — Instructors apply for Summer '00 Class Accounts.
March 30 – May 6 — Instructors apply for Fall '00 Class Accounts.
May 1 – May 12 — Students expecting incompletes in courses associated with Class Accounts should apply for account extensions. Instructor’s signature required.
May 1 — Last day of classes.
May 2 – 26 — Students with Class Accounts on ITS UNIX systems should store file they wish to keep after their accounts expire.
May 3 – 10 — Spring semester final exams.
May 11 — Commencement; Spring '00 semester ends. ITS labs’ summer hours begin.**
May 22 — First summer session begins.
May 29 — Memorial Day.*
May 30 — Spring '00 Class Accounts expire.

*NYU holiday: Labs & offices closed.
**Please check at labs and at above web address for updates on ITS hours.

Additional Information

Class Locations
www.nyu.edu/its/classes/
The following are the street addresses of the locations referred to in the course descriptions.
Warren Weaver Hall, 251 Mercer Street
Bobst Library, 70 Washington Square South, B Level
14 Washington Place, lower level
Education Building, 35 West 4th Street, 2nd floor
Third Avenue North Residence Hall, 75 Third Avenue, C-3
Tisch Hall, 40 West 4th Street, lower concourse

Client Services Center
www.nyu.edu/its/helpdesk/
251 Mercer Street, 2nd floor 998-3333
Troubleshooting; software distribution; information about ITS services and academic support.

Accounts Office
www.nyu.edu/its/accounts/
251 Mercer Street, 3rd floor 998-3035
Special, individual and coursework (class) accounts.

Innovation Center
www.nyu.edu/its/ic/
251 Mercer Street, 2nd floor 998-3044
Discipline-oriented resources and services for faculty and advanced students; instructional computing support; new and emerging technologies.

Student Computer Labs
www.nyu.edu/its/labs/
14 Washington Place 998-3457
Education Building 998-3421
3rd Avenue North Residence Hall 998-3500
Tisch Hall 998-3409
Student NYU-Internet services; computer and Internet access. (See ITS flyers and above web address for hours and rules of access.)

Publications
Pamphlets, flyers, brochures and the magazine Connect for users of NYU computer and network services. Printed copies are available at the Client Services Center and labs; online editions are at the above web address.

News and Announcements
www.nyu.edu/its/announcements/
Updates on hours and services; special events and other notices of interest.
A Universe of Statistics Opens Up

John Hernandez
john.hernandez@nyu.edu

Since September 1999, Bobst Library has subscribed to a useful resource called Statistical Universe. A product of the Congressional Information Service (CIS) and Lexis-Nexis, Statistical Universe is the web-based edition of four very important resources for finding statistical data: the Statistical Abstract of the United States, American Statistics Index, Statistical Reference Index, and the Index to International Statistics. Joining the renowned indexing and abstracting of the CIS with the powerful and flexible searching capabilities of Lexis-Nexis has created a new workhorse for locating statistical publications on nearly anything, from abortion to zoology.

Full Text Access to a Popular Statistical Compendium

Published by the United States Bureau of the Census and sold by the U.S. Government Printing Office, Statistical Abstract of the United States is an annual compendium of statistics covering a wide variety of topics. It has been the standard source of summary data on social, political and economic matters in the U.S. since 1878. The editions vary somewhat from year to year by presenting new tables on issues of particular concern at the time. Every year’s edition includes tabular data on population, vital statistics, health, nutrition, education, recreation, elections, government finances, labor, income, prices, business, trade, manufacturing, transportation and energy.

While the tables provide good summary statistics, the book’s greatest strength is the use of source notes at the bottom of each table, which indicate the source of the data and lead the reader to more detailed information. Statistical Universe gives access to the full text of the Statistical Abstract, preserving the book’s most helpful feature while providing a powerful search engine. Tables are presented as PDF files, which require Adobe Acrobat to read, and as GIF images. The tables are also accessible in spreadsheet-ready, manipulable formats as Excel worksheets or comma-separated values (CSV) files, which can be imported into Excel, Lotus 1-2-3 and most other spreadsheet applications.

Web Access to Three CIS Statistical Indexes

The other three publications in Statistical Universe are old standards in many libraries. The American Statistics Index (ASI), provides indexing and abstracts of U.S. government statistical publications issued by the executive branch, Congress, the judiciary, regulatory agencies and other Federal entities. The Statistical Reference Index (SRI) covers publications from trade and professional associations, business organizations, commercial publishers, independent research organizations, state government agencies and universities. The Index to International Statistics (IIS) provides a master guide and index to current English-language statistical publications of the world’s largest inter-governmental organizations, including the United Nations, Organization for Economic Cooperation and Development, Organization of American States, and the European Union. These three references provide the necessary indexing for publications that are available in matching sets of microfiche. All three indexes are...
available in print at the Business and Social Sciences/Documents Center, located on the sixth floor of Bobst Library, along with their corresponding microfiche sets.

Now Statistical Universe provides web access to these indexes, along with the full text of selected publications. As more U.S. government agencies publish their reports on the Web, statistical data has become greatly more accessible. Statistical Universe takes advantage of the Web by providing direct links to many of these publications. Bobst currently subscribes to the Base Edition, which provides full text access to about 15 percent of the publications in ASI. With the addition of the direct web links to U.S. government data publications, our current subscription to Statistical Universe provides full text access to nearly 60 percent of the publications indexed in ASI. At present, the Base Edition does not provide full text access for the SRI or IIS.

**Powerful and Flexible Searching**

Statistical Universe allows users to conduct keyword searches in the Statistical Abstract alone, or to conduct more detailed searches of the ASI, SRI and IIS by subject, title, publisher, author, category and document number. Category searches can find comparative data published by specific analytical groupings such as race, sex, age, county, city or Census division. Number searches allow users to scan publications by Superintendent of Documents number, GPO Monthly Catalog number, Library of Congress book number or CIS Record number.

Statistical Universe supports Boolean operators such as AND, OR and AND NOT, as well as wildcard searches with an asterisk and truncation with an exclamation point. In addition, researchers can employ advanced search strategies with proximity operators such as W/5, which will find keywords within five words of each other. For example, "population W/5 characteristics" will find the keywords "population" and "characteristics" in any order with up to five words between them. Searches may be limited to any or all of the three indexes, as well as to specific dates or date ranges.

Since Statistical Universe uses Lexis-Nexis command syntax, users familiar with Lexis-Nexis will find it easy to take advantage of the search engine’s advanced capabilities. Novice users will find ample online assistance in the form of tips and help screens.

**Results Lists and Output Options**

The results of a search are displayed as a Documents List, 25 items at a time, showing only basic information such as the document title, type, source, record number and content notation.

By default, results are sorted in reverse chronological order with the latest documents at the top of the list, but they can be resorted by their relevance to the search query. The Expanded List option shows the same list, plus a few lines of each record with the search terms highlighted. The Key Word in Context (KWIC) option displays a snapshot of each record, highlighting the search terms and displaying the context in which the terms were found. The Full option displays one full record at a time.
Search Stat Abstract

Each record shows bibliographic information for the document along with an abstract or summary. Bibliographic information includes the index in which the document was found, the title, the type of document (series, periodical article, etc.), its periodicity (monthly, annually, etc.) and its source, followed by availability information. If the document is available as part of one of the corresponding microfiche sets, the Microfiche Status line will indicate how many fiche cards it takes up, or if only part of the document is available in fiche. If full text is available, the record will display a line saying so. If a direct web link to the data is available, it is also provided.

The last line of bibliographic information indicates the CIS record number for the document. Use this number to find the document in the microfiche set. The Abstract provides a brief summary of the document’s contents, followed by Index Terms, which list the subject headings assigned to the document and can be useful for follow-up searches.

Category Breakdowns indicate the specific analytical groupings the document uses to present data, and Content Notation gives a quick, one-line description of the kind of data presented. Statistical Universe also supports a number of output options which allow users to save results to a disk, and print results at a local or network printer using a web browser. Users can also e-mail search results to a specified address.

Focus In on Your Specific Topic

In addition to all the strengths of its search engine, Statistical Universe employs a special Focus feature that allows you to narrow your search results even further. Suppose you did a search for gross domestic product. After finding a great many sources for this data, you might decide you want the data expressed in U.S. dollars. You can use the Focus feature to further narrow your results to those that contain terms in U.S. dollars by scrolling to the bottom of the results list and entering “US$” in the Focus box. Statistical Universe treats the additional terms you enter in the Focus box as being added to the previous search using the AND operator. This way you can start with a broader search and narrow your results set down in as many steps as you need to focus in on your specific topic.

Accessing Statistical Universe

Bobst Library provides open access to Statistical Universe to NYU students, faculty and staff. Users may access the system at terminals at the library, as well as elsewhere on NYU-NET. Most of the documents indexed in Statistical Universe can be viewed on microfiche at the Business and Social Sciences/Documents Center on the sixth floor of Bobst Library. In addition, many of the documents indexed may be available in print in the library’s main collection, the U.S. Documents Collection, or the U.N. Documents Collection. Reference desk staff are available to assist you. Call the reference desk at (212) 998-2600 for more information.
Wandering Around the AirPort with your iBook

For some time, wireless networking has been used in a variety of devices such as pagers, cellular phones and satellite-based TV services. Wireless technology has also been available in computing devices through the infrared port on many computers and printers. This is how Palm Pilots connect to each other and how you can print your document to a printer with an infrared port. However, infrared networking requires that the devices have an unobstructed line of sight to communicate — that is, the devices must be within a certain distance and be within sight of each other. If you move out of this line of sight, you lose connection between devices.

Emerging versions of wireless computing devices use radio waves instead of infrared to transmit information. With radio waves, there is no need for the devices to be within sight of each other. You can roam within the range of your signal, enjoying connectivity and freedom of movement. Imagine being able to take your laptop out in the backyard to enjoy a beautiful spring day while working on a project and connecting to the Internet.

Until recently, wireless devices have been relatively expensive. In general, large corporations had deployed them to enable their employees to move about freely while remaining connected to a network. With the iBook, Apple has brought this technology to the consumer market in an inexpensive, easy-to-use design accessible to home users.

The iBook comes with a built-

Can the AirPort be used on NYU-NET?

Information Technology Services’ staff at NYU is excited at the prospect that wireless networking offers. However, there are currently security, interoperability and scalability concerns. Implementing the technology before these issues are resolved could jeopardize the security of NYU-NET. Therefore, wireless devices currently cannot be attached to NYU-NET without the permission of ITS Network Services. This includes ResNet users and home computer users who connect to NYU-NET with a DIAL connection.

NYU Computer Store Manager Kathy Bear is a regular contributor to Connect.

Kathy Bear
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in antenna. With an AirPort Base Station connected to your network, you can take your AirPort Card-equipped iBook and roam up to 150 feet from your base station while still enjoying connectivity to the network or to other computers. The AirPort Base Station supports up to 10 devices, so you can easily share files between computers or connect numerous iBooks to the network through one base station. You can also connect two computers with AirPort cards without the use of a base station. By simply setting up the software that comes with the AirPort card to enable computer-to-computer communication, you can transfer files or play games with two computers, without needing any other device.

Since the technology uses radio waves, the communicating devices are not limited by line of sight. Communication is possible through physical obstructions, but at degraded signal strength. This can, however, result in slower data transmissions or even loss of the wireless connection between devices.

There are several emerging standards in the wireless communications arena; 802.11 and BlueTooth seem to be the most predominant in mobile computing. As the technology develops and more standardization occurs, costs will get lower and the technology will become more prevalent. Currently, several manufacturers are offering wireless PC cards for both PowerBooks and PC laptops.

Based on the IEEE (Institute of Electrical and Electronic Engineering) 802.11 standard, the AirPort Base Station can communicate at speeds up to 11 Megabits per second, which are comparable to those possible when connected to an Ethernet network. The base station can be connected to the Internet via your telephone jack, cable modem, DSL modem or Ethernet jack, so you could easily set up a small network in your home.

Please consult with the NYU Computer Store staff on any question you may have on this important and emerging technology and consult with ITS Network Services about its future deployment at NYU.
Lower Latency, More Bandwidth

Update on Internet2 and NYSERNet 2000

Bill Russell
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The NYU connection to NYSERNet 2000 and Internet2 has been designed and implemented. In the past year, the statewide GigaPoP has come together. Contracts were finalized and construction of the infrastructure has been finished.

The general form of the NYSERNet 2000 network is a distributed statewide GigaPoP made of an OC-12 Asynchronous Transfer Method (ATM) backbone running at 622 Mbps. The ATM infrastructure consists of Newbridge 36170 ATM switches. The backbone currently runs north from New York City to Albany, and then west through Syracuse, Rochester, and Buffalo.

Most institutions will be connected to ATM switches with local loops at a speed of OC-3 (155 Mbps). Currently NYU, Columbia University, the University of Rochester, Syracuse University and the University at Buffalo (SUNY at Buffalo) are connected at OC-3. Rensselaer Polytechnic Institute should be connected at OC-3 very shortly. Cornell University is also expected to move its current OC-3 vBNS connection to NYSERNet 2000.

We are connected via NYSERNet 2000 at OC-3 to the vBNS service sponsored by the National Science Foundation. We have established an OC-3 connection to the Abilene network, which is a service of the University Corporation for Advanced Internet Development. Traffic began to flow over this connection at about 13:15 EDT on October 5, 1999. An additional connection to a new service — Gemini2000 at OC-3 — started to exchange routes and pass traffic at 9:50 EDT on October 29.

With the NYSERNet 2000 connectivity and our two active Internet2 connections, we now have high-speed access to over 3800 IP networks located at hundreds of research and educational institutions.

Internet2 Backbone Upgrades

Over the last several months, both the vBNS and the Abilene network have been upgraded. The vBNS service has an OC-12 (622 MB/sec) backbone. OC-48 (2.4 GB/sec) links have been added in places of high network traffic. New high-performance routers from the Juniper Corporation have also been added. Abilene currently has an OC-48 path from New York City to the West Coast, with other links running at OC-12. Both networks may add OC-192 (four times OC-48) links for paths that could experience high traffic loads in the future.

Internet2 Foreign Connections

These networks have established connections to other high-speed Internet2 class networks such as CA*net 3 in Canada; DANTE (Delivery of Advanced Network Technology to Europe Limited, a not-for-profit company established by European national research networks); and SingAREN (Singapore Advanced Research and Education Network). We used the path to CA*net 3 in late September to demonstrate the transmission of a Dolby Digital six-channel sound stream (AC-3 or DD 5.1). A live music performance at McGill University was piped into the Cantor Center at NYU, in conjunction with the annual Audio Engineering Society (AES) convention held in NYC (see Philip Galanter’s article on page 15).
When the connection to DANTE was established with Abilene in October, connectivity to NYU's La Pietra facility in Florence increased. We acquired a redundant path to Europe. The 19 router hops over the commodity Internet went down to 12 hops via Internet2, and the latency reduced by about 10 to 15 milliseconds. In December, Internet2 researchers in the United States and Argentina agreed to collaborate on new network technologies and applications. This may allow our forthcoming Buenos Aires facility to have better connectivity in the future. It is currently scheduled to be routed back to the U.S. with a satellite link.

Latency and Bandwidth

When we measure network connectivity, there are two criteria that are important — latency, or the time to travel from one place to another; and bandwidth, or how wide and high a load can be carried between the end points. Latency is very important when interacting with a computer application, such as logging in to your is* account from Florence, or with a person in real time, such as when videoconferencing (for more on videoconferences, see Dennis Smith's article on page XX). The commodity Internet has low latency to many of the same places that Internet2 connects, but it is very variable. The congestion can cause bad lag times, and a network link that was usable one minute can be degraded the next — not because of your usage, but someone else's.

Internet2 is engineered so that latency is maintained even when the network is carrying very large amounts of traffic. However, since latency is limited by the speed of light, it still can take 60 to 80 milliseconds to go between the West Coast and New York City.

When we talk about network bandwidth, we need to talk about some of the technologies. On long distance network connections, high bandwidth is achieved by using a well-tuned IP / TCP protocol stack. The standard TCP protocol stack operates by detecting network congestion, avoiding it by sending less data, and hopefully reducing the congestion along the path to the other end of the connection.

To achieve a high bandwidth connection, the standard TCP stack needs to allocate much larger buffer space. Why is that? To achieve a certain data rate between two end points, you need to be able to inject data into the Net at the rate that you wish your partner to receive it. Remember that, because TCP needs to keep any unacknowledged data in case of lost packets, the sender will require suitable buffers. Making the buffers too large on an entire system can actually cause a system to experience a memory shortage.

All connections are limited by the end points in the conversation, or by the slowest and narrowest point between them. This means that even though there is an FDDI (100 Megabit/second, or 100 Mbit/s) backbone in place at NYU, if all you have is an Ethernet connection, then the most bandwidth you could get is 1.25 Mbytes/second (Mbps).

The peak bandwidth of the link is typically expressed in Mbit/s, and for the Abilene or vBNS network is approximately 120 Mbit/s. The round-trip delay for a link can be measured with traceroute, and for high-speed WAN links it is typically between 10 msec and 100 msec. For a 60 msec, 120 Mbit/s path, the product of bandwidth and delay would be 7200 kbit, or 900 kByte.

The Pittsburgh Supercomputing Center maintains a set of web pages that describe which features and enhancements are available for various TCP stacks on a wide selection of operating system platforms. See www.psc.edu/networking/perf_tune.html.

The most important features are described in three Request-For-Comments (RFCs): RFC1191 — Path MTU Discovery; RFC1323 — Large Windows; and RFC2018 — TCP Selective Acknowledgments. We expect to have more information about network utilization enhancements, on the ITS website and in future articles.
ITS Receives $1 Million Gift from Sun Microsystems

Faced with increasing demands on the infrastructure supporting its shared services environment, NYU Information Technology Services (ITS) is happy to announce a gift from Sun Microsystems worth over $1 million. The equipment will be used to replace aging machines that currently provide central e-mail and web services for the University.

The central machine in the new shared-services environment is a Sun E10000, a multiprocessor platform also known as a Starfire or an E10k. The NYU E10k configuration has four processor nodes (like four computers) containing a total of 32 powerful Sparc processors, 32 gigabytes of memory, and three terabytes (that's 3,000 gigabytes!) of disk space. This computer is the most advanced and reliable currently sold by Sun, and it is widely regarded as one of the most powerful available today. In addition to the hardware, high availability (HA) software will make the services on the E10k even more reliable by automatically sharing them with other computers.

ITS would not have been able to afford this acquisition without the generous support of Sun Microsystems. The gift of $1 million in value is in addition to the standard educational discount available to NYU from Sun. In part because of this gift, ITS will be able to help create and host next generation Internet services for the 21st century, including NYU Home, the University's portal that will provide a one-stop shop for University information, collaboration, interaction and communication.

— David Ackerman
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GRASS (Geographic Resource Analysis Support System) is a Geographic Information System initially developed by the United States Army Corps of Engineers Construction Engineering Research Laboratory (USACERL) in 1982.

Data analysis and modeling capabilities of GRASS include:
- terrain analysis,
- population demographics,
- business geographics,
- environmental analysis,
- land use planning,
- spatial visualization,
- digitizing,
- map production, and
- statistical analysis.

GRASS version 4.1 and its five updates and patches were released by the U.S. government and were considered Public Domain. The most recent patch was released in 1995. For those of us who used GRASS for developing our own applications, who appreciated its clear design and powerful features, USA-CERL's termination of GRASS development in 1995 was sad news.

Fortunately for both old users and GIS newcomers, a new version, GRASS4.2, was released by the GRASS Research Group at Baylor University in 1998. The resurrected GRASS Development Team is made up of researchers at Baylor and at the University of Hannover, Germany, with cooperators at the University of Illinois. GRASS runs on all UNIX and Linux operating systems, either through a shell or in X-Windows as a graphical user interface. Latest versions of GRASS are not as difficult to install as older ones.

In October, 1999 GRASS was released under the terms of the Gnu Public License (GPL), making GRASS the first fully featured GIS to be released worldwide under the GPL.

The current stable version is GRASS4.2.1 (version 22). A newer version is in beta testing and is available as GRASS 5.0 beta5. For more information about this remarkable GIS package or to download GRASS source code or binary code, visit Baylor University at grass.baylor.edu, or go to the University of Hannover website at www.geog.uni-hannover.de/grass. GRASS4.2.1 is available on a Linux PC at the Academic Computing Services Stats/GIS Lab, located in Tisch Hall, Room LC 7. For more information, please contact the author at 998-3403 or e-mail yakov.smotritsky@nyu.edu.
Using Audio Computer-Assisted Self-Interview in AIDS Risk Research

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Interviews, questionnaire surveys, and focus groups have been important methods of gaining understanding about behaviors that increase the risk for human immunodeficiency virus (HIV), and about ways to promote change. Using Audio Computer-Assisted Self-Interview (ACASI) software, people with lower literacy are able to participate in such interviews, since the entire interview and instructions are heard instead of read. The research participant listens to digitally recorded question items over a headset, and if desired, can simultaneously read the questions on the computer screen. The participant responds by pressing a number key.

A relatively new technology for survey interviews, ACASI has been used in large, randomized, national studies to determine its effect on the measurement of highly personal behaviors (Turner et al., 1998). The use of this technology has been found to increase reporting of private and sanctioned behaviors over face-to-face interviews, since the person responds in privacy to the computer. Research participants who paper-and-pencil questionnaires complex and confusing may report more accurately with ACASI. Using ACASI, participants see only the sections that are pertinent to their own sexual and partner histories, since the skip patterns are automated (Turner et al., 1998). This reduces the work of the participant.

Another research advantage is that the delivery of all the question items is standardized, so that every participant hears each question asked in exactly the same manner. Out-of-range responses can be eliminated, since the range checks are automated (Gribble, Miller, Rogers & Turner, 1999). Missing data is also eliminated, since the parameters can be set to continue to the next item only after the previous item has been answered.

The researcher is able to preset the maximum number of times a question may be repeated. The maximum time spent per question is also pre-set by the researcher. The latter offers comparison of time spent per item. The participant’s responses are stored in the computer database, eliminating a huge step in the data entry process, and reducing data entry error in the process.

For these reasons, a pilot study on the feasibility of using ACASI to study women’s HIV sexual risk behaviors was conducted. The objectives of the pilot study were to assess whether women who may have had no previous computer experience, and for whom literacy was not a requirement, could successfully complete the interview on a notebook computer running ACASI. This involved...
use of a headset to hear the questions, and a small number keypad to select the appropriate answers, so that the data are input directly and accurately into the database.

Further, the pilot would assess the accuracy of the automated complex skip patterns and a realistic assessment of how long the interview would take. If the program ran properly, then the question number, type, answers, prompts, parameters and corresponding voice files were appropriately programmed and functioning. The pilot was done in preparation for a larger, dissertation study.

Notebook computers offered a distinct advantage in this pilot study. They allowed the study to be conducted in the field, in community settings. The questionnaire was piloted in the field with an AST Ascentia J Series multimedia notebook computer with Windows95, 40 MB RAM, and a Pentium processor. A second computer was a Dell Inspiron 7000, Pentium II, 128 MB RAM, and a Pentium processor. A second computer was a Dell Inspiron 7000, Pentium II, 128 MB RAM multimedia notebook, running Windows 98. Thirty-five young, urban women at an urban housing project and at a Women, Infant and Children (WIC) food program completed the interview.

The ACASI used in this study was developed and distributed by Audio Data Systems (ADS) for Windows 95/NT. The evaluation version, which is a fully functional version of the program, comes with a 21-day license. The evaluation version was downloaded from the company’s website at www.teratech.com/ads. After downloading the software, the registration process involved e-mailing a computer entry number to ADS and sending a fee for the software. A registration key is then sent.

Audio-Computer Assisted Self-Interview for Windows 95/NT is written in Visual Basic and is programmed in Microsoft Access 97. The minimum hardware requirements are a Pentium-class computer with 16 MB of RAM and a SoundBlaster-compatible sound card, microphone and speakers or headphones. Software requirements are Microsoft Access 97 for Windows 95. The program also ran successfully on Windows 98.

The recordings of each interview question were created using a LabTech C-33 headphone with attached microphone. This improved the clarity of the voice files over using the computer’s internal microphone. Research assistants who were of similar gender, age and culture as the participants recorded all survey questions, instructions and elements of informed consent on a desktop computer with a Yamaha soundcard, and created the audio files for playback. Sound Recorder, a Windows 95 multimedia player that allows for recording sound from a microphone, was used to record these voice files.

Since voice quality was determined to be of great importance to the success of the research, the files were saved in 44 Mhz, 16-bit mono Pulse Code Modulation (PCM) format. The major disadvantage of this was the relatively large size of each file, but low-cost storage devices such as Iomega 100Mb Zip disks or writable 650Mb CD-ROMs made data storage manageable. Audio files were saved onto both the computer hard-drive and external storage devices.

The ADS program involves use of a tool called Survey Builder. Survey Builder is an MS Access program, which helps non-programmers create the interview. There are five tables in the Survey Builder tool: Question, Answer, Prompt, Parameter and Result. From the Survey Builder screen, data in each table may be accessed and changed. The MS Access Question and Answer tables specify the text to be displayed and the names of the sound files. These tables are linked, so the Windows .wav voice files are integrated with the corresponding text.

The ADS ACASI comes with a sample database file Drugs98.mdb, created by the developer. This database is renamed and saved in another ADS ACASI directory to allow for data manipulation. Once the new .mdb file is opened in Access, the new survey is entered into the five tables. There are drop-down menus to select the type of question, answer and prompts, allowing the user to select options. For example, one may select the option in the question table that will determine the format of the answer. Choice of question is used to allow for selection of multiple-choice answers, whereas Aided date will require a three-part statement consisting of month, date and year. The questions, answers, verification of answers, time limit, associated voice files, branching and prompts and parameters can be viewed and modified in this view.

The Survey Builder permits simultaneous interface with all five tables contained in the .mdb file. Otherwise, all of the tables
can be accessed individually in Access (for more on Access, see Frank LoPresti's article on page 37). However, the interview must be opened up to actually view as well as hear how the modifications appear, as it cannot be run from within Survey Builder.

All the variables and parameters must be entered correctly. Early in the pilot, we discovered that some of the skip patterns were not working properly. Identifying the source of the problem was difficult, since the program can run with errors. When the data entry error was discovered and resolved, those interviews were set aside and the pilot was successfully restarted. This discovery underscored the importance of our practice of checking the results table after every data collection session.

Another key discovery was that when the participant pressed the number key too long or hard, the answer would record repeatedly, for the next few items. This problem was detected by finding items that recorded zero time spent on the item, and was resolved by setting the keyboard properties from fast to slow.

ACASI uses the keyboard as the only input medium for the respondent. It can be formatted in two ways. When the appropriate answer is heard and highlighted, the participant can press the ENTER key to select the answer, or the number is typed when the frequency of a behavior is requested. Although the user manual states that the MS Access cross tab command is used to transfer data to statistical analysis program, SPSS, the Access file was first saved in Excel and easily imported to SPSS.

Audio-Computer Assisted Self-Interview comes with a short manual that provides basic directions. However, the manual left several questions unanswered. ADS developer Larry Greenfield responded promptly to phone and e-mail questions. The cost of this ACASI program is $500 per computer. Student discounts are available.

Another ACASI software was evaluated, although not used in the pilot. Sensus Q&A 2.0 does not use MS Access. Efficiently designed, it is a highly intuitive and easy to use program for even a casual Windows user, since this is a What You See Is What You Get (WYSIWYG) interface. From Survey Q&A Create, a new, or existing file is opened. The initial screen of Sensus Q&A Create contains five windows: Main Toolbar, Object Toolbar, Object Properties, Page Control and Main Page. While creating the interview, one may go directly to the interview view, an advantage over ADS ACASI.

However, an important drawback to using Sensus Q&A in the current research is the use of the mouse to input the answers, since using a mouse requires some previous computer experience. Also, this program requires higher literacy, since the items must be read. At an additional cost, a touch screen interface is available. There is also an additional cost to adding voice; this application with multimedia is four times the cost of ADS ACASI. However, once purchased and programmed, the interview may be used on multiple computers.

Both Audio Data Systems and Sensus Q&A 2.0 provide demonstration samples. It is highly recommended that the user becomes familiar with the settings in these files before attempting to create individual interviews.

In this pilot study, 34 of 35 participants responded that use of the computer for the interview was “very easy,” and one participant found it to be “easy.” Audio CASI was found to be appropriate for use in this pilot study of sexual risk behaviors among young, urban women.

Special thanks to Iris Araujo, Selina Bray, Ayanna Mills and Linglingay Tolentino, who audio-taped the question items and assisted in recruiting participants; to the program directors of WIC and Project Self-Sufficiency; and to all the women who participated in this study. This pilot study was supported by a Dean's Grant from the NYU School of Education.

References


FireWire, Media Convergence, and your Future Home Network

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FireWire, a computer interface standard poised to replace SCSI, has shown explosive growth in the past year. Videophiles are familiar with it as an easy-to-use digital interface used by DV camcorders and decks. Others may be more familiar with Sony’s i-Link trademark, or by the technical specification IEEE 1394.

Less than two years ago, those who wanted to use FireWire to set up a desktop DV editing system were mostly restricted to Macintosh-based systems configured by boutique vendors specializing in the technology. Now, FireWire-based DV editing systems are available for both Macintosh and Windows-based systems, and it is even a basic feature available on Apple’s entry level product, the iMac.

For computer users, a full line of 1394/FireWire products are now available, including hard disks, scanners, CD recorders and more. FireWire seems well positioned to replace SCSI as a high speed interface, just as USB promises to replace older, slower-speed interfaces such as the RS-232 serial port and Apple’s Desktop Bus (ADB).

What more could one want from a modern interface? Quite a bit more, as it turns out. A 1394/FireWire-based digital network could feasibly support all media, communication and computer use in the home.

What is FireWire?

Technically, 1394/FireWire is a bus, but for most purposes one can think of it as a network. The current IEEE 1394 specification offers a number of compelling advantages. For example, the FireWire connector is small and easy to include in both computer and consumer electronics products. FireWire is hot-pluggable, meaning that unlike SCSI, FireWire devices can be attached or unplugged from a running system without powering down, rebooting, or disturbing running applications.

Beyond user convenience, 1394/FireWire also offers a rich and sophisticated set of features for applications. Data transmission over FireWire can be asynchronous, or somewhat loose relative to time, using a best-effort approach similar to that of typical TCP/IP ethernet networks. But FireWire can also dynamically create, use and discard up to 64 simultaneous isochronous connections. Isochronous connections provide an application with an amount of guaranteed dedicated bandwidth. This allows FireWire media streams such as video and audio to be sent from device to device without any of the glitches or dropped frames one often experiences with streamed media over an ethernet.

One of the most important aspects of FireWire, generally understood but also underappreciated, is that it helps keep digital media digital. For example, DV video is compressed at a 5:1 ratio, much more than 2:1 or 3:1 motion-JPEG video typically used in nonlinear editing systems such as those from Avid and...
Media-100. In addition, DV video has about half the color resolution provided by the typical analog Betacam video used as source footage with Avid and Media-100 systems.

So why does the end product of a DV workflow look so good, usually as good as the hybrid analog/nonlinear workflow described above? One reason is that DV media is digitized right in the camera as close as possible to the CCD elements used to convert the optical image to electronic signals. Once digital, no additional noise or distortion is added to the signal. And noise is the enemy of compressed video—the more noise, the less redundancy there is to safely discard, and the less the signal can be safely compressed.

In addition, digital formats like DV can produce many copies across many generations without signal loss or distortion. Patching devices together using FireWire is simple and less expensive than fancy analog patch cords with exotic braided cables or gold connectors.

In general, the production goal for digital media is to digitize as early in the process as possible, to not require intermediate digital-analog-digital conversions, and to execute the final digital-to-analog conversion as close to the final display device as possible. DV over FireWire does exactly this—it keeps digital media digital.

FireWire for Home Networking and Media Convergence

When people think about a home network, usually one of two situations comes to mind. For some, a home network is primarily a set of control functions for lighting, heat, doors, security, automated kitchen services, etc. For others, especially since the Web revolution, a home network is a way the family can share Internet and printer access from a number of computers in various rooms in the house.

In terms of the information flowing into, out of, and through a household, however, video consumption is by far the largest part of the data budget. (See the chart on page 36). Given the data rates at which they are currently provided, a single household’s use of voice, data and even music totals less than a single stream of DVD video.

While there are many competing predictions as to the details, most observers agree that previously distinct electronic media are now converging in search of a common digital infrastructure. Given its data capacity and isochronous delivery requirements, video will dominate and drive the design of any integrated system for home networking. And FireWire is already on deck to provide that needed connectivity.

The 1394 Trade Association includes more than 170 companies from around the world, and is dedicated to the advancement and proliferation of FireWire as a multimedia standard. In pursuit of widespread media convergence, this year the Trade Association is shifting its focus from computing to the broader consumer electronics industry.

Association Chairman James Snider explains, “For the past five years, the 1394 Trade Association has mounted a major technology and product demonstration at Comdex. We pretty much accomplished our original goals, which justified being at Comdex. We’ve seen 1394 go from an early-stage technology, with only a few end products in the market, to a thriving technology with hundreds of products in the market. Now, we have moved our focus to the Consumer Electronics Show. We see this as the next critical step in the success of 1394. We’ve brought in new talent to help us accomplish a new set of goals. Starting in January 2000, you will see a new direction for the 1394 Trade Association.”

Of course it requires more than marketing to create a digital infrastructure for household networks. It also requires engineering and multi-vendor cooperation. Which leads us to HAVi.

HAVi Specifications and Products

HAVi stands for Home Audio/Video Interoperability Architecture. The HAVi 1.0 beta specification was released about a year ago by Sony, Philips, Hitachi, Sharp, Matsushita, Thomson, Toshiba and Grundig. HAVi specifies what engineers often refer to as “middleware.” HAVi is not restricted to any particular low-level networking scheme, nor does it define high-level products individuals can directly use. HAVi provides engineers creating end-user products an Application Program Interface (API) and services in support of a multi-vendor multimedia network.

While HAVi is not an open standard, the specification is publicly available. It will likely serve as a de facto industry standard, and is not dependent on any particular underlying proprietary technology. Also, HAVi as middleware is not technically tied to
FireWire for its low-level network support, but HAVi was developed with FireWire in mind and makes full use of its unique capabilities.

The new generation of HAVi consumer electronics products will include digital televisions, VCRs, DVD players and recorders, dish and cable television access devices, Internet connection devices, tuners, clocks, sound amplifiers, speakers and video display devices. A system of such components will share, record and play back digital media from device to device and room to room, and allow household-wide control of any device. The HAVi specification also allows for partial integration of pre-HAVi legacy devices.

The HAVi Network

Each HAVi device will connect with a single FireWire cable, simplifying installation and eliminating the typical rat's nest of RCA, S-Video, composite and BNC cables. Like current FireWire devices, HAVi products can be plugged in or out or moved without having to turn off power or stop using other components. When a brand-new HAVi device is plugged in, the device will identify itself to the network, and the network will automatically reconfigure so every device knows about every other device.

One issue this brings to mind is the question of physical wiring for home networks. For many years, it has been assumed that Category 5 twisted pair copper wiring will cover most present and future needs. With each jack wired back to a central household switch, this supplies each device with its own 100 Mbps connection.

But this scheme assumes using Internet-style TCP/IP, which unlike FireWire is difficult to configure, and is not being adopted by consumer electronics firms as a household standard. A FireWire network throughout the house would be much more useful. Current FireWire connections by specification must be only a few meters long, but very long optical fiber connectors and hubs are under development.

This will take care of the room-to-room connection of HAVi devices, but what about incoming and outgoing Internet traffic, where TCP/IP is king? It is easier for low bandwidth applications to follow high bandwidth applications than the other way around. Also, ease of use and plug-and-play features will drive the vast home consumer marketplace. Therefore, the most likely scenario is that TCP/IP traffic for the household will be carried over a 1394/FireWire network. This is also currently in development.

In such a home, both computers and home entertainment equipment will plug in using an identical single FireWire cable. All manner of media and Internet activity will be able to be routed from device to device, and to any screen or speaker in the household. New equipment will simply be plugged in, old equipment moved or removed, and the network will properly reconfigure itself.

In short, the future of household media convergence will include TCP/IP, but is likely to be FireWire-based and driven more by the consumer electronics industry than the traditional computing vendors.

Playstation 2:
A Game, DVD Player, Supercomputer and More

Slated for a spring release in Japan, and a fall release in the U.S., the Sony Playstation 2 is poised to revolutionize the game machine industry. In its initial release, the Playstation 2 (PS2) will sell for a suggested list price of about $370. The system includes two processors, and offers performance that rivals a supercomputer connected to a high-end graphics workstation.

The Sony Playstation 2. (photo courtesy of Sony)

The main PS2 processor is nicknamed the Emotion Engine because its supercomputer level performance can simulate compelling and lifelike characters with realistic simulations of facial expressions, flowing hair, and natural-fiber clothing. It's the first single-chip CPU to use a 128-bit wide design for all aspects including data bus, cache memory, and all registers. The processor, created in collaboration with Toshiba, includes vector processing units and can achieve an amazing 6.2 GFLOPS peak computation rate.

In addition, the PS2 includes a second processor called the Graphics Synthesizer, used for 3-D graphics. If offers direct hardware support for 24-bit color, an
companies such as Tivo and RePlayTV. But their products are hybrid analog/digital devices that do not support FireWire, do not interface easily with VCRs, and use a phone line connection to download broadcast schedule devices. The PS2, by contrast, could potentially act as a video server for the entire family via the household FireWire network.

Once one starts viewing consumer electronics devices as peer components on a household network, many new synergies and applications begin to come to mind. The Internet offers an alternative to expensive long distance phone calls, and a household FireWire network could support Internet phones in every room. By using the family DV camcorder, one could create a videophone. Or imagine an interface in which a game player’s face or body or living room is composited into a rendered game scene by the Playstation 2.

This scenario also poses a credible threat to Microsoft’s vision of the PC as the center of the electronic home. Unlike computer industry rivals, consumer electronics companies like Sony have the capital and industry leverage to take on Microsoft. The HAVi specification eschews Windows CE, Microsoft’s embedded system offering, for the arch rival Java environment. The Playstation 2 development system used by game designers is based in Linux rather than Windows.

The battle lines have been drawn, and no one knows what the future will bring. But in a war between the Sony camp and Microsoft, consumers should be the ultimate victors.
<table>
<thead>
<tr>
<th>Data Transfer Rates Spanning Six Orders of Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Telephone modem</strong></td>
</tr>
<tr>
<td><strong>ISDN modem</strong></td>
</tr>
<tr>
<td><strong>Cable Modem (upstream maximum)</strong></td>
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<tr>
<td><strong>Dolby Digital audio</strong></td>
</tr>
<tr>
<td><strong>CD audio (44.1 Khz)</strong></td>
</tr>
<tr>
<td><strong>DAT audio (48 Khz)</strong></td>
</tr>
<tr>
<td><strong>MPEG-1 video</strong></td>
</tr>
<tr>
<td><strong>T1 network connection</strong></td>
</tr>
<tr>
<td><strong>DSL (symmetric)</strong></td>
</tr>
<tr>
<td><strong>Cable Modem (downstream maximum)</strong></td>
</tr>
<tr>
<td><strong>MPEG-2 DVD quality video</strong></td>
</tr>
<tr>
<td><strong>DVD media max bandwidth</strong></td>
</tr>
<tr>
<td><strong>Ethernet (classic)</strong></td>
</tr>
<tr>
<td><strong>USB</strong></td>
</tr>
<tr>
<td><strong>MPEG-2 HDTV quality video</strong></td>
</tr>
<tr>
<td><strong>DV video</strong></td>
</tr>
<tr>
<td><strong>DV stream (DV+DA+timecode)</strong></td>
</tr>
<tr>
<td><strong>DV stream over IP</strong></td>
</tr>
<tr>
<td><strong>SCSI-1</strong></td>
</tr>
<tr>
<td><strong>T3 network connection</strong></td>
</tr>
<tr>
<td><strong>M-JPEG video at broadcast quality</strong></td>
</tr>
<tr>
<td><strong>SCSI-2 (Fast)</strong></td>
</tr>
<tr>
<td><strong>100 base-T Ethernet</strong></td>
</tr>
<tr>
<td><strong>FDDI</strong></td>
</tr>
<tr>
<td><strong>FireWire/IEEE 1394</strong></td>
</tr>
<tr>
<td><strong>OC3 network connection</strong></td>
</tr>
<tr>
<td><strong>SCSI-2 Fast and Wide</strong></td>
</tr>
<tr>
<td><strong>ITU-R BT.601-4 (was CCIR-601)</strong></td>
</tr>
<tr>
<td><strong>FireWire/IEEE 1394</strong></td>
</tr>
<tr>
<td><strong>OC12 network connection</strong></td>
</tr>
<tr>
<td><strong>HDTV (1125 lines, 60 Hz, 16:9)</strong></td>
</tr>
<tr>
<td><strong>Fibre Channel</strong></td>
</tr>
<tr>
<td><strong>Gigabit Ethernet</strong></td>
</tr>
<tr>
<td><strong>OC48 network connection</strong></td>
</tr>
<tr>
<td><strong>FireWire/IEEE 1394b</strong></td>
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<tr>
<td><strong>OC192 network connection</strong></td>
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<td><strong>OC768 network connection</strong></td>
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This chart of data rates ranks a number of standards, services, and products by relative data transfer rate from slowest to fastest. The numbers were compiled by the author from a number of sources. These numbers are intended for coarse comparisons, and may vary slightly from rates found in other sources. Some rates may reflect theoretical limits never reached in practice. Others may be practical approximations.

For example, as shown here, at least three numbers can be given for DV. Shown are the data rate of the raw DV video data; the data rate of the DV stream once it includes audio, timecode, and padding bits; and a third data rate for sending a DV stream encapsulated in an TCP/IP data stream.

Note that this chart covers a six order-of-magnitude span. To get a better intuitive sense of what this means, consider that a one-second burst of data on a OC768 network would take almost eight days to receive over a phone line using the fastest available modem.
Databases in SPSS and Access

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Today, advances in software have made staggeringly powerful research tools available to the quantitative researcher. Now the SPSS programmer or researcher can use Microsoft Access, a relational database, in a simple fashion to harness collections of large datasets.

Standard Query Language (SQL) is a standardized language used to query and manipulate relational databases to retrieve information you want. A relational database is a collection of datasets (or tables) designed in such a way that SQL works. The method for designing the tables is called normalization.

Our hypothetical AIDS project is a three year study which collects three types of data. The key variables, ID and HOSPITAL, will be common to the three datasets. The key will allow us to use the three datasets jointly. The selected participants receive an Entry Time Demographic Interview and quarterly blood tests at their own hospitals. The third dataset is information about their hospital. For datasets to be in a form best suited for a database, the datasets must be normalized.

Over three years, there are going to be the twelve quarterly blood tests. We might be tempted to create a dataset with one line of data for each participant and twelve groups of variables, one set for each blood test. This would not be good normal form. It is better to have twelve lines of data, one for each blood test, with variables ID, date, hospital and the blood test results. These normalization design issues allow the database to be queried and modified. Our third table stores information about the hospitals — one record or line for each hospital with the hospital name and number of beds, etc. These datasets are created in SPSS but stored in Access.

Now we would be in a position to ask complex questions involving complex retrievals from the database, such as the average age of persons whose T-cell count is below average in two consecutive blood tests, or whether size of hospital or race was a factor. These types of questions require that the three tables be appropriately joined together. This is where SQL can help.

SPSS and SQL

SPSS has a Database Capture Wizard that allows point-and-click SQL. The three tables from our AIDS study are visualized in an SPSS window and joined together. The Wizard walks us through a series of windows. An SQL retrieval is written and the database is culled to create a new dataset. Variables from the three tables are joined together to allow us to use standard SPSS to answer our complex research questions.

First, we use SPSS to create the three datasets. Second, we import them into Access using the Access "Import" command. Third, we use the SPSS Database Capture Wizard to join these tables. The, we can perform our analysis using SPSS.

If the tables need to be updated, we may modify their structure or edit their data using SPSS. Look at the Academic Computing Services Stats Group website at www.nyu.edu/its/socsci/statistics.html for a more detailed discussion of this method. NYU researchers may contact the author for help using this technique.
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