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Script identification is the process of examining a document to ascertain whether its script (printed characters or pictographs) is Cyrillic, Roman, Japanese, etc. Currently script identification is most often done solely with human expertise. However, scientists at Los Alamos have recently developed a reliable automated technique for identifying the script from images of electronically scanned documents. To speed up the script identification process, they are focusing on clusters that were most reliable for differentiating scripts. This figure shows, for each script, the two most frequently occurring templates with reliabilities of at least 90%. Each cluster is represented by a template derived by averaging the cluster members. For more information, see the article on page 4.

## Customer Service Center . . . . .(505) 665-4444 or [cichelp@lanl.gov](mailto:cichelp@lanl.gov)

Because of the wide variety of CIC computing services, numerous facilities are available to address your questions. If you are uncertain whom to call, you can always call the Customer Service Center (CSC). CSC consultants are trained to either answer your question or locate someone who can. To reach the appropriate consultant, dial 665-4444 and make your selection from the following choices:

Option 1: New user topics including e-mail, passwords, registration, and World Wide Web.

Option 2: Labwide Systems such as Travel, Time and Effort, and Purchase Cards.

Option 3: Scientific computing, storage systems, and networking.

Option 4: Classroom instruction and training.

Option 5: Desktop Consulting for PC and Macintosh software and network configurations.

### Consulting Via E-Mail

Customer Service Center.....	<a href="mailto:cichelp@lanl.gov">cichelp@lanl.gov</a>
Scientific and engineering computing.....	<a href="mailto:consult@lanl.gov">consult@lanl.gov</a>
Administrative and business computing.....	<a href="mailto:labwide@lanl.gov">labwide@lanl.gov</a>
Passwords and registration.....	<a href="mailto:validate@lanl.gov">validate@lanl.gov</a>
Macintosh computing.....	<a href="mailto:Mac-help@lanl.gov">Mac-help@lanl.gov</a>
PC computing.....	<a href="mailto:PC-help@lanl.gov">PC-help@lanl.gov</a>
UNIX computing.....	<a href="mailto:UNIX-help@lanl.gov">UNIX-help@lanl.gov</a>

### Other Useful Numbers

Advanced Computing Laboratory.....	665-4530
Central Computing Facility.....	667-4584
Network Operations Center.....	<a href="mailto:noc@lanl.gov">noc@lanl.gov</a> or 667-7423
Telephone Services Center.....	667-3400

## BITS Interviews Don Willerton

This is the first in a series of interviews BITS is conducting with CIC group leaders and project leaders to get their views of the “big picture” as it relates to their work and the Laboratory mission. These people have also been asked to do a little forecasting as it applies to their business. BITS invites readers to join in the spirit of these interviews, treating the forecasts as a sort of informed speculation without holding anyone’s “feet to the fire” to make the predictions come true.

### *Tell me briefly what CIC-6 does.*

The core businesses of the group are consulting, training, and ICN access. We cover four distinct areas of consulting: the ICN Team keeps an eye on the big machines, UNIX, scientific applications, and also has three people who interface to specific customer segments; the Labwide Team helps those using the enterprise systems like Time and Effort (T&E) and Travel (there are actually 30 Labwide systems in all); the Desktop Team helps with specific Macintosh and PC questions; and the Customer Service Team helps in the overlapping areas, like e-mail and the Web. The Training Team handles all of the training for the enterprise systems, supports the three training facilities that we have, and sponsors all of the classes that address high-end computing needs. The Password Office is also part of CIC-6, officiating over access to the ICN through passwords and Laboratory Smartcards.

In addition to the core businesses, we also sponsor the BITS publications, and three of our members provide direct support to the Laboratory’s science education programs.

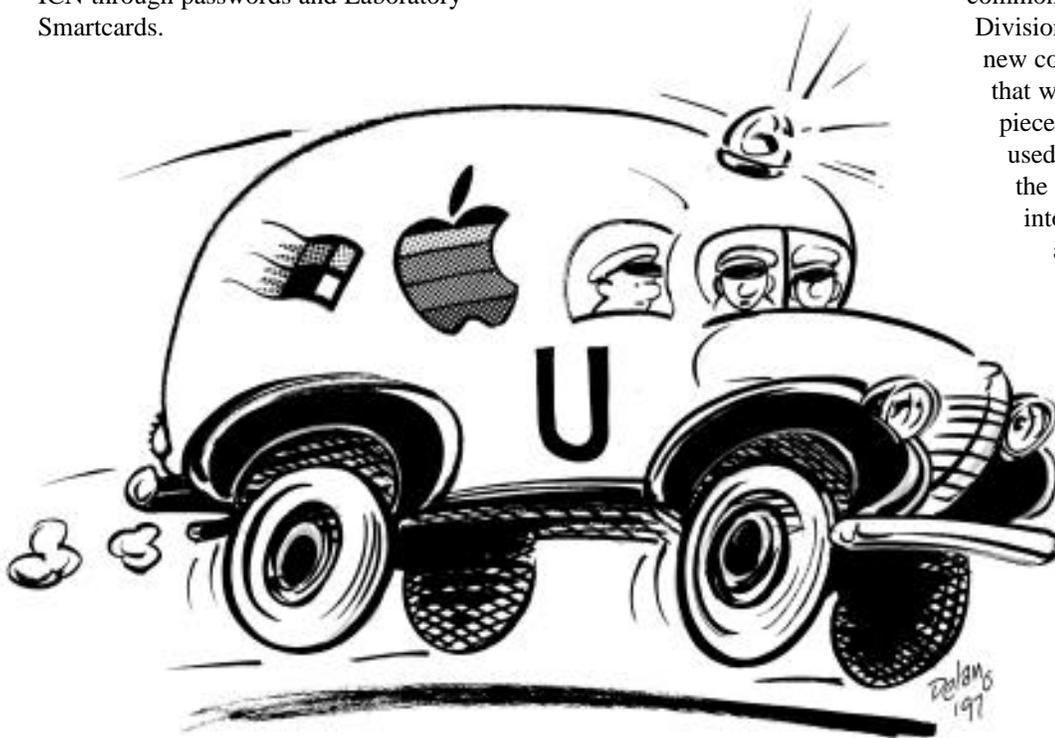
### *Is there a lot of change within the Group?*

There are a lot of good things going on and some bad things, but, overall, we’re becoming stronger in both people and roles. We’re responding to increasing workloads in every area by increasing the staff and addressing the automation of our operations. Our current initiatives include installing a new computer telephone system that will automate most of our usage-data gathering; enhancing the use of our “Remedy” trouble-tracking system; increasing the percentage of time we spend with development teams; and helping sponsor a new joint quality effort with CIC-13, which we hope will address some of the root causes of our users’ problems.

### *That all sounds like good things. What about the bad things?*

The Laboratory is converting dramatically to an environment that is pervasively computerized. That means more people are using computers for Laboratory internal business and information. The Travel and T&E systems are common examples. Through FSS Division, the Lab is moving to a major new computerized maintenance system that will use a far more involved piece of software than what has been used previously. And, through HR, the Lab is incorporating PeopleSoft into their operations, which is another huge piece of software.

All of these are examples of organizations deciding to try to take advantage of technology to work more efficiently. There are many more smaller changes in other organizations.



All of this is good, but the overall effect is that more people are using more difficult software for a larger percentage of their daily work. That translates into more people needing more help, and that translates into more people needed to give help, and that translates into money. But putting more money into support has been bad politics these days, which makes me wonder at what point the Lab will wake up to what's happening, and respond? Recently I've had to adopt some hard lines for what support we can provide and what support we cannot provide. CIC-6 doesn't want to turn down work that we ought to be doing, but I'm concerned that we keep up quality service on what we're already doing.

*Physics is hard; using your computer shouldn't be.*

Add to this situation the zooming rate of complexity in computing technology and all users are becoming disadvantaged as they try to keep up. Suddenly, everyone is working with a computer on their desktop that looks a little different than it did last week, and whole lot different than it looked last year.

This "increasing unknownness" causes of lot of insecurity and uncertainty among a lot of users and increases their dependence on someone to help them get their work done. People rely on CIC-6 to know what's going on, and that's an ever-present, growing challenge.

***What are your major strategies for the future?***

First, we have to become grounded in the ASCI initiatives because that's going to be the dominant computing event for the next decade. That means involving ourselves more in the growth of the technology and the environment of teraflop computing. Second, we're increasing our ability to communicate what the users are telling us (and have been telling us for some time) to the rest of CIC Division so we can help developers build better software and better systems. Third, we're modifying our role to include helping develop widespread computer literacy within the Laboratory instead of just being the world's best question-answerers, trainers, and password gurus. Physics is hard; using your computer shouldn't be. We'd love it if more people had fewer problems using their computers.

There are other strategies and tactics that we've identified: addressing the growth in software, hardware, and networks;

partnering with the directions of the REDI program; the looming problem of job burnout in the consulting business; funding problems; the inherent challenges of learning an overwhelming amount of new information in an inadequate environment; and the need for training and technical growth within the group.

***How do you feel about the future?***

I'm optimistic, but not because things are going to be "better." I'm optimistic because I have a group of some of the best people that I've ever met, who are committed to customer service, and who are technically excellent. You can't do quality service without quality people, and I think my group has an unusually high proportion of them. It is my hope that I can respond in kind by providing an environment in which they will love to work.

***Any parting words for the readers?***

CIC-6 answers about 240,000 phone calls a year, hosts about 3000 class attendees in some 100 classes, and manages a password and Smartcard customer base of about 12,000. We're proud to do it, and expect to get better at it. We can't do it if we don't have feedback, so we need our users to help us out by letting us know what they need now, in what form that help is most effective, and what they'll need in the future. And do it in a nice way. We're all in the same boat, and learning to use computers is the tempest that we're all fighting against. We'll never learn to row together if we spend our time arguing over who ought to walk the plank.

Willerton has been at the Lab for 21 years as a programmer, a manager of programmers, and now as a manager of customer service. He likes to raft the rivers of the Southwest, restore old cars, read, and write mystery stories for teenagers. His ambition is to be involved as a professional in leadership and management training.

*We'll never learn to row together if we spend our time arguing over who ought to walk the plank.*

## Is Your Computer Ready for the Year 2000?

Many computer systems are potentially vulnerable to the effects of the year 2000 (aka, Y2K) unless actions are taken now to replace, update, or change components of these systems to eliminate or otherwise mitigate the effects of this event. Fixing and testing the Y2K problem poses a significant challenge for maintaining systems and software. As one of the largest and most diverse computing environments in the world, Los Alamos cannot afford to underestimate the potential risks posed by the Y2K event.

### The Y2K Issue

In computer codes, two digits rather than four digits were frequently used to designate the calendar year (such as DD/MM/YY) to save valuable storage space and data entry time (just as people commonly refer to “the class of ‘96”). Although this has been common practice, it can lead to incorrect results whenever computer software performs arithmetic operations, comparisons, or data field sorting involving years later than 1999. Programs may not recognize “00” as the year 2000, or may be programmed to treat this as the year 1900.

### The Y2K Web Site

To help the Laboratory cope with the impact of Y2K, the Information Architecture Project has created a Y2K Web site (<http://www.lanl.gov/projects/ia/year2000/>). This site was designed to be a starting point for Laboratory citizens to quickly find answers to questions about Y2K. Major sections from the Y2K Web site include the following:

- Frequently Asked Questions (FAQ)—general information about the Y2K issue,
- Readiness—Y2K status of Laboratory standard operating systems and software,
- Selected Sites—primary Y2K Internet sites,
- Testing—considerations regarding Y2K testing,
- What’s Newest—list of the latest changes to this Web space,
- Sharing Information—a place to share successes, questions, or concerns about Y2K with others at the Laboratory, and

- Presentations—slide shows from presentations that Diane Weir, IA Project Leader, has given on the subject.

### A Y2K Scenario

Aaron was glad he was wearing his new LambsBend fleece pullover. But like many of the things he had mail-ordered recently, it had arrived days later than usual, first because of glitches in the “00” expiration date of his credit card and then because the shipping company was having trouble with its automated tracking. He stood warming his hands over the coffee maker in the programmers’ break room at MOS.



As it gurgled and finished filling the pot, his breath was mixing with its steam. He didn’t know how cold it was, but it was pretty darn cold. A maintenance crew was banging on pipes. Here it was, January 3, 2000, but his “new beginnings and fresh start” expectations were really being put on ice. And although the building temperature was to have been maintained at 55 degrees, over the holidays it had gone below

freezing, and his plants had died. It was all due to a failure in an embedded chip in the heating controls. He had been unable to reach Max, his manager, to tell him not to come in until the heat was fixed.

Max stuck his head in the door, breathless, because he had to walk up the stairs. The elevator wasn't working. It apparently shut down automatically following a self-generated notice for overdue scheduled maintenance.

"Hey, Max, I've got something I need you to take a look at."

Aaron filled his cup and Max followed him to the server. Aaron sat down and looked at the screen and then up at Max.

"The scratch files...they're gone. They were emptied before the status report was printed. It's just bizarre."

The phone rang (at least some things still worked) and Max punched the speaker button:

"Max and Aaron here."

It was Aimee, the Auraclue apps developer.

"Howdy, boys. Guess what! Message says license expired on Auraclue; can't bring it up and they can't send the patch out because their systems are down, and have you seen the stock market's dive? Wall Street folks are pulling their hair out, I bet.

Have any ideas on what to do?"

Another light blinked on the phone.

"I'm putting you on hold, Aimee; we've got another call."

It was Jordan, the joker Jordan, who actually sounded grim.

"I go to build a new version of the executable for the data reduction experiment, but the change management system doesn't know which of the libraries to use, so the make file doesn't work."

"What the heck is going on here?" said Max.

Then Zig, the material scientist from down the hall, appeared at the door. "My French connection just contacted me," he said, "our joint pleurisy timing experiment will have to start all over because they didn't expand the date files for the Year 2000 although we did; the data are worthless." Condolences were in order, but he turned and disappeared.

Max and Aaron looked at each other in silence; they knew these were just the first of many surprises that the new millennium had in store for them. Oh, joy to the world, the bridge to the 21st century was open, but all the welds were bad.

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## Automatic Script Identification from Document Images

Script identification is the process of examining a document to ascertain whether its printed characters or pictographs, its script, is Cyrillic, Roman, Japanese, etc. Currently, script identification is most often done solely with human expertise. However, we have recently developed a reliable automated technique for identifying the script from images of electronically scanned documents.

The security community and multinational businesses are interested in this work because script identification is a key part of the processing of documents in international arenas. For example, a document's script determines which OCR (optical character recognition) software should be used. Script identification is also helpful in language identification, which is required for machine translation, or for distributing documents to an appropriate reader, indexer, or translator. For

scripts, such as Korean and Greek, that are unique to one language, script identification also accomplishes language identification. For scripts shared by many languages, such as Roman, script identification is an important first step in language identification.

Our script identifier system automatically learns distinctions among scripts. Using cluster analysis, which automatically groups similar symbols, our system discovers the most characteristic letters or word shapes in a representative set of documents (called training documents, because we use them to train the system). To identify a script in a new document, we compare 50–75 characters in the document to the characters identified by the cluster analysis for each script. We then choose the script with the best match.

Our system currently distinguishes all 13 major scripts: Armenian, Burmese, Chinese, Cyrillic, Ethiopic, Greek, Hebrew, Japanese, Korean, Roman, Thai, Arabic, and Devanagari (the script for Sanskrit and several modern Indian languages). The last two scripts have a somewhat unique characteristic—their printed letters can be connected, as in Roman handwriting. Chinese and Japanese are also somewhat unique in that they use nonalphabetic scripts. The only documents our system misclassified were those printed in fonts that differed markedly from those in the training documents. We believe we will be able to prevent such errors by augmenting the training set.

The essence of our approach is to discover character shapes and word shapes that occur frequently in each script and then to look for those shapes in documents. The process has four steps:

1. Assemble training and test sets of document images.
2. Find and rescale textual symbols (characters, letters, numbers, marks) in the training set.
3. Cluster similar symbols within each script, eliminate minor clusters, and identify unreliable clusters.
4. Match a subset of symbols from a document to the clusters for each script.

We scanned in 276 document images (single pages) from books, newspapers, magazines, and computer printouts, in 33 languages, in the 13 scripts listed above. We divided the images into three sets: training, testing, and challenge. Test images were from the same sources used in the training set; challenge images were from new sources.

All document images were printed in black on white paper, although some challenge set images contained some white-on-black areas. No documents were handwritten. We eliminated illustrations from the training and testing sets but not from the challenge set. We also eliminated foreign characters in the training and testing images but not in the challenge set. Most of the documents included numerals. We also included skewed images (up to 10 degrees) because skewing sometimes occurs during printing or binding.

We included broken and touching characters in the clustering and scoring process as well as whole words in connected scripts such as Arabic. The process also included large punctuation marks and diacritics, such as exclamation marks and Spanish tildes, although it excluded small punctuation marks (such as periods) and speckles.

We believe that including diverse marks and poor-quality samples in our training set produces a more flexible system that can process documents with poor-print quality. In addition, this inclusive approach reduces the preprocessing time required for each document.

Our automated system correctly identified the languages of all 65 test images and all but three challenge images. The misidentified images were all in fonts significantly different from those in the training set. The correct classification of all the other challenge images, including many with novel fonts and languages, demonstrated that our system is able to generalize and properly identify scripts except in extreme cases. The images that were classified incorrectly were Gothic Roman, an italic type font, and a modern Cyrillic font, which differed dramatically from the fonts in the training set. Challenge documents in scripts that were identified correctly included fonts and even languages not found in the training set, as well as obfuscating factors such as reverse type (white on black background), textbook illustrations, a page from an almanac, and characters from other languages.

We are now moving toward extending our method to handwritten documents and for segmenting multilingual documents. For example, given a page of mixed Japanese and English, we would like to be able to distinguish the Japanese and English regions automatically in preparation for using an optical character reader.

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## Locally Developed Software Working Group (LDSWG) Reconvenes

The LDSWG was formed in 1994 to help plan the transition from CTSS (and LTSS) to UNICOS computing systems and to help users of the scientific computing resources at the Laboratory make that transition. The working group convened again in August 1996 to provide the same services in making the transition from Cray machines to those the Laboratory will be using in the foreseeable future to support the Accelerated Strategic Computing Initiative (ASCI). Lessons learned from the earlier transition will be used in making the present one easier for users.

*See the LDSWG Report and Recommendations for ASCI Mountain Blue at [www.lanl.gov/ldswg/](http://www.lanl.gov/ldswg/)*

The attention that is being focused on smoothing this transition highlights the fact that it is difficult. Change can be painful in general, and leaving the security of software and libraries that are working well to enter a relatively unknown computing environment is a bit like moving to a new country where you're not very familiar with the language. But the payoffs of ASCI will be enormous. Without the data from underground testing, enhanced 3-D computing capabilities will be essential if we are to be able to continue to certify the performance of nuclear weapons in the enduring stockpile. As these existing weapons age, we must be able to model and predict the changes in their nuclear and nonnuclear materials to assess the potential consequences of these changes on their safety and performance. Our present 1-D, 2-D, and 3-D simulations combined with existing hydrodynamic test data cannot do this adequately. (For more information on ASCI capabilities, see the most recent CIC Division Report, LALP-97-91, [www.lanl.gov/Internal/divisions/cic/pubs/cicannual97/CICannual97.qrk.pdf](http://www.lanl.gov/Internal/divisions/cic/pubs/cicannual97/CICannual97.qrk.pdf), or contact Ray Miller, [rdm@lanl.gov](mailto:rdm@lanl.gov))

Perhaps the biggest challenge in moving to the ASCI environment is that it operates with standardized tools almost exclusively. The customized software that code developers and the people who maintain system software have created for the Cray machines may not be portable to ASCI. The LDSWG is

an umbrella that helps developers and users of these legacy codes move gradually into the new computing environment. The working group involves users as members of its teams and makes its members available for the users' teams as well. The LDSWG helps users' work teams plan their strategies for making the transition. One such team is X Division's Computing Coordination Council, or "XDC3." Others include the Defense Special Weapons Agency (formerly Defense Nuclear Agency), along with CIC-7's Scientific Computing Resources and Scientific Computing Environments Teams. The LDSWG has been meeting with XDC3 over the past year to see how the recommendations in the "LDSWG Report and Recommendations for ASCI Mountain Blue" ([www.lanl.gov/ldswg/](http://www.lanl.gov/ldswg/)) are useful to the users in X Division. The LDSWG/XDC3 is also working on a prioritized list of software to determine which software will be ported to the ASCI machines and to identify vendor-supplied products to take the place of software that will not be ported. The current production computing Cray machines will continue to remain in full operation for a reasonable time to allow for the validation of production codes in the ASCI environment.

CIC-7 is working closely with X Division's Code Integration Group and ASCI code teams to help code developers create quality assurance systems for their codes. The group's planning also includes assistance with porting legacy codes to ASCI and developing automated testing mechanisms for stability, consistency, and reliability in the new environment. In conjunction with this work, CIC-8 is building a bridge to replace the existing legacy graphics libraries and ease the porting of the legacy production codes that use these graphics libraries to the new machines.

For now the ASCI secure machines and ASCI-type open machines are experimental. They are being used to establish an environment of stability and to verify and validate the ASCI Mountain Blue approach. The LDSWG and other teams in CIC and X Divisions continue to work together to help make this change of computing culture a smooth one.

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## What's This Knowledge Management Stuff?

The business world has a very broad interpretation of the phrase "knowledge management (KM)." If you would like to dip into the literature, take a plunge into these Web resources.

- Terminology of KM ([http://www.ktic.com/TOPI6/13\\_TERM0.HTM](http://www.ktic.com/TOPI6/13_TERM0.HTM)).
- KM Metazine (<http://www.ktic.com/topic6/km.htm>).

The following three Web sites collectively present introductory material, literature resources, company listings, and product listings.

- Visually, this site may cause you to hit the delete button, but be patient, it contains a very good introduction plus predictions on where KM may go in the future (<http://www.Brint.com/km>).
- Karl Erik Sveiby is one of the important writers in this field and his Web page (<http://www.sveiby.com.au>) contains links as well as information about TANGO, a business simulation to help measure knowledge assets. His article "What is knowledge management?" (<http://www.sveiby.com.au/KnowledgeManagement.html>) gives good background information, especially into active companies and products for KM.
- This is a home page for a newsletter on the topic, but allows you to view some articles, case studies, interviews, and has information on upcoming meetings, conferences, and events (<http://www.knowledgeinc.com>).

These are several ways to keep current of developments in the world of knowledge management. KM World presents a list of daily newswire stories (<http://www.kmworld.com/index.htm>). The Laboratory has access to GartnerWeb where you can set up a profile on knowledge management. Access GartnerWeb through the Research Library's electronic database page (<http://lib-www.lanl.gov/edata/edata.htm>). An alert can also be set up via SciSearch® at LANL (<http://scisearch.lanl.gov/lanl/>).

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## Holiday Schedule for CIC Production Computing

During the Laboratory closure for the Christmas holidays, From 16:00, December 24, 1997, through January 4, 1998, some of the computing services normally offered by CIC Division will be unavailable.

However, some of these services will be maintained at a minimum operating level. The following sections provide information about specific services.

**CM5 and Cray Supercomputers:** From 16:00, December 24, until 07:00, December 26, the CM5 and the Cray supercomputers will run unattended. Any problems encountered during this time will not be resolved until after 07:00, December 26. From December 26 to January 5, the UNICOS and CM-5 machines will have minimum staffing.

The CFS (Common File System) will be available but with limited capability as no tapes will be mounted during this time.

The open cluster will be left running but will not be supported. This means customers can access and use the cluster, but if they have problems or a machine goes down, help will not be available until the Laboratory resumes normal operations on January 5.

On December 29 from 06:00 to 18:00 and on December 30 from 07:00 to 16:00 some CIC computing services may be unavailable or experience outages. Necessary electrical/mechanical maintenance and upgrades will take place during these time periods. All precautions will be taken to limit the impact on service and to keep the outage as short as possible. Please plan accordingly. Up-to-date status will be available by calling (505) 667-2919 or (505) 667-1333. For more information call Jim Frybarger at (505) 665-1023 or Rick Riveria at (505) 667-5781.

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## SciSearch® at LANL Version 3.0 Released

SciSearch® at LANL Version 3.0 was released October 27, 1997. SciSearch® at LANL is the application developed by Los Alamos National Laboratory to search SciSearch®, an electronic database based upon the Science Citation Index®. This international, multidisciplinary index, produced by the Institute for Scientific Information®, covers the journal literature of science and technology. Updated weekly, SciSearch® covers the 3,300 journals from Science Citation Index® plus an additional 1,300 science and technology journals. It is available off the Research Library home page (<http://lib-www.lanl.gov>) or directly at <http://scisearch.lanl.gov/lanl> (please note that this is a new URL.)

Lots of enhancements and new features have been added:

- (1) A redesigned navigation bar with quick access to general search, cited search, and alerts from anywhere in the system has been added. The download button has been replaced with List Marks.
- (2) General search now uses pull down menus for index and option selections.
- (3) Two new options have been added—limiting by document type and sorting.
- (4) Context sensitive help is now available.
- (5) Marking has been significantly improved with the introduction of JavaScript. From the full record, select the Mark Button, which changes to Unmark, to indicate that the record has been marked. Marking from a full record is also noted with a check mark on the brief results list.
- (6) Computer-generated keywords (which are based on shared title words in bibliographic references) are now preceded by a plus sign (+).
- (7) Author supplied keywords (which appear in journals requesting keywords from authors) are listed without any indicator.
- (8) Tagged output is now available with filters for PC versions of EndNote, ProCite, and Papyrus. Work continues on a filter for the PC version of Reference Manager. Filters for MAC versions will follow.
- (9) “Previous 15 / Next 15” buttons are now located both at the top and bottom of the cited search browse list.
- (10) Hardware has been upgraded to a Sun 4000. Response time should be significantly improved.

This version of SciSearch® at LANL requires at least Netscape version 3.0 with JavaScript enabled.

Your past suggestions and comments have directly contributed to these enhancements. Please continue to send your comments to [sci-info@lanl.gov](mailto:sci-info@lanl.gov).

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The SciSearch® at LANL Home Page

## Making the Web Accessible Part 2: Text Issues and Conclusion

Who would you not want on your team?

“My body may be stuck in this chair, but with the Internet my mind can go to the ends of the universe.”

—Stephen Hawking, mobility impaired.

Of Leonhard Euler’s 886 books and papers, nearly half were produced after he was totally blind, including, for example, the development of the notation  $i$  for the square root of  $-1$ .

Sir John Warcup Comforth, deaf, won the 1975 Nobel Prize for his work on the stereochemistry of enzyme-catalyzed reactions, including, for example, the synthesis of steroids and the condensation of acetate with oxalylactic acid to citric acid.

Who would you not want on your Web site?

In last month’s BITS article, “Making the Web Accessible Part 1: Overview and Graphics,” I discussed some of the input and output devices that can be used to experience the Web in different ways and some approaches for making the content of graphics accessible for screen readers and non-graphical browsers. In this month’s article, I’ll focus on some common problems and solutions with the accessibility of text, and on some general approaches to “tying it all together” in a Web site.

Like last month, what I write here is heavily based on good work done by others, particularly those associated with the Web Accessibility Initiative (WAI) for the World Wide Web Consortium (W3C). References to source materials are provided at the end of the article.

### Make Links that Make Sense

As noted in last month’s article, “click here” can be a nonsensical phrase when used with input devices that don’t click (somewhat akin to telling someone to “speak up” when you’re communicating by e-mail). In addition, the fact that it’s not always literally true, “click here” doesn’t carry any information about what is being linked to. Screen readers will typically read links in isolation, so it becomes important that the linked phrase carry enough information that the user can decide whether or not to follow it. Hence, “details” is better than “click here,” but “detailed survey results” is better yet.

Screen readers can also encounter difficulties with horizontal lists of links that are separated only by spaces. Unless some punctuation appears between the links, the screen readers won’t always know where one link ends and the next begins.

(Sighted users can have problems with this, as well.) The most accessible solution is to list links on separate lines. When design considerations override that approach (such as in a navigation bar at the top of a page), then make sure to use some form of standard, non-linked punctuation between the links (such as a comma, semi-colon, or dash).

### Be Conservative with Text Effects

Standard HTML has evolved to the point where there are a number of text effects that are possible (and acceptable, if used correctly). A number of these effects can cause accessibility problems, though. When changing font color, be sure to select a color that contrasts well with the background. Screen readers can’t make out the wording without adequate contrast; sighted users can encounter problems when using lower color-depth monitors; and color-blind users can encounter problems with certain color combinations. (One bad example is blue-green lettering on a blue background.)

Variations in font size should similarly be handled with care. One commonly cited example is a line that uses a larger font size for initial capital letters in a title. Screen readers can lose the larger letters while translating the normal ones (e.g., “Making the Web Accessible” would become “aking the eb ccessible”). Hence, even though some variation in font size is acceptable under the right circumstances, try to at least keep the size consistent within a line.

And then, of course, there’s the persistently non-standard `<BLINK>` tag. On top of all the other arguments against it (it’s annoying, unprofessional, etc.), screen readers can skip over blinking text. (For those of use who plain old dislike the `<BLINK>` tag, there’s a nice irony that using it to attempt to call attention to something can lead to that something being completely overlooked.)

### Offer Alternatives to Multi-Column Layouts

HTML `<TABLE>`s are a valuable tool for arranging information on a screen, and I have advocated their use since they became part of the standard HTML. They have their limitations, though, when screen readers attempt to read them.

As noted in last month’s BITS article, screen readers are generally designed to be used with a variety of different programs, not just browsers. Hence, they read what is displayed on the screen, not the underlying HTML. To do this, they read across the screen, one line at a time. This leads to problems with multi-column displays such as the following:

Variations in font size should be handled with care. And then, of course, there's the similarly handled with care. persistently non-standard <BLINK> tag. One commonly cited example is a line that uses a larger font size for initial capital letters (it's annoying, unprofessional, etc.) screen in a title. Screen readers can ... readers can skip over the blinking ...

Although it's generally fairly easy for sighted readers to distinguish between the two columns, a screen reader would read it as "Variations in font size should and then, of course, there's the similarly handled with care persistently non-standard," etc.

For short tables, this isn't always a problem. A table such as the following would still make sense even if it weren't as nicely aligned without the table:

Year 2000 Testing Checklist

- Before the test:
1. Stop any pending processes.
  2. Shut down and reboot the system.
  3. Perform a complete backup.
  4. For multi-user systems, set the system for single-user mode.
  5. Disallow logins during the test.

- After the test:
1. Stop any pending processes.
  2. Shut down and reboot the system.
  3. Set the date correctly.
  4. Restore from the complete backup.
  5. Allow logons.

Markup tips: For short, simple tables such as the above, there are two tricks to making sure it can be read. First, set <TR VALIGN=TOP> for each of the rows, so that the headings in the first column don't align with the middle of the lists. And second, set <TD NOWRAP> for the longest of the first-column headings ("Before the test" in the example). This ensures that enough space is provided for the first column to keep those lines from wrapping.

Also note that the internal markup used in the above example (e.g., <OL> lists) will cause the content to display meaningfully on browsers that don't support tables. Although this level of backward compatibility is less important than it was 22 months ago, please refer to the February 1996 BITS article "Tips on Writing HTML <TABLE>s" for further discussion of how to write tables for portability.

The above example works with screen readers only because (a) line wraps are prevented in the first column, which is convenient when possible but not always feasible, and (b) the structure is simple and linear. Wrapping text in the first column and more complex data arrays both lead to problems that require alternative presentations.

The easiest alternative presentation is to simply make a copy of the page and then strip out the table markup from it. If the table contains the internal portability markup described above, then stripping the table markup is generally all that is needed. Lists that appeared side-by-side will now be arranged above and beneath each other, and screen readers will be able to make sense of them. A link to the alternative version from the top of the original page will notify users that the other version is available before they get bogged down in information their tools can't make sense of.

This type of simple alternative is the approach I use, for example, for the Information Architecture Project's home page (along with stripping the graphics out of the alternative version). The advantages of the approach are that it's easy to set up, it's structurally identical to the original page, and all its links work because they're the same links the original page has. Disadvantages include the need to do any editing/updating twice, once for each version, and the fact that it isn't adequate for more complex data arrays.

Consider, for example, a table such as the following:

IA Web Space Activity: Q3/4 1997

Month	Hits	Visitors	New	Return
July	12,881	4,062	2,207	1,855
August	11,906	3,862	1,909	1,953
September	9,918	3,060	1,789	1,271
October	13,285	4,071	2,325	1,746

The problem in this case isn't that the information is difficult for a screen reader to read, but that it is difficult to make sense of without being able to read vertically as well as horizontally. When a sighted user looks at the third column of numbers for September, it's easy to glance up and see that the number refers to the "New" visitors. When a screen reader reads the same number, though, it will read the number in isolation, without the easy reference to the column head.

In cases such as this, the only fix is to rework the table to make the data more accessible. The following approach, for example, is readable and emphasizes the trends (which would be obscured if the primary arrangement were by month).

IA Web Space Activity: Q3/4 1997

Hits per Month:

July: 12,881; August: 11,906; September: 9,918; October: 13,285.

Visitors per Month:

July: 4,062; August: 3,862; September: 3,060; October: 4,071.

New Visitors per Month:

July: 2,207; August: 1,909; September: 1,789; October: 2,325.

Return Visitors per Month:

July: 1,855; August: 1,953; September: 1,271; October: 1,746.

Note how punctuation is used to indicate where each list item begins and ends.

As a final caveat to this section, I should note that there is substantial development activity for alternative output devices for HTML, which may eventually lead to screen readers and refreshable braille pads that can more successfully handle multi-column displays. For now, though, the alternative versions are frequently the only workable option, plus they offer the additional benefit of better support for individuals who prefer to use larger font sizes.

#### Tying It All Together

This is nowhere near a complete discussion of accessibility problems that can be encountered with text. Frames, for example, present similar problems to multi-column tables; scrolling marquees are just as inaccessible as blinking text; forms frequently need text-only alternatives that can be filled

out separately and e-mailed (because current screen readers "see" nothing in form input areas); audio files need text transcriptions for people with limitations of hearing, software, or bandwidth; and more. Hopefully, though, the above examples serve to illustrate the types of problems that are encountered and the nature of solutions that are available. (For resources that provide further information on the additional accessibility issues, please refer to the end of this article.)

Surrounding all the specifics is the more general issue of how to make a Web site as a whole work consistently within itself to promote accessibility. It's not just a matter of getting readable materials out there; it's also a matter of making them easy to find. Here are a few general tips:

1. Remember that not everything requires an alternative page. If a page with images still has its content available without the images loaded, then there is no need for a text-only page. If multi-column tables still read meaningfully when read left to right, one line at a time, then there is no need for a non-table alternative.

2. Define the scope of the Web space that needs to be accessible. In general, the larger the potential audience is, the more important accessibility becomes. If access is provided to the world at large, then accessibility gains importance through the sheer number of people encountering one or more physical or technical barriers. If access is restricted to a limited team of identified individuals, then accessibility can be tailored to those people. Remember, however, that tailoring a Web area to suit an identified group of people is very different from using the Web area to place restrictions on who can join that group. (Hawking, Euler, Comforth—who wouldn't we welcome to our team?)

3. Make alternative pages available from the top of non-accessible original pages. Let the user know there is an alternative available before he or she encounters potential confusion on the original page. Also, put the link in a consistent place, so that when a user doesn't see it, he or she can know it isn't available and there is no need to look for it.

4. If you use D-links (as described last month), use them consistently whenever they're needed but don't use them when a short ALT description is adequate. That way the user can know that when a D-link isn't present he or she doesn't need to look for the longer description. (Note that the W3C HTML 4.0 Working Draft includes a LONGDESC attribute for images that may eventually supersede the D-link.)

5. Provide links from alternative pages back to the original pages. Indexing robots will list the alternatives along with the originals, so some people may use the alternative pages as entry points.

6. Whenever you do provide an alternative page or a long description for an image, consider including a link to a description of your accessibility practices and conventions. This can help the user know what to expect throughout your Web site.

7. Don't clutter things up with unneeded, excessive, or meaningless descriptions (e.g., "This is a horizontal bar that separates the text before it from the text after it with a bright, cheerful rainbow effect"). Such excess slows down screen readers and braille pads, resulting in less accessibility instead of more.

8. For accessibility, prefer HTML over other formats. Adobe, for example, has software that improves the accessibility of PDF, converting it into a more easily read form, but PDF by its nature remains essentially a page-rendering format instead of a content-description format. HTML, by contrast, is an SGML language that has been designed from its outset to promote accessibility (notwithstanding certain vendor extensions that work counter to this goal).

9. Keep the HTML standard. Refer to IA-5815: Laboratory Standard HTML for Information Architecture guidelines on which standard markup is supported by multiple browsers.

Finally, test the pages, as always, with multiple browsers on multiple platforms at multiple screen resolutions and color depths. The World Wide Web is a big audience with all sorts of tools, capabilities, limitations, and talents. The better we serve it, the better served we all are.

#### Additional Information

As mentioned in last month's article, the following are a few of the many source materials that provide valuable information on promoting accessibility:

- "Unified Web Accessibility Guidelines," Vanderheiden, et al.,  
<http://trace.wisc.edu/HTMLgide/htmlgide.html>
- W3C Web Accessibility Initiative, Daniel Dardailier, lead,  
<http://www.w3.org/WAI/>
- "Accessible Web Space Design," Starling Access Services,  
<http://www.igs.net/~starling/acc/actoc.htm>
- Web Page Accessibility Self Test, Public Service Commission of Canada,  
<http://www.psc-cfp.gc.ca/dmd/access/welcome1.htm>

If you would like further information about the Information Architecture project in general, including other activity areas we are working on, please visit our home page at <http://www.lanl.gov/projects/ia/> (or look under "What's New" from the Laboratory internal home page). If you would like further information about our IA General Internet/WWW activity area, please visit its page at <http://www.lanl.gov/projects/ia-lanl/area/web/> (access restricted to Laboratory machine addresses). If you would like printed or e-mail copies of any of the IA materials, please contact me at the address below.



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## Research Library Training

The LANL Research Library provides training for using its specialized databases. Training sessions begin and end at times indicated below. Classes are free but you must preregister by calling the Research Desk at 7-5809 or sending e-mail to [library@lanl.gov](mailto:library@lanl.gov). Special classes and orientations can also be arranged.

<b>Date</b>	<b>Time</b>	<b>Subject Matter</b>
12/3/97	1:00 - 1:30 p.m.	Finding Addresses and Phone Numbers on the WWW
12/4/97	2:00 - 4:00 p.m.	InfoSurfing: Basic Web Searching Strategies
12/10/97	1:00 - 1:30 p.m.	Environmental Resources on the WWW
12/11/97	1:00 - 1:30 p.m.	BIOSIS at LANL
12/16/97	1:00 - 1:30 p.m.	GeoRef on the Web
12/17/97	1:00 - 1:30 p.m.	Finding Addresses and Phone Numbers on the WWW
12/18/97	2:00 - 4:00 p.m.	InfoSurfing: Basic Web Searching Strategies
1/6/97	1:00 - 1:30 p.m.	Research Library Catalog via the WWW
1/7/97	1:00 - 1:30 p.m.	Finding Addresses and Phone Numbers on the WWW
1/8/97	1:00 - 1:30 p.m.	Search Engines, Advanced Web Searching
1/8/97	2:00 - 4:00 p.m.	InfoSurfing: Basic Web Searching Strategies
1/13/97	1:00 - 1:30 p.m.	Introduction to Electronic Library Resources
1/15/97	1:00 - 1:30 p.m.	What the Report Collection Can Do for You
1/20/97	11:00 - 11:30 p.m.	MELVYL (U of CA specialized databases)
1/21/97	1:00 - 1:30 p.m.	Finding Addresses and Phone Numbers on the WWW
1/22/97	1:00 - 1:30 p.m.	BIOSIS at LANL
1/22/97	2:00 - 4:00 p.m.	InfoSurfing: Basic Web Searching Strategies
1/27/97	1:00 - 1:30 p.m.	Environmental Resources on the WWW

## Labwide Systems Training

The Customer Service Group (CIC-6) offers training for users of Laboratory information systems. The CIC-6 courses offer training for a variety of personnel including property administrators, group secretaries, training coordinators, budget analysts, group leaders, or anyone needing to access training records, property records, costs, employee information, travel, chemical inventories, etc. Refer to the table below for specific information about courses currently offered.

You must have a valid ICN password before taking any of the courses shown in the table. To register for a course, call the CIC-6 Training, Development, and Coordination section at 667-9559 or access our Web page. From the LANL home page, look under "Services/Computing at LANL/Training" or enter the URL: <http://www.lanl.gov:8010/computer-information/cic6/teampage.html>.

Course Title	Date	Time	Cost	Course Number
Employee Development System - Basic Training (EDS I)	12/3/97 & 1/7/98	8:30–12:00	\$375	Course #5289
The course provides hands-on instruction to request course enrollment, use the on-line course catalog, retrieve training transcripts, and assign EDS authorities. The student will learn to create courses, add students to the courses, and generate several training reports.				
Employee Development System - Training Plans (EDS II)	12/18/97 & 1/21/98	8:30–12:00	\$375	Course #7155
Participants receive hands-on instruction to create and maintain training plans, assign assignment codes, and generate training plan reports. Attendees must have prior training in the Employee Development System.				
Eudora Electronic Mail	TBA	1:30–3:30	\$200	Course #9762
This class is a hands-on class that teaches the participant how to use Eudora software to create, send, receive, and edit electronic mail messages. In addition to these procedures, the participant will learn what related settings mean and how to configure the system to meet his or her individual needs.				
Data Warehouse Basics	12/9/97 & 1/20/98	8:30–10:30	\$200	Course #11961
Students will receive hands-on training to generate standard reports and make quick queries from information in the data warehouse, a real-time collection of data tables from Laboratory financial, time-reporting, and personnel systems.				
Data Warehouse/ Financial Reporting	12/9/97 & 1/20/98	10:30–12:00	\$200	Course #11960
Prerequisite: Data Warehouse Basics. Students will receive hands-on training to generate standard financial reports and make on-line queries from information in the "data warehouse," a collection of data from Laboratory budgeting, accounting, and time-keeping systems.				
HTML Basics	12/2/97 & 1/13/98	8:30–12:00	\$375	Course #11605
Students will gain a basic understanding of HTML (Hypertext Markup Language), the language for the World Wide Web. Topics covered will be commands and standards, creating and editing documents, and authoring programs.				

Course Title	Date	Time	Cost	Course Number
HTML Tables	12/16/97 & 1/22/98	8:30-12:00	\$375	Course #11959
Students gain basic understanding of how to create various tables in HTML and new tags in HTML 3.0. Netscape-specific tags are also identified for clarity. Prerequisite: HTML Basics or permission of the instructor.				
Utilizing Netscape	TBA	8:30-10:30	\$200	Course #10961
Students gain basic understanding of the Internet, the World Wide Web, and Netscape as a browser to surf the Net. Topics covered are both Laboratory sites and open sites, along with practical uses of the Internet.				
Notes Basics 4.5	12/10/97	8:30-12:00	\$375	Course #9917
Participants receive hands-on computer instruction to learn to create and send Notes e-mail memos, fax documents, search on one or multiple databases, use views and folders, create nicknames and distribution lists, set defaults, create doclinks, send attachments, and replicate databases.				
Meeting Maker	12/2/97 & 1/7/98	1:30-3:30	\$200	Course #12395
Students learn how to create an address book, create personal groups, utilize the Auto-Pick feature, utilize e-mail integration with non-Meeting Maker users, and customize various Meeting Maker features.				
Reporting with Infomaker	1/29/98	8:30-5:00	\$650	Course #11054
Hands-on training to query data and develop ad hoc, or non-standard, reports from the LANL data warehouse using Infomaker software.				
Time and Effort System (GUI)	12/16/97 1/21/98	8:30-10:30 1:30-3:30	\$200	Course #11018
The student will learn how to enter attendance, amend attendance, approve attendance, and submit exception and approval reports. Time codes and associated policies will be discussed. The student will also learn how to use the Information Manager utility to view and print reports.				
Travel	12/9/97 1/28/98	1:00-4:30 8:30-12:00	\$375	Course #12091
Hands-on training to submit and approve travel requests and expenses in the new Travel System which replaces the TRIPS on-line system and the post-travel expense worksheets.				

## Advanced Technical Computer Training

The Customer Service Group (CIC-6) supports advanced technical training in computing areas such as programming languages, system administration, networking, and World Wide Web development tools. The support provided by CIC-6 can be as limited as providing the appropriate facilities for a specific group or as extensive as coordinating training functions such as system administration, vendor acquisition, EDS administration, and class facilitation. The table below lists classes that are either currently being offered or are available on request. An expanded list of classes that are potentially available can be viewed on the Internet at <http://www.lanl.gov:8010/computer-information/ComputerTraining/Vendor.html>. To request registration in any course or for general assistance, please contact the CIC-Division Advanced Technical Computer Training Coordinator at (505) 667-9399 or send e-mail to [cic6-train@lanl.gov](mailto:cic6-train@lanl.gov). \*Cost per student will vary depending on the total number of students enrolled in the class.

Course Title	Date	Cost	Course Number
C++ for Experienced C Programmers	3/2-6/98	\$1800-\$2300*	9050
Prerequisite(s): Excellent C Language programming skills. Topics Include: Major Differences and Additions to ANSI C; Building C++ Classes; Introduction to Text I/O with C++; Function Overloading; Single Inheritance; Virtual Functions; Multiple Inheritance; Operator Overloading; Creating, Initializing and Assigning Objects; Passing and Returning Objects; Templates, Parameterized Functions and Classes; C++Stream I/O with the File System; and C++ Course Summary.			
C-Shell Programming	Available on Request (5 days)	\$1800-\$2300*	4790
Prerequisite(s): Knowledge of basic Unix commands and the ability to use basic programming constructs, such as variables and loops, to write simple programs in at least one programming language. Topics Include: Use Local and Environment Variables; Use Shell Metacharacters and Redirection; Perform Basic String Manipulations and Integer Arithmetic; Use Aliases, History, and Exit Status to Determine if a Command Succeeded or Failed; Employ Flow-Control Constructs (Branching and Loops); Customize the .cshrc and .login Start-up Scripts and the Search Path and Prompt; Create and Debug C-Shell Scripts; Create a C-Shell Script That Interacts With Users, Accesses Command-Line Arguments, Returns an Exit Status, and Makes Decisions Based on Numeric Comparison, String Comparison, or Command Exit Status.			
IDL 5.0 Graphic Object Workshop	4/14-16/98	\$1100-\$1400*	
Prerequisite(s): Completion of Foundations of IDL Programming course or equivalent knowledge and experience. Topics Include: IDL Objects (Object Inheritance and Encapsulation, Object Methods, Creating and Destroying Objects, and Memory Tricks); IDL Object Graphics Workshop - Building an IDL Object Graphics Application (Building an Object Graphics Hierarchy, View-Model Hierarchy and Container Objects, Graphics Atoms [Plot, Surface, Image, Polygon, Polyline], Positioning and Rotating Objects in 3D Space, Light Sources, Color Models - RGB vs. Indexed, System Fonts and 3D Text, Texture Maps, Creating Contours with Object Graphics, IDL Pointers to Pass Data, Using IDL Draw Areas for Object Graphics, Implementing Background Tasks, Bulletin Board Base to Change Object Properties, WYSIWYG Printing, and Helper Objects [Annotations]); and Linking IDL with Other Languages (Call_External, Linkimage, and Callable IDL).			
Java Programming	3/30-4/3/98	\$1800-\$2300*	11686
Prerequisite(s): Students must have the ability to create compiled programs using an advanced language (such as C or C++) and the knowledge to use basic Solaris commands and a World Wide Web browser (such as Mosaic or Netscape). Topics Include: Using the Java Programming Language to Create Java Applications and Applets; Defining and Describing Garbage Collection, Security, and the Java Virtual Machine; Describing and Using the Object-Oriented Features of the Java Language; Developing Graphical User Interfaces in Java, Taking Advantage of the Various Layout Managers Supported by Java; Describing and Using the Java 1.1 Delegation			

Course Title	Date	Cost	Course Number
Java Programming (continued)			
	Event Model; Using Java Windowing Components, Including Mouse Input, Text, Window, and Menu Components; Using Java Exceptions to Control Program Execution and Define Custom Exceptions; Using the Advanced Object-Oriented Features of the Java Language, Including Method Overriding and Overloading, Abstract Classes, Interfaces, Final and Static, and Member and Field Access Control; Using Java to Perform File Input/Output; Using Java's Built-In Threading Model to Control the Behavior of Multiple Threads; and Using Java to Access Servers and Clients Through Sockets.		
SGI Network Administration	4/20-24/98	\$1800-\$2300*	11690
	Prerequisite(s): Completion of Silicon Graphics System Administration (Beginning) course or equivalent knowledge and experience. Topics Include: Networking Fundamentals; Network Configuration; Network Troubleshooting; Resource Management with Network; Information Services; Domain Management with Domain Name System; Electronic Mail with Sendmail; Remote File Sharing with Network File System & Automounter; Network Performance Monitoring; and Network Security.		
SGI Performance Evaluation and System Tuning for Origin2000 and Onyx2	1/5-9/98	\$1800-\$2300	
	Prerequisite(s): SGI system administration experience. Topics Include: Kernel Debugging and Configuration, CPU, Memory, Swap, and Disk Tuning Techniques; Performance Analysis Methodology; Analysis of System's Hardware Configuration; Analysis of System's Software Configuration; Performing System Analysis; Monitoring System Usage; Application Tuning; Filesystem Tuning; CPU Tuning; Filesystem Buffer Cache and Tuning; Memory Management and Tuning; NUMA-Specific Memory Management and Tuning; Workload Management and Tuning; and Miser and Tuning.		
SGI ProDev Workshop	2/17-20/98	\$1400-\$1800	12895
	Prerequisite(s): C, C++, or Fortran77 Programming experience. Topics Include: Silicon Graphics C, C++, and Fortran77 (not Fortran90) Compiler Environment Including Compiler Use and Compiler Flow; Customizing the ProDev Environment Including Changing Color Schemes, Using the Source View, File Browser, Silicon Graphics Help, and Graphical View; Using UNIX Regular Expressions; Writing Simple Make(1) Files; Using the Build Manager Tools to Compile Programs; Using the Static Analyzer to Create Filesets and Databases and to Make Queries; Setting Traps (Breakpoints) and Looking at Data Using the Debugger; Setting Fast Watchpoints; Using the Fix+Continue Feature to Debug and Prototype Changes; Profiling Your Code and Determining Resource Usage Using the Performance Analyzer; Doing Heap and Memory Fragmentation Analysis Using Heap View; Determining the Coverage of Your Software Tests with Tester; Tuning Your C, C++, and Fortran77 Code for Silicon Graphics; and Tuning Your Code for Memory and I/O Bottlenecks.		
SGI System Administration (Beginning)	1/26-30/98	\$1800-\$2300*	11688
	Prerequisite(s): Familiarity with using Silicon Graphics IRIS workstations and system administration procedures on other open system platforms. Topics Include: The Role of the System Administrator; Set Up and Configuration of an IRIS Workstation or Server; Supporting a Group of Silicon Graphics Users; System Security Maintenance; Backups and Recoveries; Configuration of Disk Drives; System Installation and Application Software; Attaching Terminals and Printers; Modifying the system Start Up and Shut Down Sequences; Automating Administrative Procedures; and Performing Basic System Troubleshooting.		
SGI System Administration (Advanced)	2/23-27/98	\$1800-\$2300*	11689
	Prerequisite(s): Completion of Silicon Graphics System Administration (Beginning) course or equivalent knowledge and experience. Topics Include: System Error Monitoring; Kernel Reconfiguration and Debugging; System Monitoring Tools; Process Management; MultiProcessor CPU Management; Memory Management and Tuning; Swap Management and Tuning; Disk Management and Tuning; XPS Filesystem Management; and System Security Concepts.		

Course Title	Date	Cost	Course Number
Solaris 2.X System Administration (Beginning)	3/16–20/98	\$1800–\$2300*	7477
Prerequisite(s): Knowledge of Unix commands and an editor. Topics Include: Custom Install a Solaris 2.X Server; Use the Solaris 2.X Device Naming Conventions; Use the Format Utility to Display Partition Information; Change System Run Levels; Add Startup Files for Additional Services; Add and Remove Software Packages; Add Peripheral Devices, Configure Terminals and Modems; Administer Disks and File Systems; Configure NFS to Support the Client-Server Environment; Use the Automounter; Add and Remove Diskless Clients; Back Up and Restore File Systems; Perform Basic Recovery and Troubleshooting Procedures; and Use Scripts to Configure and Administer the NIS+ Environment.			
Solaris 2.X Network Administration	6/8–12/98	\$1800–\$2300*	8107
Prerequisite(s): Completion of Solaris 2.X System Administration (Beginning) class or equivalent knowledge and experience. Topics Include: TCP/IP Networking Model's Major Protocols; Monitor Network Traffic; Monitor and Control the Address Resolution Protocol Cache; Set Up, Configure, and Manage a Sun Internet Router with Subnets; Identify the Differences Between TCP and UDP; Manage Client-Server Transport Layer Communications; Configure and Maintain RPC-Based Applications Support; Describe Common Applications, Systems, and Network Bottlenecks; Test and Monitor System, Disk, and Network Loads; Use Monitoring Commands to Find Performance Bottlenecks; Set Up and Maintain a Simple Domain Naming Service (DNS) Environment; Set Up a Jumpstart Automated Network Installation Server; Identify Sendmail Functionality and Configuration; Install a Mail Server; and Install UUCP Between Existing Solaris 2.X Systems.			
UNIX (Basic)	2/17–20/98 (mornings)	\$400	5267
Prerequisites: Basic computer literacy (knowledge of the keyboard and mouse) are helpful. Topics: Getting Started; UNIX File System; Editing with VI; Manipulating Files; Using C-Shell Features; Customizing Your Environment; Navigating the Network; Job Control; Generic UNIX E-mail; and Electronic Mail Registration (EMR).			
UNIX (Advanced)	3/10–13/98 (mornings)	\$400	12972
Prerequisites: The Basic Unix class or equivalent knowledge. Topics: File Manipulation; File Reorganization; Network File System Concepts; Introduction to C-Shell Scripts; Conditional Execution; Shell Programming; The Korn Shell; Korn Shell Script Features; and SED Filtering Tool.			
UNIX and Windows NT Integration	Available on Request (4 days)	\$1400–\$1800	14608
Prerequisite(s): Familiarity with Unix and NT network administration and TCP/IP protocols is useful. Topics Include: Common NOS Characteristics; Comparing the Operating Systems; Developing an Integration Strategy; Identifying Elements to Integrate; Integrating Protocols; Optimizing Protocols in the Enterprise Environment; Administering IP Addresses; Network File System (NFS); Server Message Block (SMB); Printing Across the Enterprise; Configuring User Accounts; Application Support; Remote System Administration; Resolving IP Addresses; IP Routing; Running Diagnostic Utilities; and Resolving Network Problems.			
Windows NT Security	Available on Request (5 days)	\$1800–\$2300*	14611
Prerequisite(s): Windows NT 4.0 Workstation and Server class (EDS # 12729) or equivalent knowledge and experience. Topics Include: An Overview of Security Objectives; Developing a Windows NT Security Policy; Trusted Computing Base (TCB); Microsoft's Security Commitment; Practical Implications of C2 Security; The NT Security Subsystem; NT Security Components; Planning Domains; Managing Accounts and Groups; The Windows NT Server and its Registry; Setting Up Shared Resources; Basic ACLs for Files and Directories; Controlling Access; Mechanics of Auditing; Common Auditing Scenarios; Tracking Applications with Security Logs; Protecting Your Network from Hostile Intruders; Securing Microsoft IIS; Implementing Firewalls; Thwarting the Threat from Within; and The Evolution of Windows NT Security.			

# INTEGRATED COMPUTING NETWORK (ICN) VALIDATION REQUEST

**Instructions:**

- (1) Complete all parts of this form that apply to you. Please take note of the "Special Requirements" section and complete any applicable parts.
- (2) Manager (Group Leader or above) authorization and signature are required for all validation requests.
- (3) Before submitting this request, ensure that your Employee Information System (EIS) information is current.
- (4) Once completed, either mail this request to the Password Office at MS-B251, fax it to (505) 667-9617, or, if you are cleared, handcarry it to TA-3, SM-200, Room 257.

If you have **questions** call (505) 665-1805 or send e-mail to [validate@lanl.gov](mailto:validate@lanl.gov)

**Owner Information**

Z-Number (if you have one)		Name (last, first, middle initial)	
LANL Group	Phone Number	LANL Mail Stop	Citizenship (Foreign National see "Special Requirements-Foreign National")

<p><b>Check LANL affiliation:</b></p> <p><input type="checkbox"/> LANL employee</p> <p><input type="checkbox"/> Contractor _____ (specify contract company)</p> <p><input type="checkbox"/> External user _____ (specify employer)</p> <p><input type="checkbox"/> Other (specify) _____</p>	<p>Send password / smartcard to:</p> <p><input type="checkbox"/> Mail Stop    or    <input type="checkbox"/> Mail to address indicated below</p> <p>Name / Organization _____</p> <p>Address _____</p> <p>City, State, Zip Code _____</p>
--	---

**Access** Check access method and needed partitions:

<b>Access method:</b>	<input type="checkbox"/> ICN Password	<input type="checkbox"/> Smartcard	<input type="checkbox"/> Both
<input type="checkbox"/> Open partition (e.g., open machines, or for dial up access)			
<input type="checkbox"/> <b>Administrative</b> partition (e.g., Travel, Data Warehouse, IA [BUCS, Stores], IB [EIS, FMIS, PAIRS]) If you are not a cleared LANL employee, see required steps in section "Special Requirements-Administrative Partition".			
<input type="checkbox"/> <b>Secure</b> partition (i.e., secure machines) A Q-clearance is required for secure access. After obtaining Manager signature for Secure access, handcarry this form to the Password Office to obtain your Secure account.		<p>I certify this person does require <b>secure</b> access:</p> <p>_____</p> <p>Manager Signature (Group Leader or above)                      Date</p>	

**Password Office Use Only**

New <input type="checkbox"/>	Change <input type="checkbox"/>	Clearance Status	Processed	Lv	Smartcard Serial #
Comments:					

cut along dashed line

## Special Requirements

<b>Administrative Partition</b> Lab-Wide Systems (e.g., Travel, Data Warehouse, IA [BUCS, Stores], IB [EIS, FMIS, PAIRS])	
<input type="checkbox"/> Under 18 years of age	If you need to access Administrative systems, your Group Leader must provide a memo accepting responsibility for your actions and justifying your need for access. This memo is to accompany all forms taken to the security briefing (see "Contractor or Non-Cleared") section below. You may not access the Secure Partition.
<input type="checkbox"/> Contractor or Non-Cleared	Phone (505) 665-4444 (option #2) to obtain Access Authorization packet. Phone (505) 667-9153 to schedule a security briefing.  Bring all forms including this ICN Validation Request to the security briefing for approval.
CIC-6 Security Briefing Approval Signature	Date

<input type="checkbox"/> Foreign National	Attach a copy of Form 982 (REQUEST FOR UNCLASSIFIED VISIT OR ASSIGNMENT BY A FOREIGN NATIONAL) with all approval signatures. Be sure Box #11 of Form 982 is completed. If you are not a visitor/assignee under a LANL/DOE approved Visit / Assignment Request, attach written justification from your host Group Leader or Division Director describing your need to access the ICN.
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<b>Authorization (required)</b>			
Print Manager Name (Group Leader or above)	Manager Z-Number	Group	
Manager Signature (Group Leader or above)	Mail Stop	Date	
If you are NOT a LANL employee you must have a LANL contact and obtain the contact's signature in addition to the contact's manager's signature.			
<b>LANL contact: Read the following and sign below.</b>			
By signing this form I affirm that I understand and accept the following:			
a. I am a regular Laboratory employee.			
b. I am responsible for forwarding password reauthorizations and verifying annual account reauthorizations for this user.			
c. I am responsible for notifying the Password Office within 10 days of changes in my status.			
d. I am responsible for notifying the Password Office immediately of changes in this user's status (termination, end of contract, etc.).			
Print LANL Contact Name	Contact Z-Number	Phone Number	Group
LANL Contact Signature	Mail Stop	Date	

NOTE: All Laboratory computers, computing systems, and their associated communication systems are for official business only. By completing this validation request and signing for a password and/or smartcard, you agree not to misuse the ICN. The Laboratory has the responsibility and authority to periodically audit user files.

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