



[LISA '98]

December 6-11, 1998

12th Systems Administration Conference

Marriott Copley Place Hotel, Boston, Massachusetts

SAVE.
Register by October 30

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Goldman Sachs & Co.

PROGRAM CO-CHAIR: Rob Kolstad

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Important Dates to Remember:

Early Registration Savings Deadline: Friday, October 30, 1998

Hotel Discount Deadline: Monday, November 16, 1998

Program at-a-Glance

Saturday, December 5

On-Site Registration 5:00 pm – 9:00 pm

Sunday, December 6

On-Site Registration 7:30 am – 5:00 pm

Tutorial Program 9:00 am – 5:00 pm

Conference Orientation 6:00 pm – 7:00 pm

Monday, December 7

On-Site Registration 7:30 am – 5:00 pm

Tutorial Program 9:00 am – 5:00 pm

Global-LISA Workshop 9:00 am – 5:00 pm

Tuesday, December 8

On-Site Registration 7:30 am – 5:00 pm

Tutorial Program 9:00 am – 5:00 pm

Advanced Topics Workshop 9:00 am – 5:00 pm

Birds-of-a-Feather Sessions 7:00 pm – 11:00 pm

Wednesday, December 9

On-Site Registration 7:30 am – 6:00 pm

Keynote Address 9:00 am – 10:30 am

Refereed Papers 11:00 am – 5:30 pm

Invited Talks 11:00 am – 5:30 pm

Practicum 11:00 am – 5:30 pm

Products Exhibition 12:00 pm – 7:00 pm

Reception in Exhibit Hall 5:30 pm – 7:00 pm

Birds-of-a-Feather Sessions 7:00 pm – 11:00 pm

Thursday, December 10

On-Site Registration 7:30 am – 5:00 pm

Refereed Papers 9:00 am – 5:30 pm

Invited Talks 9:00 am – 5:30 pm

Practicum 9:00 am – 5:30 pm

Products Exhibition 10:00 am – 4:00 pm

SAGE Meeting/Candidate Forum 5:30 pm – 6:30 pm

Reception 6:30 pm – 7:30 pm

Birds-of-a-Feather Sessions 7:00 pm – 11:00 pm

Friday, December 11

Refereed Papers 9:00 am – 5:30 pm

Invited Talks 9:00 am – 5:30 pm

Practicum 9:00 am – 5:30 pm

An Invitation from the Program Chairs



“Learn to take advantage of the unique and innovative methods that sysadmins from around the world are using to manage their large scale systems”

Dear System Administrator:

As technology advances at breakneck speed, it is increasingly difficult to stay current in the broadening field of systems administration. Join other members of the professional systems administration community for the 12th LISA Conference. LISA '98 features three days of tutorials, workshops, and three days of multiple tracks where you can learn to take advantage of the unique and innovative methods that sysadmins from around the world are using to manage their large scale systems.

The highly acclaimed LISA tutorial program spans the spectrum of sysadmin interests. There are tutorials geared for novice to advanced audiences. Pick and choose among the 36 tutorials offered over three days.

The LISA Refereed Papers Track features papers on topics ranging from security and networking through managing system configuration to new theories in self-managing systems. The Invited Talks Track has many engaging speakers discussing both emerging technological areas as well as information of immediate practical use. And, as usual, we will have the Guru is IN, Works-in-Progress and

Birds-of-a-Feather Sessions. The Exhibition, with over 100 providers of sysadmin products and services, is larger than ever.

LISA '98 will be the first to include the “Practicum” track, which is an eclectic potpourri of highly pragmatic presentations. Co-Chair Rob Kolstad and his committee have selected speakers chosen for their expertise and outstanding speaking ability. This track promises to be a superb addition to the LISA tradition of excellence and communication.

You might also be interested in attending the Global-LISA or Advanced Topic Workshops—see pg. 18 for details.

Over the years, the participation at LISA has grown in both size and scope. Please join us for a great time in Boston on December 6–11, 1998 with tutorials, workshops, presentations, and camaraderie.

For the LISA Organizing Committee,

Xev Gittler, *Goldman Sachs & Co.*
Program Co-Chair

Rob Kolstad
Program Co-Chair

QUESTIONS?

Email: conference@usenix.org

Phone: 949.588.8649 Fax: 949.588.9706

Updates: www.usenix.org/events/lisa98/

Tutorial Program

Sunday–Tuesday, December 6–8, 1998

UNIX has expanded its tutorial program to deliver the critical information you need. Delivered by experts, tutorials are intensive, practical, and essential to your professional development.

Sign up for tutorials and you'll get an immediate payoff by gaining command of the newest developments and putting them to work in your organizations.

Register now to guarantee your first choice—seating is limited.

Tutorial fees include:

- Admission to the tutorial(s) you select
- CD-ROM—including tutorials and conference proceedings
- Admission to the Products Exhibition
- Lunch

Tutorial Program at-a-Glance

Sunday, December 6	S1 New Administering Windows NT: A Course for UNIX People	S2 System and Network Performance Tuning	S3 Internet Security for UNIX System Administrators	S4 New Learning Perl (Bring Your Own Laptop)	S5 Linux Systems Administration	S6 Setting Up And Administering A Web Server	S7 New Secure Communications over Open Networks	S8 Sendmail Configuration and Operation (Updated for Sendmail 8.9)	S9 Network Security Profiles: What Every Hacker Knows About You and How They Do It
Monday, December 7	M1 Topics in System Administration	M2 New Designing Resilient Distributed Systems—High Availability	M3 UNIX Security Tools: Use and Comparison	M4 New Learning More Perl (Bring Your Own Laptop)	M5 Windows NT Security	M6 New Computer Attacks: Trends and Counter-measures	M7 New Advanced Solaris System Administration Topics	M8AM New Ethics for Systems Administration	M9AM New Introduction to Domain Name System Administration
							M11PM New Setting up and Maintaining a Secure Web Server	M12PM New Intermediate Topics in Domain Name System Administration	
Tuesday, December 8	T1 New Hot New Topics in Modern System Administration	T2 Updated Advanced Topics in DNS and BIND	T3 Troubleshooting Firewalls	T4 CGI and WWW Programming in Perl	T5 Handling Computer and Network Security Incidents	T6 New Configuring Cisco Routers on an IP Network	T7 New Computer and Network Security—A Multi-dimensional Approach	T8AM New SPAM—What You Can Do To Limit Your Intake	T9AM New Faster Gigabit Ethernet Networks, File Servers, and Users
							T11PM New Configuring Samba: Avoiding Pitfalls	T12PM New How to Give Great Presentations	

For Registration form, see page 27.

Sunday, December 6

S1 Administering Windows NT: A Course for UNIX People NEW

Aleen Frisch, *Exponential Consulting*

Who should attend: UNIX system administrators who are also responsible for Windows NT systems (or who may become responsible for them at some point in the future). Students attending this class should be comfortable with general system administration concepts (file-systems, processes, user accounts, backups, and the like) as well as the major tools and procedures used to manage them on UNIX systems. A sense of humor will also be beneficial when initially approaching Windows NT.

The primary goal of this course is to help you apply what you already know about system administration under UNIX to the tasks and challenges of the Windows NT environment, in an effort to make that transition as easy and painless as possible. The course will include a variety of real-world examples and will focus on practical techniques and strategies for NT system administration. You can expect a very fast-paced, information-rich course.

Topics Covered:

- **A Walking Tour of a Windows NT Server**
 - The NT world view (WNT = ? VMS++)
 - The Client-Server System Model and its implications
 - Filesystem layout and essential system files
 - Processes under NT
 - Don't forget that it's a PC
- **Tools to Aid in NT System Administration**
 - What NT supplies
 - Commercial products and freely-available software
 - Making NT act like UNIX
- **Booting under Windows NT**
 - Normal startup and shutdown
 - Troubleshooting hints and strategies
 - Multi-OS system configurations
- **Managing User Accounts**
 - Mechanisms and procedures
 - NT groups
 - Security and user accounts
- **Disks and Filesystems on Windows NT systems**
 - The NTFS filesystem
 - Spanning disk partitions
 - Fault tolerance capabilities

- **Networking under NT: Connecting to UNIX and Other Systems**
 - What NT provides
 - NT and UNIX networks
 - Connecting to Windows systems
 - Filling in what NT is missing
- **Printing on and from Windows NT Systems**
 - Local printing
 - Printers and networks
 - Going to/from UNIX systems
- **Overview of Windows NT Security**
 - NT's view of system and network security
 - Controlling access to system resources
 - System monitoring and security

S2 System and Network Performance Tuning

Hal Stern, *Sun Microsystems, Inc.*

Who should attend: Novice and advanced UNIX system and network administrators, UNIX developers concerned about network performance impacts. A basic understanding of the UNIX system facilities and network environments is assumed.

We will explore procedures and techniques for tuning systems, networks and application code. Starting from the single system view, we will examine how the virtual memory system, the I/O system and filesystem can be measured and optimized. We'll extend the single host view to include Network File System tuning and performance strategies. Detailed treatment of networking performance problems, including network design and media choices will lead to examples of network capacity planning. Application issues, such as system call optimization, memory usage and monitoring, code profiling, real-time programming, and techniques for controlling response time will be addressed. Many examples will be given, along with guidelines for capacity planning and customized monitoring based on your workloads and traffic patterns. Question and analysis period for particular situations will be provided.

- **Performance Tuning Strategies**
 - Practical goals
 - Monitoring intervals
 - Useful statistics
 - Tools, tools, tools

Continuing Education Units (CEUs)

USENIX provides Continuing Education Units for a small additional administrative fee. Established by the International Association for Continuing Education and Training, the CEU is a nationally recognized standard unit of measure for continuing education and training, and is used by thousands of organizations across the United States. Each full-day tutorial, or two half-day tutorials, qualifies for 0.6 CEUs. You can request CEU credit by completing the CEU section on the registration form. USENIX provides a certificate for each attendee taking a tutorial for CEU credit, and maintains transcripts for all CEU students. CEUs are not the same as college credits. Consult your employer or school to determine their applicability.

S10
Introduction to UNIX Administration

M10AM
Managing Network Printers and Print Spoolers

M13PM New
Ethernet Technology: From Basics to State of the Art

T10AM New
Performance Monitoring and Tuning Under Windows NT

T13PM New
PC/UNIX Connectivity

■ Server Tuning

- Filesystem and disk tuning
- Memory consumption and swap space
- System resource monitoring

■ NFS Performance Tuning

- NFS server constraints
- NFS client improvements
- NFS over WANs
- Automounter and other tricks

■ Network Performance, Design and Capacity Planning

- Locating bottlenecks
- Demand management
- Media choices and protocols
- Network topologies: bridges, switches and routers
- Throughput and latency considerations
- Modeling resource usage

■ Application Tuning

- System resource usage
- Memory allocation
- Code profiling
- Job scheduling and queueing
- Real-time issues
- Managing response time

S3 Internet Security for UNIX System Administrators

Ed DeHart, *Pittsburgh OnLine, Inc.*

Who should attend: UNIX system administrators, network managers, operations and support staff. You should have a good working knowledge of UNIX system administration, and be an experienced Internet user.

In this tutorial you will learn strategies and techniques to help eliminate the threat of Internet intrusions and to improve the security of UNIX systems connected to the Internet.

This tutorial will also help you understand, set up, and manage a number of Internet services appropriate to your site's mission.

At the end of the day, you will be able to establish and maintain a secure Internet site that allows the benefits of Internet connectivity while protecting the organization's information. Topics will include:

- Latest information on security problems
- UNIX system security
- TCP/IP network security
- Site security policies

S4 Learning Perl (Bring Your Own Laptop) *NEW*

Tom Christiansen, *Consultant*

Who should attend: Programmers with previous experience either in a structured programming language, like C, C++, Pascal, Python, or Java, or else in a scripting language like the Bourne shell, Javascript, or Tcl. While some previous exposure to Perl is beneficial, it's not essential.

This is the first of two classes—"Learning Perl" (S4) and "Learning More Perl" (M4)—that were designed to be taken one after the other, although this is not a requirement.

Designed to be programmer-friendly and platform-neutral, Perl is a high-level, general-purpose programming language that makes easy things easy and hard things possible. Now moving into its second decade, Perl has become the language of choice across all platforms for programmers engaged in rapid prototyping, system utilities, software tools, system management tasks, database access, graphical and web programming. Perl programming is an essential skill for any system administrator or web programmer, and an important one for nearly everyone else.

Because Perl incorporates aspects of more than a dozen well-known UNIX tools, experienced UNIX programmers and administrators can come up to speed on Perl very rapidly. However, because Perl is portable to all major platforms, programmers and administrators everywhere will benefit from this high-powered tool.

Topics in this first full-day class include:

- Getting started with Perl, command-line switches
- Debugging, common beginner "gotchas"
- Control flow structures, such as loops and conditionals
- Strings and numbers
- Detailed description of basic data types (scalar, array, and hash variables)
- Key built-in functions and operators that act on these

Bring your own laptop: This course uses a new strategy: practical lab work is added to the traditional lecture format to reinforce the lectures. Students should bring their own laptop on which they can work through instructor-assisted lab exercises. Laptops should have Perl already installed on them, but no specific operating system is required. Detailed directions can be found on the web at:

www.perl.com/perl/training/byo-setup.html

S5 Linux Systems Administration

Bryan C. Andregg, *Red Hat Software, Inc.*

Who should attend: System administrators who plan to implement a Linux solution in a production environment. This course is designed to benefit both the novice Administrator and the guru. You should be familiar with the basics of systems administration in a UNIX/Linux environment: user level commands, administration commands and TCP/IP networking.

From a single server to a network of workstations, the Linux environment can be a daunting task for administrators knowledgeable in other platforms. Starting with a single server and finishing with a multi-server, 1000+ user environment, case studies will provide practical information for using Linux in the real world.

The following areas will be covered with a special emphasis on security:

- Installation features
- Disk partitioning and RAID
- Networking
- User accounts
- Services
- NFS and NIS
- High availability environments
- The workplace

By the end of the course, you should feel confident in your ability to set up and maintain a secure and useful Linux network. This tutorial will be conducted in an open manner that allows for questions to be asked and answered.

S6 Setting Up And Administering A Web Server

Bryan Buus, *XOR Network Engineering*

Who should attend: Administrators who are interested in creating a World Wide Web service for their company, or becoming their company's "Webmaster." The course is intended for people who have some knowledge of UNIX system administration.

The World Wide Web is the most widely used Internet service. Companies are quickly discovering that they need to be on the Web to provide information to customers and to keep up with the competition. This course describes how to set up and maintain a World Wide

Web server on a UNIX platform. The servers covered in the course include the popular and freely available Apache and NCSA Web servers (these servers own approximately 60% of the server market).

Topics covered include:

- The architecture of the Web
- The HTTP protocol
- Compiling the server
- Server configuration
 - Creating “Virtual Hosts”
 - Resource configuration
 - Access configuration
 - Per user access
- Analyzing and rotating logs
 - Making sense of Agent and Referrer Logs
- Web-related security issues
- Electronic commerce issues
- Security and the Web
 - Operating System, CGI, and software considerations
 - Setting up and configuring SSL (Secure Sockets Layer)
- Server performance issues
- Using multiple servers
- Detecting server problems

Setting up the Web server is only half of the battle. Understanding exactly how the protocol works, what performance issues are critical, what security implications are, and other nuances are just some of the important issues that all webmasters need to thoroughly understand. After completing this course, webmasters should have an in-depth understanding of their server environment and the critical issues surrounding ongoing maintenance.

S7 Secure Communications over Open Networks NEW

Marcus J. Ranum, *Network Flight Recorder, Inc.*

Who should attend: Programmers, network managers, and individuals that need to develop or deploy secure communication systems. Some experience with TCP/IP and UNIX is assumed.

People increasingly rely on electronic communications as a daily part of their private lives. Corporations rely on Internet services as essential tools for their business. At the same time, many of the tools being used lack even basic protections against snooping and tampering. To make matters more interesting,

governments are becoming concerned that civilian use of secure communications may threaten national security, and are pushing for various degrees of regulation.

This tutorial is intended to teach the experienced network and system manager how to build and deploy a wide range of secure communication tools. Tools are discussed within the overall context of communication security and appropriateness. Topics will range from the highly paranoid, including basic spycraft and covert channels, to the practical, such as building your own VPN router or operating PGP. We will cover actual configurations, set-up procedures, and command lines for software packages on BSD UNIX. Debugging and verifying operation will also be discussed.

Topics Include:

- The communications security environment
- Covert operations: Introductory Spycraft
- Absolute security: one-time-pads
- DES encryption
- E-Mail security: PGP
- Hiding communications: Steganography
- Virtual Private Networks: using SSH and IPSEC
- Privacy: anonymous remailers, anonymizer servers, and crowds
- Up and coming technologies
- The regulatory environment
- Where to get crypto-munitions

S8 Sendmail Configuration and Operation (Updated for Sendmail 8.9)

Eric Allman, *Sendmail, Inc.*

Who should attend: Systems administrators who want to learn more about the *sendmail* program, particularly details of configuration and operational issues (this tutorial will not cover mail front ends). This will be an intense, fast-paced, full-day tutorial intended for people who have already been exposed to *sendmail*. This tutorial describes the latest release of *sendmail* from Berkeley, version 8.9.

After introducing a bit of the philosophy and history underlying *sendmail*, this tutorial covers:

- The basic concepts of configuration: mailers, options, macros, classes, keyed files (databases), and rewriting rules and rulesets.

- Configuring *sendmail* using the M4 macro package.
- Day-to-day management issues, including alias and forward files, “special” recipients (files, programs, and include files), mailing lists, command line flags, tuning, and security.
- How *sendmail* interacts with the Domain Name System.

S9 Network Security Profiles: What Every Hacker Knows About You and How They Do It

Jon Rochlis and Brad Johnson, *SystemExperts Corp.*

Who should attend: Network, system, and firewall administrators; security auditors or audit recipients; people involved with responding to intrusions or responsible for network-based applications or systems which might be targets for hackers. Participants should understand the basics of TCP/IP networking. Examples may use UNIX commands or include C or scripting languages.

This course will be useful for people with any type of TCP/IP based system: whether it is a UNIX, Windows, NT, or mainframe based operating system or whether it is a router, firewall, or gateway network host.

There are common stages to network-based host attacks—whether it comes from the Internet, extranet, or intranet: reconnaissance, vulnerability research, and exploitation. This tutorial will review the tools and techniques hackers use in performing these types of activities. You will learn how to be prepared for such attacks by becoming familiar with the methods they use. Specifically, the course will focus on how to generate profiles of your own systems over the network. Additionally, it will show some of the business implications of these network-based probes.

The course will focus primarily on tools that exploit many of the common TCP/IP based protocols (such as WWW, SSL, DNS, ICMP, SNMP) which support virtually all of the Internet applications, including web technologies, network management, and remote file systems. Many topics will be addressed at a detailed technical and administrative level. This course will primarily use examples of public domain tools because they are widely available and commonly used in these situations.

Topics will include:

- Review of attack methodology: reconnaissance, target selection, and exploitation
- Profiles: what does an attack look like
- Techniques: scanning, CERTs, TCP/IP protocol “mis”uses, denial of service, and hacking clubs
- Tools: *scotty*, *strobe*, *netcat*, SATAN, ISS, ToneLOC, SSLeay/upget, etc.
- Business exposures: integrity and confidentiality, audits, and intrusion resolution

S10 Introduction to UNIX Administration

Peter Galvin, *Corporate Technologies, Inc.*

Who should attend: Computer-literate students interested in learning UNIX administration. Some background *using* UNIX will be a plus.

This tutorial is designed to teach UNIX administration skills to those who are experienced with computers but new to UNIX administration. The course covers all of the essential system administration topics, and stresses professional methods of administration. It uses Solaris as the example operating system when exploring detailed examples.

Course Outline:

- The role of System Administration
- The UNIX file system
- User authorization and control
- System startup and shutdown
- Boot process and start-up files
- Installation
 - Installation from CD
 - Jumpstart
 - Patches
 - Installing layered software
- File system backups
- System tuning and process control
- Configuration and devices
- Devices
 - Device naming
 - Device creation
 - Troubleshooting SCSI problems
- Admintool
 - Printing
 - User management
 - Terminal configuration

- Networking, IP configuration
- NFS
- Security
- User services—mail, print, data transfer
- Monitor, manage, troubleshoot
- Performance monitoring tools

Monday, December 7

M1 Topics in System Administration

Trent Hein, *XOR Network Engineering;*

Evi Nemeth, *University of Colorado, Boulder*

Who should attend: System and network administrators who want to learn about real-life solutions to everyday problems.

Overwhelmed by the rapid change in the system administration field? Need to learn some *useful skills quickly*? This tutorial is a pot-pourri of learning about hot topics that will make you more effective in your role as a system administrator.

Topics include:

Squid cache—The *squid* Internet object cache is a very high-performance proxy caching system for web clients. When deployed correctly, it can drastically improve the performance of your network and reduce the need to purchase external bandwidth. We’ll talk about how to implement this hierarchical tool at your site in a practical manner.

Security packet filtering primer—All too often these days, the word “firewall” is used in a sentence. But what does it really mean, and how do you set up a packet filter list to implement a basic one? We’ll teach you the do’s and don’ts of creating a robust packet filter, and talk specifically about how to apply one in an environment using Cisco routers.

Bind 8.x—BIND, also known as *named* or the ‘DNS server’, has been changing to keep up with the times. Have you? We’ll cover the recent changes that have been made in BIND, as well as how to set the newest version up in your network.

6bone—Ready or not, here it comes. It’s time to start testing applications at your site that use the “next generation” IP protocol,

IPv6. Learn how you can set up a test bed and connect to the “6bone” to begin learning about IPv6 in a hands-on manner before it’s too late.

WAN Performance—Practically every site these days has a WAN—whether it be for Internet or Intranet. How do you measure the performance you’re getting from your WAN? We’ll introduce you to the basics of practical WAN performance monitoring.

M2 Designing Resilient Distributed Systems—High Availability NEW

Evan Marcus, *Veritas Software;*

Hal Stern, *Sun Microsystems, Inc.*

Who should attend: Novice and advanced UNIX system and network administrators, and UNIX developers concerned with building applications that can be deployed and managed in a highly resilient manner. A basic understanding of UNIX system programming, UNIX shell programming, and network environments is required.

This course will explore procedures and techniques for designing, building and managing predictable, resilient UNIX-based systems in a distributed environment. Hardware redundancy, system redundancy, monitoring and verification techniques, network implications, system and application programming issues will all be addressed. We will discuss the trade-offs between cost, reliability and complexity. Topics to be covered:

- What is high availability? Who does and does not need it?
- Defining uptime and cost; “big rules” of system design
- Disk and data redundancy; RAID and SCSI arrays
- Host redundancy in HA configurations
- Network dependencies
- Application system programming concerns
- Anatomy of failovers: applications, systems, management tools
- Planning disaster recovery sites and data updates
- Security implications
- Upgrade and patch strategies
- Backup systems: off-site storage, redundancy and disaster recovery issues
- Managing the system managers, processes, verification

M3 UNIX Security Tools: Use and Comparison

Matt Bishop, *University of California, Davis*

Who should attend: UNIX System, Network, and Security Administrators who need to better understand the various security tools currently available.

The goal of this course is to assist UNIX security administrators, and other interested users, in locating and using publicly available programs to improve the security of their system. This course will compare the uses and drawbacks of several different programs, with an emphasis on when to use which.

Topics include:

- Tool checking and analysis: what to look for, how to analyze a tool, checking downloaded tools for security problems
- Static analysis tools: file system auditing (*tripwire*, *binaudit*), more general analysis tools (*tiger*, *COPS*)
- Network analysis and security tools: monitors (*tcp_wrapper*), probes (*strobe*), NFS and NIS analysis and testing tools (*nfsbug*, *nfswatch*), ISS, SATAN, Gabriel, Courtney
- Tools for privilege: managing shells (*osh*, *sudo*), shared account management (*lsu*)
- Tools for logging and log analysis tools (*swatch*, *logchecker*)
- Libraries (*mssystem*, *trustfile*)
- Tools for authentication: proactive password changers (*npasswd*, *passwd+*); password generation tools, challenge-response and one-time password techniques (*S/key*), password concealment and cracking tools (*shadow*, *crack*)

M4 Learning More Perl (Bring Your Own Laptop) NEW

Tom Christiansen, *Consultant*

Who should attend: This intensive course is designed for programmers who already have a basic working knowledge of Perl and want to learn more. Although the two classes “Learning Perl” (S4) and “Learning More Perl” (M4) were designed to be taken one after the other, this is not a requirement. The prerequisite for this class is understanding the topics taught in the “Learning Perl” (S4) course, which a few weeks playing around with Perl could also supply. See that course’s description for details.

Topics in this second full-day class include:

- Working with files and directories
- Binary I/O, formatted data, records
- Nested and multidimensional data structures
- References
- Detailed work on Perl regular expressions for pattern matching and substitution
- Writing user-defined functions
- Scoping issues
- Signal handling
- A light overview of packages, libraries, modules, and object-oriented programming in Perl

Bring your own laptop: This course uses a new strategy: practical lab work is added to the traditional lecture format to reinforce the lectures. Students should bring their own laptop on which they can work through instructor-assisted lab exercises. Laptops should already have Perl installed, but no specific operating system is required. Detailed directions can be found on the web at:

www.perl.com/perl/training/byo-setup.html

M5 Windows NT Security

Rik Farrow, *Consultant*

Who should attend: System and network administrators and programmers who work with NT systems and need to understand its security principles. Those accustomed to working with UNIX systems will benefit from the comparisons between UNIX and NT.

Windows NT is the result of an unusual marriage between disparate operating systems: a completely reworked replacement for DEC’s VMS and Windows 3.1. On the one hand, there are security features to satisfy the most avid control freak: centralized control over user accounts, file sharing, desktop appearance, fine grained object access, encryption, a security monitor, and auditing sensitive enough to capture most security related events. On the other hand, most programmers writing for NT have no concept of writing secure software for multiuser systems. After taking this tutorial participants will understand the complex security model of Windows NT which, when correctly configured, can make it reasonably secure.

This tutorial explains the security mechanisms in Windows NT, and how it can best be used to improve the security of networked NT systems. We will not only review NT’s security related GUT’s, we will go behind the scenes and discover the file and directory hierarchy of the trusted computing block, Web server (IIS), registry and event logs, and system files and libraries. Wherever possible we will explore the command line interfaces and tools for controlling and auditing security of NT systems. In this course you will learn about:

- The NT registry, a file system-like construct for storing device and application configuration, passwords, and other system values, all of which is protected by access control lists (ACLs);
- User accounts, local and global groups, rights, and privileges
- Domains, domain controllers, local and network authentication
- NT passwords, and collecting and cracking passwords
- ACLs for file, directories, and other objects
- NT’s event and audit mechanism
- Correct configuration of IIS, RAS, network services, and protecting NT systems with firewalls

M6 Computer Attacks: Trends and Countermeasures NEW

Tina Darmohray, *SystemExperts, Corp.*;
Phil Cox, *Networking Technology Solutions*

Who should attend: System and network administrators who implement or maintain networks and site managers charged with selecting and setting site security requirements. Familiarity with TCP/IP networking is a plus.

Many classic security problems, such as perimeter and host security, have become well defined and are routinely addressed by a wide range of product offerings; however, computer and network attacks are still on the rise. Effectively combating these attacks is a network and security management discipline with emerging strategies and solutions. This tutorial will cover the latest trends in computer attacks and the security precautions you can take against them, including defensive penetration analysis, host auditing, network logging solutions, and intrusion detection.

After this tutorial, attendees will understand the important areas of security management. They will be able to defensively assess their system and network security. Additionally they will have an appreciation for auditing and monitoring hosts and networks for intrusions and storing critical information required for network forensics.

Topics include:

- Trends in computer attacks
- Defensive penetration analysis
- Host and network auditing tools
- Intrusion detection
- Network forensics
- Ethics, policies, and legal concerns of auditing computer communications

M7 Advanced Solaris System Administration Topics NEW

Peter Galvin, *Corporate Technologies, Inc.*

Who should attend: UNIX administrators who need more knowledge of Solaris administration.

This course covers a variety of topics that are of importance to Solaris system administrators. We will discuss the new major features of recent Solaris releases, including which to use, which to avoid, and how to use them. This in depth course will provide the information a systems manager/administrator needs to effectively run a Solaris installation.

Topics include:

- **Installing and Upgrading**
 - Planning your installation, filesystem layout, post-installation steps
 - Installing (and removing) patches and packages
- **Advanced Features of Solaris 2**
 - CacheFS—Configuring and using AutoFS
 - Software Manager
 - NIS+ features, differences between NIS+ and NIS, migration issues
 - Printing
 - Serial I/O—The Service Access Facility, enabling logins on a serial port, configuring a serial port for tip
- **Networking and the Kernel**
 - Virtual IP—Configuration and uses
 - PPP and alternatives
 - Kernel and performance tuning—New features, adding devices, tuning, debugging commands
 - Devices—Naming conventions, drivers

■ Enhancing Solaris

- High availability essentials—Disk failures and recovery, RAID levels, uses and performance, H/A products
- Tools—Useful free tools, tool use strategies
- Security—Locking down Solaris, system modifications, tools
- Resources and references

M8AM Ethics for Systems Administration NEW

Lee Damon, *QUALCOMM Incorporated*

Who should attend: Systems administrators and others with access to confidential information. Anyone who manages systems administrators, or makes policy decisions about computer systems and their users.

The class will start with examination of some of the ethical responsibilities that come along with access to other users' data, accounts and confidential information. There will be several case studies, and all attendees will be encouraged to actively participate in the discussion. We will look at numerous viewpoints and come up with a rational and reasoned response to various ethical challenges.

Using the SAGE Code of Ethics as a model, some examples we will examine:

- Implicit expectations of ethical behavior: For example, a sysadmin reads another person's email with intent to see how that person feels about someone or something.
- Coercion to violate ethics: Your manager wants to "get the dirt" on another manager and asks you to look in her email and files for anything "wrong."
- Well intentioned violations of privacy: ISP front-line support person is asked by their manager to examine user (customer) home-dirs for kiddyporn.
- Collection, retention & protection of personal data: Your site collects names, addresses, email information, age, etc. online. What do you do or not do with the data?
- Your friend and fellow employee has been terminated "for cause" and their account disabled. Your manager wants you to look through their files. How do you protect their privacy, or do you?

The answers to these and other questions are often far more complicated than one would initially guess. After completing this tutorial, you will be better able to resolve questionable situations, and will have the means to support your decisions.

M9AM Introduction to Domain Name System Administration NEW

William LeFebvre, *Group Sys Consulting*

Who should attend: Systems or network administrators who have never been exposed to DNS before, except as users. No prior knowledge of DNS is required, although a basic understanding of the IP protocols, TCP and UDP, data encapsulation, and the seven layer ISO model will be beneficial. This class is designed for the beginning DNS administrator and is the first in a series of two tutorials offered on DNS (M9AM & M12PM).

This course is an introduction to DNS for network administrators. The Domain Name System (DNS) is the primary method which the Internet uses to name and number machines. It is used to translate names like "www.usenix.org" into a numeric address like 131.106.3.253. DNS is critical to the operation of the Internet and any site which is serious about joining the Internet community will need to understand how to configure and administer DNS.

This course will describe the basic operation of DNS, and will provide instructions and guidelines for the configuration and operation of DNS on UNIX platforms using the BIND software distribution. This class is designed for the beginner and is intended to provide a foundation for the afternoon tutorial (M12PM) "Intermediate Topics in Domain Name System Administration."

Topics to be covered include:

- DNS and BIND
- The DNS Name Hierarchy
- The four components of the DNS protocol
- Query methods: iterative versus recursive
- Essential resource records: SOA, A, PTR, CNAME, NS
- Zone transfers and secondaries
- Vendor-specific differences

M10AM Managing Network Printers and Print Spoolers

Patrick Powell, *AStArt Technologies*

Who should attend: System managers who are faced with managing a wide variety of printers in a distributed and non-homogeneous environment. Participants should be familiar with the basics on UNIX and networking, and the concepts of client/server programming.

This tutorial will provide an overview of network based printing, and discuss the various approaches used by UNIX, Novell, and Microsoft to support printing. It will focus on the problems of supporting a heterogeneous print spooler environment, such as UNIX BSD, System V, and Microsoft NT printing.

Topics include:

- Printer interfaces, printer job languages, and page description languages
- Print spooler architecture and functions
- BSD print spooler organization, system V print spooler
- Novell print spooler, and Microsoft print spooler
- Network protocols—RFC 1179
- Application programs, drivers, and PDL conversion programs
- BSD print spooler
 - Organization
 - LPRng, BSD 4.4 LPD
 - Installation of software
 - *printcap* files
 - Filters
- SAMBA and SMB print spooling support
 - Organization
 - Installation
 - Configuration
- Exotic spooling problems
 - System V to LPD spooling
 - PCNFSD spooling
 - Windows WINSOCKET client programs
- Guidelines and recommendations

After completing this course, attendees will have a better understanding of the problems and some solutions when managing a large number of printers with different capabilities. Examples covered in depth include supporting NT print clients on UNIX systems and vice versa, using LPRng and Samba.

M11PM Setting up and Maintaining a Secure Web Server **NEW**

Bryan Buus, *XOR Network Engineering*

Who should attend: Those interested in security concerns and implementation details with Apache or NCSA HTTP servers. The course is intended for people who have some knowledge of system administration. Some basic knowledge of Apache is useful, but not essential. Persons taking this class should *not* also take S6 (Setting up and Maintaining a Web Server), as there will be substantial overlap in materials.

This course will provide a solid overview of security concerns and implementation details in Apache and NCSA HTTP servers, with some coverage of Netscape servers. The course will describe user-and host-based access control as well as SSL (secure sockets layer) server configuration. In addition, several non-server specific security details will be covered.

The tutorial topics are:

- User-based Access Control
- Host-based Access Control
- SSL Server
- Verisign Key registration
- Setting up SSL in Apache Stronghold
- Setting up SSL in Netscape FastTrack/Enterprise
- SSL Digital IDs
- Pitfalls of SSL servers
- Securing data after it arrives
- Additional security concerns, not server specific
 - CGI security
 - Monitoring machines and HTTP servers
 - Using SSL/SSH telnet, S/key
 - Site maintenance security concerns
 - Network security

M12PM Intermediate Topics in Domain Name System Administration **NEW**

William LeFebvre, *Group Sys Consulting*

Who should attend: Network administrators with a basic understanding of DNS and its configuration should consider attending this course. Those whose experience is limited to administering a single domain will learn how

to create and delegate subdomains. Administrators planning to install and use BIND 8 will also benefit. Attendees are expected to either have prior experience with the Domain Name System, including an understanding of basic operation and zone transfers, or to have attended the "Introduction to Domain Name System Administration." (M9AM)

The Domain Name System (DNS) is the primary method which the Internet uses to name and number machines. It is used to translate names like "www.usenix.org" into an address like 131.106.3.253. DNS is critical to the operation of the Internet. Any site which is serious about joining the Internet community will need to understand how to configure and administer DNS.

This class will explore topics important to the administration of domain name servers, going more in depth than an introductory level course. Once an administrator has a basic understanding of DNS, additional information and techniques are required to fully utilize the system's potential. Attendees will be taken beyond the basics into a more thorough understanding of the overall design and implementation of the domain name system. Topics to be covered include:

- Subdomains and delegation
- Resource records: NS, RP, MX, TXT, AAAA
- Migration to BIND 8
- DNS Management tools
- DNS design
- DNS and firewalls

M13PM Ethernet Technology: From Basics to State of the Art **NEW**

Patrick Powell, *AStArt Technologies*

Who should attend: System and network administrators who need a jump-start on the various Ethernet technologies available today. Attendees should be familiar with such basic concepts as propagation time, data rates, and data transfer rates.

This tutorial provides an intensive and technical review of the Ethernet technology. The organization of the course is based on the historical development of the technology, and shows how major developments have led from the initial 2 Mbps Ethernet-1 to the current Gigabit network standards. In addition to theoretical material, discussions of actual equipment, configuration, and network design

methodologies will be covered. The course will include demonstrations of equipment and wiring installation, as well as setting up hubs and switches.

After attending this course, participants should be able to design a simple network configuration, and to critically evaluate proposed network configurations. They will be familiar with the meaning of various buzzwords and jargon currently in use by the networking industry. They will also understand the wiring and cable plant requirements for the current and the next coming generation of datalink networking technologies.

Course Topics:

- Historical overview
- Cables and EMI—the really short course
- CSMA/CD protocol
- IEEE 802.3 and other frame formats
- Base5/10Base2—Coax Based Ethernet
- Repeaters and Multisegment Networks
- Evolution of 10BaseT, 10Base4
- 5-4-3-2-1 Rule of Network Design
- Ethernet Switches—the basics
- 100 Mbps Ethernet—3-2-1 Rule
- Ethernet Switches—10/100, full duplex, and autosenes
- State of the Art—Gigabit networks, Virtual Networks
- Current practice in Link Level Network Design

Tuesday, December 8

T1 Hot New Topics in Modern System Administration NEW

Trent Hein, *XOR Network Engineering*;

Evi Nemeth, *University of Colorado, Boulder*

Who should attend: System and network administrators who want to learn about real-life solutions to everyday problems.

Overwhelmed by the rapid change in the system administration field? This tutorial is a potpourri of learning about hot topics that will make you more effective in your role as a system administrator. Specifically, we'll be covering the following:

wreq—Managing user requests and trouble tickets is an everyday task. We'll discuss the freely available web-based tool *wreq*, together with procedures that you can use to make your SA group serve the needs of its internal customers.

Y2K compliance—The year 2000 is coming, and now is the time to make sure your site is prepared. We'll talk about the Y2K issues that you need to address as an administrator in the UNIX environment, and give you some tips on creating a Y2K gameplan for the UNIX hosts at your site.

Optimizing web server performance—Learn tricks-of-the-trade to make your hot UNIX web-server even hotter. We'll cover measuring UNIX web server performance as well as tuning it for optimum throughput and response.

LPRng—Tired of those nasty printing problems? This next-generation print spooler can ease many cross-platform printing hassles as well as reduce time spent maintaining the printing system at your site.

What's hot on the UNIX security battlefield—It's been a long year in UNIX security, and now's a great time to brush up on happenings in this area. We'll talk about the most important holes that you need to address as well as suggest approaches to general UNIX security.

Modern UNIX filesharing—NFS has a bunch of new features, but do you know what they do or how to use them? Learn how to maximize the benefits of NFS 3.0 at your site.

A new world, split by OS—Are you suffering from UNIX in the machine room with PCs on the desktop? This syndrome is affecting system administrators everywhere, but there are some cures. We'll talk about strategies to handle this situation, and tools to make it seamless.

T2 Advanced Topics in DNS and BIND UPDATED

Paul Vixie, *Internet Software Consortium*

Who should attend: Name server administrators and software developers who need a deeper understanding of the DNS protocol and of the internals of BIND. Participants should already be responsible for the operation of at least one name server, should be familiar with Internet protocols such as TCP and UDP, and should be able to recognize C source code when they see it.

This tutorial will survey the DNS protocol and describe upcoming extensions to it, as well as implementation considerations in BIND.

Topics will include:

- DNS message format
- DNS resource record format
- Zone file format, and zone transfers
- Incremental zone transfer
- Dynamic update and deferred update
- Real time change notification
- DHCP interaction
- BIND current status
- DNS security
- DNS politics
- BIND Version 8

After completing this tutorial, participants will know what the IETF has been up to lately, and what to expect in upcoming BIND releases. For attendees who have taken Paul's tutorials in the past, this tutorial will not be a rehash of prior material—new subjects will be covered.

T3 Troubleshooting Firewalls

Char Sample, *Consultant*

Who should attend: Systems integrators; firewall administrators, support personnel and managers; anybody who either presently runs a firewall or plans to implement one in the future.

Now that your firewall is installed (perhaps by someone else) how do you deal with the problems that will almost certainly come up? This tutorial focuses on the tools and techniques used to solve the most typical problems that occur after the installer has left.

Topics will include:

- DNS
- Sendmail
- Routing
- Subnetting
- Load sharing vs. load balancing
- Access control lists
- Authentication
- VPNs
- Logging and reporting
- Operating system nuances

This tutorial provides a list of some of the more common firewall problems, behavior associated with those problems, troubleshooting methods and the all-important solutions. The slides from this tutorial can be used as a reference guide in firewall problem solving.

T4 CGI and WWW Programming in Perl

Tom Christiansen, *Consultant*

Who should attend: Programmers with some background in Perl and HTML. No previous CGI experience is required. Programmers without any Perl background should read the Llama book first. This is neither a “for non-programmers” course nor a “for guru programmers” course. It’s for “occasional programmers”, folks other than UNIX gurus who need to deal with CGI and WWW programming.

Have you always wanted to learn about CGI and other WWW programming using Perl, but didn’t know where to begin? This tutorial will provide you with a good start. Special attention is given to system security issues. All aspects of writing and processing fill-out forms are covered using the standard *CGI.pm* module. Attention is also given to automated web scripting using the *LWP.pm* module to write scripts that fetch and analyze remote documents.

Specific topics include:

- Configuring your server for CGI execution
- Setuid execution and taint checking
- Avoiding the perils of shell escapes and back-quotes
- An overview of the HTTP and CGI protocols
- CGI-related environment variables
- CGI without forms
- Debugging your CGI programs interactively
- Remote browser and remote user determination
- All standard form widgets
- Generating dynamic forms
- Persistent widget values
- Cookies
- Multistage (“shopping cart”) forms
- Saving forms to files or sockets
- Sending mail safely
- Virtual hosts and directories
- Location redirection
- Database access using flat text or HTML files, DBM files, and a full SQL database
- HTML parsing and link analysis
- Processing URLs by modification date
- Negotiating through firewall proxies

T5 Handling Computer and Network Security Incidents

Jim Duncan, *Penn State University*, and Rik Farrow, *Consultant*

Who should attend: System and network administrators, security staff, and their management who have responsibility for the security of networks and connected systems. Basic knowledge of modern operating systems and networking is recommended because it will help in understanding the example incidents, procedures, and countermeasures.

Are you prepared to handle a security incident at your site? Responding to computer security incidents is a requirement for any organization in which computers and networks are an important part of the infrastructure. This course provides the knowledge necessary to prepare for and handle computer and network security incidents with step-by-step information and examples from real-world incidents.

Incident handling ranges from the mundane, yet critical, details of preparing your management and modifying policy to working with an incident in progress and correctly handling evidence. The instructors will explain the types of incidents and how to gain management support in building an incident response team. This course provides examples of actual incident handling and the steps involved in recovering from an incident, since incident handling impinges on all aspects of effective system administration.

You will learn about the need for comprehensive computer security incident handling capability, how to communicate that need to management and the user community, how to investigate an incident (as a handler, not as law enforcement), and how to build and maintain that capability. You will also learn how to adapt policy and the incident handling capability to each other, how to staff an incident response team, and how to establish links and communicate with other teams and law enforcement agencies. Even if you are the only person tasked with security, this tutorial will help you prepare yourself and your organization for an inevitable computer security incident.

T6 Configuring Cisco Routers on an IP Network NEW

William LeFebvre, *Group Sys Consulting*

Who should attend: System administrators who are or anticipate being responsible for router configuration and maintenance on their Inter- or Intranet site. Attendees are expected to have a solid knowledge of general networking concepts, data encapsulation, the ISO seven layer model, the Internet Protocols, IP addressing, and subnetting. Knowledge of routing protocols, especially distance vector versus link state, is also recommended. This class is not intended to teach networking concepts, but to apply those concepts to the configuration of a router.

Routers are the glue that holds the Internet together by providing the direct connectivity between adjacent networks. Cisco routers dominate the router marketplace, and they are an extremely popular choice among sites with high networking demands. But configuring and maintaining Cisco routers is unlike anything else in the industry. The command-oriented interface is unique and difficult to master.

This course introduces the attendees to the essentials of Cisco router configuration. After completing this course participants will feel comfortable at a router’s console and will be able to interpret output from more common router commands. They will understand the various modes of the Internetwork Operating System (IOS), and how to read and alter a basic configuration.

Topics to be covered include:

- Router modes (user, privileged, and configuration)
- Configuration file syntax
- Command line editing
- On-line help
- Configuration statements essential to IP
- Configuring routing protocols: RIP, IGRP, EIGRP, OSPF
- Serial lines: ISDN and Frame Relay (if time permits)

The class size will not permit any hands-on work, but live demonstrations will be provided throughout the lecture. Although this class is not part of the Cisco curriculum, William is a Certified Cisco Systems Instructor.

T7 Computer and Network Security—A Multidimensional Approach NEW

Fred Avolio, *Security Consultant*

Who should attend: System administration staff or IS managers who need to know what technologies exist beyond firewalls and anti-virus systems.

The Internet, and its use, has grown dramatically over the past 10 years. What used to be a community “where everybody knows your name” has become a world wide web of millions of users touching nearly every country on the planet. Because of the Internet revolution, security is now recognized as essential, computer and network security is becoming ubiquitous, security perimeters are becoming dynamic, and the paradigms for security that were established a few short years ago must metamorphose in order to meet the challenges of these changes.

Topics include:

- **Security**
 - Prevention
 - Detection
 - Response
- **Security management**
 - Planning
 - Policy
 - Production
- **Security deployment**
 - Perimeter
 - Servers
 - Desktops

In the beginning, there were no firewalls. But just as the change of a community from small town to city brings changes in lifestyle, the growth of the Internet has required changes in network security mechanisms and methods. We’ve moved from defensive solutions, to the need for enabling solutions. This course will give an overview of a multidimensional model for security.

T8AM SPAM—What You Can Do To Limit Your Intake! NEW

Tina Darmohray, *SystemExperts, Corp.*;
Mark Mellis, *Mellis & Associates*

Who should attend: System and network administrators who implement or maintain electronic mail for their site. Familiarity with sendmail configuration (specifically *sendmail.cf*) is required.

Unsolicited e-mail (or SPAM), is the plague of the Internet, costing unwilling participants ever-growing hours and dollars. Effectively filtering spam traffic from your site is a new administration task with newly emerging strategies and solutions. This half-day tutorial will cover the current strategies to fight unwanted bulk email.

After this tutorial, attendees will be able to incorporate and configure the new anti-spam rulesets into *sendmail*. They will understand the popular anti-spam measures on the Internet and they will have an overview of the vendor solutions and approaches.

Topics will include:

- The *sendmail* anti-spam rulesets
- Anti-spam measures on the Internet
 - The Real-time Blackhole List
 - Heuristics for filtering spam
- Vendor offerings

T9AM Faster and Faster—Gigabit Ethernet Networks, File Servers, and Users NEW

Stuart McRobert, *Imperial College, London*

Who should attend: System and network administrators responsible for designing or upgrading computer networks and file servers supporting a wide variety of applications, along with managers seeking a better understanding of this rapidly advancing technology.

With the increasing speed of CPUs and rising numbers of desktop and laptop systems fully utilizing Fast Ethernet bandwidth, many network backbones and central servers have been left behind with yesteryear’s technology. Although the need to upgrade is often well understood, just where do you begin?

This tutorial is intended for people facing just such a challenge and looks at two key areas, high performance networking with Gigabit Ethernet (1000 Mbps) and faster file serving. By the end of this tutorial you should have a sound understanding of both Gigabit Ethernet and ways of providing high performance fileserving for various applications. Key topics include:

■ **Faster Networking**

- Gigabit Ethernet: What is it? How does it work? The standards
- Hardware: Fiber Channel, media types, link lengths
- 802.3x full/half duplex links, flow control
- 802.1p, 802.1Q Virtual LANs (VLANs), Tagging
- Wire speed switching and hardware IP routing
- Product examples, Extreme Networks
- Packet filtering
- Trunking or link aggregation
- Quality of service, management issues

■ **Faster File Servers**

- UNIX and Veritas File Systems, logging
- File server platforms, disks, I/O requirements
- RAID: levels, performance issues, hardware vs. software, system management
- Volume Managers, Sun Solstice DiskSuite and Veritas
- Fault tolerance: fail-over, backups, storage replication, HSM

T10AM Performance Monitoring and Tuning Under Windows NT NEW

Aleen Frisch, *Exponential Consulting*

Who should attend: NT sysads familiar with elementary Windows NT system administration concepts and tasks, including basic server configuration and maintenance, configuring TCP/IP networking under Windows NT and administering Windows NT services. Experience tuning UNIX or other systems is helpful but not required. UNIX sysadmins with significant tuning experience can expect much of the conceptual material to be a review and may find the overall pace slower than they’d like.

This in-depth course will focus on monitoring and improving system and network performance on Windows NT systems. A variety of real world scenarios and examples will be discussed. We will use the standard Windows NT Performance Monitor facility to examine and track system performance.

Topics covered are:

- Overview of performance factors and considerations
- Monitoring system operation and evaluating system efficiency

- Strategies for locating performance bottlenecks
- CPU performance
- Memory usage and its performance implications
- Disk and other I/O performance issues
- Network performance issues
- System tuning strategies and hints
- Capacity planning

T11PM **Configuring Samba: Avoiding Pitfalls** NEW

John Blair, *Cobalt Microserver*

Who should attend: Administrators of heterogeneous environments consisting of Windows and UNIX hosts.

The freely distributed Samba software suite has become a popular tool for providing Windows (SMB) networking services from hosts running UNIX and UNIX-like operating systems. Samba allows organizations to use existing UNIX hosts or inexpensive servers running one of the free UNIX-like operating systems to provide networking services to PCs running Windows 95, Windows NT, and OS/2. In other words, Samba allows Windows machines to “see” UNIX hosts on their networks, including the Internet. In many situations, Samba running on a free operating system like Linux or FreeBSD is an inexpensive alternative to running Windows NT Server. In other environments, Samba is an invaluable tool for providing convenient access to existing UNIX servers from PCs.

Because the problems that it tackles are complex, configuring Samba is often difficult. You will learn how to avoid simple to complex configuration problems. Examples of topics that will be covered are:

- General system architecture
- Dealing with problems caused by the differences between the UNIX and Windows filesystems
- Using Samba to process logins from Windows NT and Windows 95 machines.
- Smoothly integrating a Samba server into a large Windows network containing multiple NT domains and spanning more than one TCP/IP subnet.

People who attend this tutorial will leave with a thorough understanding of Samba and its components, as well as a toolbox of solutions to frequently encountered problems.

T12PM **How to Give Great Presentations** NEW

Hal Pomeranz, *Deer Run Associates*

Who should attend: Anybody who wishes to become a better speaker and presenter.

Nearly every day you are called upon to present your ideas to others. Whether chatting in the hallways at work or standing up in the board room, presenting your ideas affects nearly every aspect of your life. Yet surveys show that having to speak in front of an audience is one of the most common fears that we all share. Presented by a highly rated and experienced speaker, his course teaches the golden rules that make a great technical presentation and the common mistakes that sabotage most speakers. Participants will be asked to practice lessons from the course in front of the other students.

Topics covered include:

- The Golden Rules for Great Presentations
- Planning and preparing for your presentation
- Style: body language, eye contact, clothing
- Handling questions—especially the tough ones!
- Stories and humor
- Visuals

T13PM **PC/UNIX Connectivity: UNIX Server as a File and Print Host for Windows Clients** NEW

Joseph Radin, *Sun Microsystems, Inc.*

Who should attend: System administrators and technical managers who wish to evaluate or set up UNIX file and print servers in an heterogeneous environment consisting of Windows and UNIX hosts. People who attend this tutorial will leave with a thorough understanding of how one can create Microsoft compatible file and printer sharing without the users ever knowing that these services emanate from a UNIX server.

Because the problems it tackles are complex, configuring a product providing file and printer sharing is often difficult. This tutorial will teach you how to adapt UNIX for effective use

in an heterogeneous environment as a file and print server. Topics to be covered include:

- Server based vs. client based solution
- Comparison and benefits of various commercial and non-commercial products (client types, NT domain security component vs. none)
- Phased approach: architecture, migration planning, sizing, implementation (server consolidation and upsizing, moving from PC-based NFS to a Server-Centric solution)
- Using UNIX based server to process logins from Windows NT and Windows 95 machines
- Integration of a UNIX file and printing server into a large (multidomain multi-subnet) Windows network.
- Advanced Server for UNIX based products as the NT domain controller:
 - Managing trust relationships, domain controller, local and network authentication
 - Managing user accounts, profiles, local and global groups, rights and privileges, access control list
 - Managing NT style auditing, error logging and viewing via event viewer
 - Managing NT system policy
 - NT server diagnostic tool by using Advanced Server for UNIX admin tool
- Dealing with problems caused by the differences between the UNIX and Windows file systems
- UNIX workstation to look “like” a Windows PC by using Citrix technologies

Using the material presented, participants will have the tools to administer the new environment, including:

- Establishing domain trust relationships
- Establishing user accounts
- Creating local and global groups
- Creating and modifying login scripts
- Establishing home directories
- Passwords and password restrictions
- Granting and revoking user and group permissions
- User and group file permission
- Security audit and error logs
- Troubleshooting

Tutorial Instructors



Eric Allman

Eric Allman (S8) is the original author of sendmail. He was the chief programmer on the INGRES database management project and an early contributor to the UNIX effort at Berkeley, authoring *syslog*, *tset*, the *-me troff* macros, and *trek*. He designed database user and application interfaces at Britton Lee (later Sharebase), and contributed to the Ring Array Processor project for neural-network-based speech recognition at the International Computer Science Institute. He is a former member of the Board of Directors of the USENIX Association.



Frederick M. Avolio

Frederick M. Avolio (T7) is an independent consultant specializing in computer and Internet security, as well as e-mail systems. He was Vice President of Technology Marketing at Trusted Information Systems, Inc., has been active in TIS' network security consulting, and was product manager for TIS' Gauntlet Internet Firewall. He has lectured and consulted on Internet gateways and firewalls, Internet security, cryptography, and electronic mail configuration for both government and industry, and has worked in the UNIX and TCP/IP communities since 1979. Fred was a senior manager with DEC where he managed and maintained one of DEC's Internet gateways and was instrumental in producing Digital's Internet firewall product. He is the co-author of *Sendmail: Theory and Practice*.



Bryan C. Andregg

Bryan C. Andregg (S5) is the Director of MIS at Red Hat Software where he has overseen combining two nationally distinct offices, moving the entire organization, re-designing the internal and external networks, and set up a second building and the WAN to connect the two. In addition he has changed the company accounting and order entry system from Macintoshes to Linux.



Matt Bishop

Matt Bishop (M3) began working on problems of security in computer systems and UNIX systems in particular at Purdue where he earned his doctorate. He subsequently worked at the Research Institute for Advanced Computer Science at NASA and taught courses in operating systems, computer security and software engineering at Dartmouth College. Matt chaired the first USENIX Security Workshop and plays an active role in identifying and thwarting security threats. Matt has been on the faculty at UC Davis since 1993.



John Blair

John Blair (T11) is the author of *Samba: Integrating UNIX and Windows* (a tutorial and reference guide) and a frequent contributor to *Linux Journal*. As a member of the Samba Team, he has contributed documentation improvements and minor bits of code. He is a software engineer at Cobalt Networks, Inc. (makers of the Cobalt Qube).



Bryan Buus

Bryan Buus (S6, M11) is the manager of XOR Network Engineering's Web services group. Before coming to XOR, Bryan kickstarted O'Reilly & Associates' online efforts in 1992. He has been managing Web services since their introduction. He has given seminars on managing Web services for USENIX, CERFnet, SANS, and Hewlett Packard's consulting division. Bryan is a co-author of *Managing Internet Information Services*.



Tom Christiansen

Tom Christiansen (S4, M4, T4) has over fifteen years experience in programming, administering, and teaching about UNIX and Internet systems. He has been involved with Perl since day zero of its initial public release in 1987. Lead author on *Perl Cookbook*, co-author of the 2nd editions of *Programming Perl*, *Learning Perl*, and *Learning Perl on Win32 Systems*, Tom is also the developer of *www.perl.com*, major



Phil Cox

caretaker of Perl's online documentation, co-author of the Perl FAQ list, and president of *The Perl Journal*. Tom served two terms on the USENIX Association Board of Directors.

Phil Cox (M6) is a consultant for Networking Technology Solutions, and is a member of a government incident response team. Phil frequently writes and lectures on issues bridging the gap between UNIX and Windows NT. He is a featured columnist in *login*: and is on this year's LISA Conference program committee.



Lee Damon

Lee Damon (M8) has been a UNIX Systems Administrator since 1985, and has been active in SAGE since its inception. He is a member of the SAGE Ethics Working Group, and was one of the commentators on the SAGE Code of Ethics. He has championed awareness of ethics in the systems administration community, including writing it into policy documents.



Tina Darmohray

Tina Darmohray (M6, T8) is a network and security consultant with over a decade of experience in administration and programming of UNIX/TCP-based computers. She specializes in firewalls, Internet connections, Sendmail/DNS configurations and defensive intrusion management. Previously she was the lead for the UNIX support team at Lawrence Livermore National Laboratory. Tina was a founding board member of the System Administrators Guild, SAGE. She is also the editor of the popular SAGE short Topics booklet *Job Descriptions for System Administrators*, editor of "SAGE News and Features" for *login*., and co-chaired the USENIX LISA IX Conference.



Ed DeHart

Ed DeHart (S3) is a former member of the CERT Coordination Center which he helped found in 1988. The CERT was formed by the Defense Advanced Research Projects Agency (DARPA) to serve as a focal point for the computer security concerns of Internet users. Today, Ed is the president of Pittsburgh OnLine, Inc., an ISP that operates several UNIX servers.



Jim Duncan

Jim Duncan (T5) is Manager of Network and Information Systems and Principal Systems Administrator for The Pennsylvania State University's Applied Research Laboratory, a multi-disciplinary research facility for the U.S. Navy and other sponsors. He is a contributor to *RFC 1244*, *The Site Security Policy Handbook*, and has developed numerous policies, guidelines, and presentations on systems and network administration, computer security, incident handling, and ethics. He has over ten years experience in UNIX systems administration and TCP/IP. Jim is an active member of the Penn State CERT team and has primary responsibility for incident handling at the Applied Research Lab.



Rik Farrow

Rik Farrow (M5, T5) provides UNIX and Internet security consulting and training. He has been working with UNIX system security since 1984, and with TCP/IP networks since 1988. He has taught at the IRS, Department of Justice, NSA, US West, Canadian RCMP, Swedish Navy, and for many US and European user groups. He is the author of *UNIX System Security* and *System Administrator's Guide to System V*. Farrow writes columns for *login*: and *Network Magazine*.



Aeleen Frisch

Aeleen Frisch (S1, T10) has been a system administrator for over 15 years. She currently looks after a very heterogeneous network of UNIX and Windows NT systems. She is the author of several books, including *Essential Windows NT System Administration*.

Tutorial Instructors



Peter Galvin

Peter Galvin (S10, M7) is the Chief Technologist for Corporate Technologies, Inc. and was the systems manager for Brown University's computer science department. He has written articles for *Byte* and other magazines, is security columnist for *SunWorld*, and is co-author of the *Operating Systems Concepts* textbook. As a consultant and trainer, Peter has taught tutorials in security and system administration and given talks at many conferences.



Trent Hein

Trent Hein (M1, T1) is chief network architect at XOR Network Engineering. He worked on the 4.4 BSD port to the MIPS architecture at Berkeley, and is co-author of the *UNIX Systems Administration Handbook*.



Brad Johnson

Brad Johnson (S9) is a well known authority in the field of distributed systems. He has participated in seminal industry initiatives including the Open Software Foundation, X/Open, and the IETF, and has published often about open systems. At SystemExperts Brad has led numerous security probes for major companies, revealing significant unrealized exposures. Prior to joining SystemExperts, Brad was one of the original members of the OSF DCE Evaluation Team, the group that identified, evaluated and selected technology to become the industry's first true interoperable middleware.



William LeFebvre

William LeFebvre (M9, M12, T6) is an author, programmer, teacher, and systems administration expert. William has been using UNIX and Internet technologies since 1983 and teaching tutorials since 1989. He has written many articles on UNIX, networking and systems administration issues. Currently he is a columnist for *UNIX Review*, writing the monthly "Daemons & Dragons" column. William is also the editor for the SAGE series *Short Topics in System Administration*. William has contributed to several widely used UNIX packages, including Wietse Venema's *logdaemon* package. He is also the primary programmer for the popular UNIX utility, *top*.



Evan Marcus

Evan Marcus (M2) is a Senior Systems Engineer and High Availability Specialist with VERITAS Software Corporation. Evan has more than 12 years of experience in UNIX Systems Administration. While working at Fusion Systems and OpenVision Software, Evan worked to bring the first High Availability software application for SunOS and Solaris to market. Evan has authored several articles and talks on the design of High Availability Systems.



Stuart McRobert

Stuart McRobert (T9) is the Network Systems analyst in the Department of Computing at Imperial College in London, where he has recently designed and installed a multi-Gigabit Ethernet backbone, and along with his colleagues manages Sun SITE Northern Europe, a 300+GB mirror archive. Stuart has spoken at several USENIX conferences and user group meetings both in the USA, Australia and Europe.



Mark Mellis

Mark Mellis (T8) is a consultant, specializing in system and network administration. Previously he was a senior engineer at Network Computing Devices where he was the technical lead of the UNIX and network administration group. He is a featured columnist in the USENIX Association magazine, */login*.



Evi Nemeth

Evi Nemeth (M1, T1) a faculty member in computer science at the University of Colorado, and has managed UNIX systems for the past 20 years, both from the front lines and from the ivory tower. She is co-author of the *UNIX System Administration Handbook*.



Hal Pomeranz

Hal Pomeranz (T12) Hal Pomeranz is the founder and technical lead of Deer Run Associates, a firm specializing in system and network connectivity and security solutions. He has been active in the system and network management/security field for over ten years, and is a regular speaker and organizer for technical conferences and professional gatherings. Hal is currently a member of the Board of Directors for the USENIX Association and is President of BayLISA, the Bay Area professional society for System and Network Administrators.



Patrick Powell

Patrick Powell (M10, M13) is CEO of AStArt Technologies, and has managed many of the student computing facilities as a professor in the department of electrical engineering at San Diego State University. He has taught courses in computer networks, operating systems, and real time systems, and is the developer of LPRng, an lpd compatible print spooler that was created in order to solve problems with existing lpd implementations. He is active in the IETF Internet Printing Protocol (IPP) working group, which is developing new standards for network printing.



Joseph Radin

Joseph Radin (T13) is a senior systems consultant at Sun Microsystems, Inc. Joseph (Microsoft Certified) has over fifteen years progressive software engineering experience in delivering state of the art systems and solutions. Among his accomplishments are the publication of several books: *X Window Inside and Out*, *UNIX System Administration Guide*, *Open Computing Guide to UNIXWare*. He also co-authored part of the *LAN Times Guide to Interoperability*.



Marcus J. Ranum

Marcus J. Ranum (S7) is CEO and founder of Network Flight Recorder, Inc. He is the principal author of several major Internet firewall products, including the DEC SEAL, the TIS Gauntlet, and the TIS Internet Firewall Toolkit. Marcus has been managing UNIX systems and network security for over 13 years, including configuring and managing *whitehouse.gov*. Marcus is a frequent lecturer and conference speaker on computer security topics.



Jon Rochlis

Jon Rochlis (S9) is a senior consultant for SystemExperts, where he provides high level advice to businesses on network security, distributed systems design and management, high-availability, and electronic commerce. Before joining SystemExperts, Jon was engineering manager with BBN Planet, a major national Internet service provider.



Char Sample

Char Sample (T3) has installed over 150 firewalls, was one of the original five engineers on the FWTK/Gauntlet project, and has spent many a stressful day on the Gauntlet support lines. She has developed and delivered training for TIS, V-ONE, SGI, Booze-Allen and Price Waterhouse LLP.



Hal Stern

Hal Stern (S2, M2) is a Distinguished Systems Engineer with Sun Microsystems, Inc., where he focuses on high-end server technology, operations management, networking, performance tuning, and information systems architecture. Hal has been a UNIX administrator and user for more than 10 years. Before joining Sun, he developed molecular modeling software for a Boston area start-up company and was on the research staff at Princeton University. He is the author of *Managing NFS & NIS* and the author of several articles on application performance and network design.



Paul Vixie

Paul Vixie (T2) is the current maintainer of the BIND software system. BIND is the Berkeley Internet Name Domain, and it includes the name server *named*, used everywhere on the Internet. Paul is also a coauthor of *Sendmail: Theory and Practice*, and the moderator of the "comp.sources.unix" newsgroup.

GLOBAL LISA WORKSHOP

Monday, December 7, 1998 9:00 am – 5:00 pm

Co-Chairs: Joel Avery & Rob Kolstad

USENIX and SAGE will host the first Global-LISA Workshop for those concerned with the issues of running huge sites' networks in globally distributed ways. An experimental, highly-interactive, limited-attendance workshop, its goal is to bring together those with common interests in solving problems like these:

A large company has 22 offices throughout the United States and 41 more offices on four other continents. Time zones, languages, laws, cultures, and technology conspire to create incredible challenges for cooperative administration. Political challenges often dominate technical ones.

A university campus is no longer a single site run by a central group with uniform applications and policies. It is a network with various buildings run by different faculties with different policies and tools. How do they all get along? How do they ensure that UIDs do not conflict?

Consider a single department in a huge company, say the US Government. How does it get along and share information with the rest of the government? Is it even able to? Are the various government bodies in enough agreement to be able to interwork and trust each other? How do large organizations address the problems of coordinating their computer resources and usages?

Format The workshop co-chairs will create the agenda from the submissions and moderate the discussion. They will divide the workshop into topics along stated lines of interest. Participants will deliver their talks about a topic and discussion will be encouraged. A scribe will create a summary which will be reviewed by the group after each topic.

Results of the workshop will be a presentation and/or summary document that identifies and exemplifies the problems Global-LISA administrators encounter and lists solutions. It is presumed that those

attendees with solutions will be matched with those who have similar problems for an interchange of ideas and applications.

Workshop Topics Topics for this workshop include (but are not limited to):

- Encryption for world wide use
- Privacy laws in different countries
- Working in export restricted countries
- Time zone issues
- Language issues
- Character set issues
- Culture issues
- Standard tools and hardware platforms
- Standards for your network
- Email systems
- Internet usage
- Security incident handling
- Pornography issues
- Spam

The workshop will have an international theme to it. Generally, country-specific issues will not be covered, but the following may be discussed:

- US encryption algorithm export restrictions
- French and German privacy laws
- US export controls when dealing with China
- French content when dealing with Quebec

How to Participate Anyone who is willing to deliver a five minute talk/white paper on topics such as those listed above is welcome. Submit a 250 word summary of your potential presentation along with a brief biography. Register and submit via the Web page at <http://usenix.org/events/lisa98/workshop.html> by November 9. All submissions will be acknowledged.

There is no additional fee to attend this workshop, but attendees must be registered for the conference technical program.

ADVANCED TOPICS IN SYSTEMS ADMINISTRATION WORKSHOP

Tuesday, December 8, 1998 9:00 am – 5:00 pm

Chair: Adam Moskowitz

This one-day workshop will focus on the most recent developments in systems administration, including technical, ethical, and "political" issues. Attendance is limited, and is based on acceptance of a position paper. The workshop will be an open forum during which a representative subset of the topics and positions submitted will be discussed.

This limited-attendance workshop will focus on the most exciting new developments and issues in systems administration. The work-

shop will be an open forum during which a representative subset of the topics and positions submitted will be discussed.

The workshop's result will be a presentation (created in real-time during the workshop) that will also be distilled to prose for dissemination to the membership.

How to Participate

Attendance is limited, and is based on acceptance of a position paper (which should make a good five minute talk). Potential workshop attendees are invited to submit a proposal (in ASCII), of at most three pages, via the Web page to Adam Moskowitz at <http://www.usenix.org/events/lisa98/advtopics.html> no later than October 1. Proposals should contain a topic for discussion, why the topic is relevant, and a personal position on the topic.

There is no additional fee to attend this workshop, but attendees must be registered for the conference technical program.

LISA '98 Products Exhibition

Wednesday, December 9 12:00 noon–7:00 pm

Thursday, December 10 10:00 am–4:00 pm

Get up-close and hands-on with systems management products and services from over 100 companies, both established leaders and emerging challengers. Save yourself hours of time researching products you need to get your job done. Publishers and booksellers will be here too, to provide the latest print and software releases. And, several companies will be recruiting or contracting employment.

**Questions?
More information?**

Call Cynthia Deno

Phone: 1.831.335.9445

Email: cynthia@usenix.org

Exhibitors (as of 7/31/98)

Addison Wesley Longman www.aw.com/cp

Alteon Networks Inc. www.alteon.com

ANDATACO www.andataco.com

Artecon, Inc. www.artecon.com

ASP Technologies Inc. www.asptech.com

Attachmate Corporation www.attachmate.com

Aurora Software Inc. www.sarcheck.com

Aurora Technologies, Inc. www.auratek.com

Auspex Systems, Inc. www.auspex.com

Collective Technologies Inc. www.pencom.com

CommVault Systems, Inc. www.commvault.com

Concorde Technologies, Inc.

www.concordetech.com

Datalynx, Inc. www.dlxguard.com

Dataram Corp. www.dataram.com

Digital Equipment Corporation www.digital.com

Dynamical Systems, Ltd.

www.dynamical-systems.com

Eagle Software Inc. www.eaglesoft.com

EasySpooler www.easyspooler.com

EIS Computers Inc. www.eis.com

ENlighten Software www.enlighten.sftw.com

Esker Inc. www.esker.com

ESM Services, Inc. www.esm.com

FacetCorp. www.facetcorp.com

Fastlane Software Systems www.fastlane101.com

Fidelity Investments www.fmr.com

Global Networking and Computing, Inc.

www.gnac.com

Globetrotter Software www.globetrotter.com

GraphOn Corporation www.graphon.com

GTE Internetworking www.bbn.com

HighWind Software, Inc. www.highwind.com

Hummingbird Communications

www.hummingbird.com

Intelliguard Software www.iguard.com

Invincible Technologies Corp. www.invincible.com

Internet Security Systems (ISS) www.iss.net

Ki NETWORKS, Inc. www.ki.com

Landmark Systems Corporation

www.landmark.com

Lightwave Communications

www.lightwavecom.com

Magma Technologies www.magma.com

Microway www.microway.com

Miller Freeman, Inc. www.mfi.com

Net Daemon Associates www.nda.com

Network Appliance, Inc. www.netapp.com

O'Reilly & Associates, Inc. www.ora.com

Open Systems Management Inc.

www.osmcorp.com

Open Systems Solutions www.opensystems.com

Overland Data www.overlanddata.com

Personal Productivity Tools, Inc. www.ppt.com

PFU AMERICA, INC. www.pfuca.com

Phobos www.phobos.com

Pinnacle Technology, Inc.

www.pinnacletech.com/

Power Center Software LLC

www.powercenter.com

Prentice Hall PTR www.prenhall.com/

QMASTER Software Solutions Inc.

www.qmaster.com

Red Hat Software, Inc. www.redhat.com

Resonate, Inc. www.resonate-inc.com

Softway Systems Inc. www.interix.com

Symark Software www.symark.com

Syncsort Inc. www.syncsort.com

Syntax, Inc. www.syntax.com

TeamQuest Corporation www.teamquest.com

Transarc Corporation www.transarc.com

UniTree Software Inc. www.unitree.com

Veritas Software www.veritas.com

Walnut Creek CDROM www.cdrom.com

Western Scientific, Inc. www.wsm.com

Zzyzx Peripherals, Inc. www.zzyzx.com



FREE EXHIBIT ADMISSION EVERYONE WELCOME!

Please complete. Information is confidential.

Open: Wednesday, December 9, 12 noon–7 pm

Thursday, December 10, 10 am–4 pm

Location: U. of Mass Exhibit Hall, Copley Place Marriott Hotel

110 Huntington Ave., Boston, MA 1.617.236.5800

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Technical Sessions Wednesday–Friday, December 9–11, 1998

Wednesday, December 9, 1998 9:00am–10:30am

Joint Opening Session

Opening Remarks & Awards

Xev Gittler and Rob Kolstad, *Program Co-Chairs*

Keynote Address

Eric Allman, CTO, *Sendmail, Inc.*



Eric Allman is the original author of sendmail. He was an early contributor to the UNIX effort at UC Berkeley, authoring syslog, tset, the -me troff macros, and trek. He was the chief programmer on the INGRES database management project and designed database user and application interfaces at Britton Lee (later Sharebase), and contributed to the Ring Array Processor project for neural-network-based speech recognition at the International Computer Science Institute. Eric is the CTO of Sendmail, Inc., and gives tutorials and presentations at USENIX conferences.

Wednesday, December 9, 1998 10:30am – 11:00am **Break**

<u>Refereed Papers</u>	<u>Invited Talks</u>	<u>Practicum</u>
Wednesday, December 9, 1998 11:00am – 12:30pm		
<p>Security Session Chair: Phil Cox, <i>NTS, Inc.</i></p> <p>Titan Dan Farmer, <i>Earthlink Network</i>; Brad Powell, <i>Sun Microsystems, Inc.</i>; and Matthew Archibald, <i>KLA-Tencor Corporation</i></p> <p>Infrastructure: A Prerequisite for Effective Security Bill Fithen and Jeff Carpenter, <i>CERT Coordination Center, Software Engineering Institute, Carnegie Mellon University</i></p> <p>SSU: Extending SSH for Secure Root Administration Christopher Thorpe, <i>Yahoo!, Inc.</i></p>	<p>Panel Discussion: TCP/IP Futures Moderator: Phil Scarr, <i>Global Networking and Computing, Inc.</i></p> <p>Is IPv6 really coming? What about IPSEC? And why do we need something new, anyway—what's wrong with IPv4? Our panel will discuss these topics, and muse about the future of networking.</p> <p>Panelists: To Be Announced</p>	<p>Teaching System Administration</p> <p>How does our profession develop new administrators? Are universities the answer? Extension programs? In-house training? This session will touch on the most important topics of educating system administrators.</p>
Wednesday, December 9, 1998 12:30pm – 2:00pm Lunch (on your own)		
Wednesday, December 9, 1998 2:00pm – 3:30pm		
<p>Pushing Users and Scripts Around Session Chair: Ozan S. Yigit, <i>Sun Microsystems, Inc.</i></p> <p>System Management With NetScript Apratim Purakayastha and Ajay Mohindra, <i>I.B.M. Thomas J. Watson Research Center</i></p> <p>Accountworks: Users Create Accounts on SQL, Notes, NT and UNIX Bob Arnold, <i>Sybase, Inc.</i></p> <p>Single Sign-On and the System Administrator Michael Grubb and Rob Carter, <i>Duke University</i></p>	<p>Zero to LISA in One Year Brent Chapman and Paul Evans, <i>Covad Communications Company</i></p> <p>How do you establish, provide, and scale system and network support for a company whose employee count doubles every four months, and whose site count doubles every 6 months? Come along for the ride with a hyper-growth startup as we explain how to cope with growing from 50 people at 2 sites in 1 region to 400 people at 8 sites in 6 regions in less than a year.</p>	<p>FREENIX Administration Issues</p> <p>The proliferation of free UNIX-clones like Linux, FreeBSD, and NetBSD offers a new set of both technical and political challenges. This session discusses those challenges and more.</p>
Wednesday, December 9, 1998 3:30pm – 4:00pm Break		

Technical Sessions Wednesday–Friday, December 9–11, 1998

Refereed Papers

Wednesday, December 9, 1998

4:00pm – 5:30pm

Storage Performance

Session Chair: Marc Staveley, *Sun Microsystems, Inc.*

How We Backed up Our 6TB Sun E10000

W. Curtis Preston, *Collective Technologies*; and Rob Cotter, *Hughes Space and Communications*

Configuring Database Servers

Christopher R. Page, *Millennium Pharmaceuticals*

General Rules for Maximizing Disk IO Performance

Dan Pollack, *America Online*

Invited Talks

Got LDAP? Deploying and Using the Lightweight Directory Access Protocol

Leif Hedstrom, *Netscape Communications Corporation*

Deploying and managing a directory server is a complicated task, requiring serious planning, a good architecture, and an idea of what to achieve. This presentation will introduce LDAP to the audience, give an outline of how to deploy LDAP, and present some possible solutions to deploying LDAP. We'll also talk about how to decide on software and hardware architecture, making sure you know how to select the appropriate tools for your environment.

Practicum

University Issues

Universities are a special environment with technical and political challenges all their own. This session will discuss some of those issues, such as networking, mail/dialup solutions, security, civil rights, and help desks.

Thursday, December 10

9:00am – 10:30am

Distributed Computing

Session Chair: Phil Cox, *NTS, Inc.*

A Configuration Distribution System for Heterogeneous Networks

Glédson Elias da Silveira and Fabio Q. B. da Silva, *Federal University of Pernambuco*

An NFS Configuration and Management System and its Underlying Object-Oriented Model

Danielle Franklin, Fabio Q. B. da Silva, Juliana Silva da Cunha, Luciana Varejão, and Rosalie Bellian, *Federal University of Pernambuco*

Design and Implementation of an Administration System for Distributed Web Server

C. S. Yang and M. Y. Luo, *Institute of Computer and Information Engineering, National Sun Yat-Sen University*

Joint Session: Succumbing to the Dark Side of the Force: The Internet as seen from an Adult Website

Dan Klein, *Cybertainment, Inc.*

The adult industry is by far the biggest consumer of net bandwidth. It is arguably also the largest cash source for content providers. Without getting into the "politics" of the industry as a whole, this talk will examine the many facets of this much maligned (and hugely subscribed) dark side of the Web. This talk will examine what it means to be in a service industry, advertising, site scaling and bandwidth, monitoring, load sharing, load shedding, and load stealing. It will also look at issues of security, payment methods, billing, theft, risk, and spamming. It will also show how data mining can be a boon and a bane, and look at issues of copyright protection and abrogation. Finally, issues of site automation, what kind of people run adult sites, and how much money can be made will be explored.

Thursday, December 10

10:30am – 11:00am Break

Thursday, December 10

11:00am – 12:30pm

Refereed Papers

Networking

Session Chair: Eric Anderson, *University of California, Berkeley*

MRTG, Multi Router Traffic Grapher

Tobias Oetiker, *Swiss Federal Institute of Technology*

Wide Area Network Ecology

Jon T. Meek, Edwin S. Eichert, and Kim Takayama, *American Cyanamid Company*

Automatically Selecting a Close Mirror Based on Network Topology

Giray Pultar, *Coubros Consulting LLC*

Invited Talks

Branchstart—A Generic, Multi-OS Installation Server

Rory Toma, *WebTV Networks Inc.*

This talk describes an implementation of a single architecture, multi-OS network installation server. This server has the capability to install to any Intel-based computer, practically any OS that will run on it.

Practicum

Panel: Technical Summaries

A panel of experts will summarize the state of the art in their fields of specialization. Each talk will summarize "all you need to know" at the highest level in just ten minutes.

Thursday, December 10

12:30pm – 2:00pm Lunch (on your own)

Technical Sessions Wednesday–Friday, December 9–11, 1998

Refereed Papers

Invited Talks

Practicum

Thursday, December 10 2:00pm – 3:30pm

Infrastructure

Session Chair: John Orthoefer, *GTE Internetworking*

What to Do When the Lease Expires: A Moving Experience

Lloyd Cha, Chris Motta, Syed Babar, Mukul Agarwal, *Advanced Micro Devices*; Jack Ma, Waseem Shaikh, *Taos Mountain Software*; and Istvan Marko, *Volt Services Group*

Anatomy of an Athena Workstation

Karl Ramm and Thomas Bushnell, *BSG, MIT Information Systems*

Bootstrapping an Infrastructure

Steve Traugott, *NASA Ames Research Center* and Joel Huddleston, *Level 3 Communications*

Repetitive Strain Injury (RSI): Causes, Treatment, and Prevention

Jeff Okamoto, *Hewlett Packard*

This talk will start with the basic anatomy of the body and habits which may cause an RSI to occur. It will then cover the most common types of RSI, including their symptoms, your interactions with your doctor, and various treatment methods. Finally, some tips on dealing with the Worker's Compensation system and ways to prevent RSI will be covered.

Mailer Wars

Which mailer is the best one? Sendmail is the most popular. Qmail claims no bugs. Vmail is designed to be a super solution. This session will feature advocates of each of the various mailers defending their favorite server.

Thursday, December 10 3:30pm – 4:00pm Break

Thursday, December 10 4:00pm – 5:30pm

Printing and Configuring Files

Session Chair: David Kensiski, *Digital Island, Inc.*

Ganymede: An Extensible and Customizable Directory Management Framework

Jonathan Abbey, *Applied Research Laboratories of The University of Texas at Austin*

Building an Enterprise Print System

Ben Woodard, *Cisco Systems, Inc.*

Large Scale Print Spool Service

Ignacio Reguero, David Foster, and Ivan Deloose, *CERN, European Laboratory for Particle Physics*

Joint Session: The Great Certification Debate

SAGE's initiative to provide certification for system administrators has certainly generated a huge amount of commentary from its members. This debate will ponder the pros and cons of such a plan.

Thursday, December 10 5:30pm – 6:30pm

Joint Session: SAGE Community Meeting & Candidates Forum

Find out how to get involved in SAGE, and hear from the SAGE Executive Committee on their recent and upcoming activities. The committee will be on hand to answer your questions, and to solicit your ideas and feedback on how to better serve SAGE members. You will also hear from the candidates running in the upcoming SAGE election. Everybody is welcome.

Friday, December 11 9:00am – 10:30am

Refereed Papers

Invited Talks

Practicum

Distributing Software Packages

Session Chair: E. Scott Menter, *ESM Services, Inc.*

Mkpkg: A Software Packaging Tool

Carl Staelin, *Hewlett-Packard Laboratories*

SEPP, Software Installation and Sharing System

Tobias Oetiker, Department of Electrical Engineering, *Swiss Federal Institute of Technology*

Synctree—For Single-Point Software Installation Upgrades and Patches

John Lockard, *University of Michigan*; and Jason Larke, *ANS Communications*

Overview of the LISA/NT Conference

Ian Reddy, *Cisco Systems, Inc.*

This session will present the highlights of the Large Installation System Administration of Windows NT Conference, held August 5-8, 1998.

Network Admin and Remote Computing

Network administration is a hot topic. This session will discuss network admin. and interfacing off-site workers to a central site. Discussions will include both technical and political issues.

Technical Sessions Wednesday–Friday, December 9–11, 1998

Refereed Papers		Invited Talks	Practicum	
Friday, December 11	10:30am – 11:00am	Break		
Friday, December 11	11:00am – 12:30pm	<p>New Thoughts and Evolution Session Chair: Melissa D. Binde, <i>Amazon.com, Inc.</i></p> <p>The Evolution of the CMD Computing Environment: A Case Study in Rapid Growth Lloyd Cha, Chris Motta, Syed Babar, Mukul Agarwal, <i>Advanced Micro Devices</i>; Jack Ma, Waseem Shaikh, <i>Taos Mountain Software</i>; and Istvan Marko, <i>Volt Services Group Computer</i></p> <p>Immunology Mark Burgess, <i>Centre of Science and Technology, Oslo College, Norway</i></p> <p>A Visual Approach for Monitoring Logs Luc Girardin and Dominique Brodbeck, <i>UBS, Ubilab</i></p>	<p>Security as Infrastructure Tom Perrine, <i>San Diego Supercomputer Center</i></p> <p>Are you shooting rabbits or building fences? This talk will describe security architectures: reliable, robust, and comprehensive plans to incorporate security into your networks and hosts. Unlike “patch of the day” and other reactive methods, security architectures are implemented to prevent entire classes of security problems throughout your network.</p>	<p>Works-in-Progress (WIPs)</p> <p>Do you have interesting work you would like to share, or a cool idea that is not yet ready to be published? The LISA audience provides valuable discussion and feedback. We are particularly interested in presentation of student work. To schedule your short report, send email to Peg Schafer, lisawips98@usenix.org.</p>
Friday, December 11	12:30pm – 2:00pm	Lunch (on your own)		
Friday, December 11	2:00pm – 3:30pm	<p>Mailing Lists Session Chair: Tim Hunter, <i>KLA-Tencor Corporation</i></p> <p>Mailman: The GNU Mailing List Manager John Viega, <i>Reliable Software Technologies</i>; Barry Warsaw, and Ken Manheimer, <i>Corporation for National Research Initiatives</i></p> <p>Drinking from the Fire(walls) Hose: Another Approach to Very Large Mailing Lists Strata Rose, <i>VirtualNet Consulting</i>; Christine Hogan, Greg Kulosa, and Bryan McDonald, <i>Global Networking and Computing, Inc.</i></p> <p>Request v3: A Modular, Extendable Task Tracking Tool Joe Rhett, <i>Navigist</i></p>	<p>Practical Cryptography—Privacy for Business and Electronic Commerce Frederick M Avolio, <i>Security Consultant</i></p> <p>This session will explain cryptographic basics, but concentrate on the tools and methods necessary for privacy for business (or personal) transactions and how they are and will be used in electronic commerce. It is not a technical presentation to discuss technical characteristics of the schemes. Rather, it is a general session to educate the system and MIS managers, who deploy encryption-enabled technology to support business on the Internet.</p>	<p>Palm Pilot Magic</p> <p>Palm Pilots: Share your business card with someone at a single touch of a button, categorize expense reports in real time, carry your rolodex around with you. This session will discuss not only interesting things to do with your Palm Pilot but also the system administration impacts of trying to synchronize it, e.g., company phone books, while on the road.</p>
Friday, December 11	3:30pm – 4:00pm	Break		
Friday, December 11	4:00pm – 5:30pm			

Joint Closing Session:

The LISA Quiz Show!



HOSTED BY ROB KOLSTAD

The LISA QUIZ SHOW debuted in Boston many years ago and now makes a triumphant return. Host Rob Kolstad promises new questions and categories. Come to Boston to win prizes and to match your wits with other administrators in the toughest quiz show in the industry.

USENIX & SAGE Membership Information and Events

About USENIX

Since 1975, the USENIX Association has brought together the community of engineers, system administrators, scientists, and technicians working on the cutting edge of computing. USENIX and its members are engaged in problem-solving, in innovation, and in research that works.

USENIX Website: www.usenix.org

About SAGE

SAGE, the System Administrators Guild, is the largest membership society for system managers and is dedicated to the advancement and recognition of system administration as a profession. SAGE is a special technical group within USENIX. To join SAGE, you must be a member of USENIX.

SAGE Website: www.usenix.org/sage

Upcoming Events Co-sponsored by USENIX & SAGE

1st Conference on Network Administration

April 7-9, 1999
Santa Clara, California
Web site: www.usenix.org/events/neta99
Submissions due: November 6, 1998

Large Installation System Administration of Windows NT Conference (LISA NT)

July 17-19, 1999
Seattle, Washington

13th Systems Administration Conference (LISA '99)

November 7-12, 1999
Seattle, Washington

ATTEND LISA '98, AND JOIN USENIX/SAGE FOR NO ADDITIONAL COST

Attend the technical sessions, and you may join or renew your USENIX/SAGE membership for FREE when paying the non-member fee. Just check the box on the registration form. Current USENIX members may join SAGE for just \$25 at the USENIX membership booth during the conference.

BENEFITS OF JOINING SAGE ARE BOTH IMMEDIATE AND INVALUABLE

When you join SAGE, you receive:

- Each booklet in the Short Topics in System Administration Series published during your membership. (The newest is "Educating and Training Sysadmins: A Survey.")
- Access to the annual System Administrator Job Profile. (Compare the work you do for your salary.)
- Access to members-only online resources (job boards, SAGE mailing lists, USENIX Proceedings since 1993, etc).
- Savings on registering for USENIX & SAGE Sponsored conferences.
- Subscription to *:login:* with the SAGE section in 6 of 8 issues
- All benefits of full USENIX membership (Including discounts from publishers, voting privileges)

Even more, you get satisfaction. You know your SAGE membership funds "good works" like introducing high school students to sysadmin skills, supporting local and international SAGE groups, contributing to creating resources for sysadmins, like code of ethics and certification. Join SAGE, and join with your fellow sysadmins to advance the sysadmin community.

USENIX AND SAGE THANK THEIR SUPPORTING MEMBERS

USENIX Supporting Members: ANDATACO * APUNIX COMPUTER SERVICES * AUSPEX SYSTEMS, INC. * CIRRUS TECHNOLOGIES * CYBERSOURCE CORPORATION * DIGITAL EQUIPMENT CORPORATION * EARTHLINK NETWORK, INC * HEWLETT-PACKARD INDIA SOFTWARE OPERATION * INTERNET SECURITY SYSTEMS, INC. * INVINCIBLE TECHNOLOGIES CORPORATION * LUCENT TECHNOLOGIES, BELL LABS * MOTOROLA GLOBAL SOFTWARE * NEOSOFT, INC. * NIMROD AS * PERFORMANCE COMPUTING * SUN MICROSYSTEMS, INC. * TEAMQUEST CORPORATION * UUNET TECHNOLOGIES, INC. * WITSEC, INC.

SAGE Supporting Members: ATLANTIC SYSTEMS GROUP * COLLECTIVE TECHNOLOGIES * D.E.SHAW & Co. * DIGITAL EQUIPMENT CORPORATION * ESM SERVICES, INC. * GLOBAL NETWORKING & COMPUTING INC. * GREAT CIRCLE ASSOCIATES * O'REILLY & ASSOCIATES * REMEDY CORPORATION * SYSADMIN MAGAZINE * TRANSQUEST TECHNOLOGIES, INC. * UNIX GURU UNIVERSE (UGU)

Hotel and Travel Information

Hotel Discount Reservation Deadline: Monday, November 16, 1998

USENIX has negotiated special rates for conference attendees at the Boston Marriott Copley Place Hotel. Contact the hotel directly to make your reservation. You must mention USENIX to get the special rate. A one-night room deposit must be guaranteed to a major credit card. To cancel your reservation, you must notify the hotel at least 24 hours before your planned arrival date.

Boston Marriott Copley Place Hotel

110 Huntington Avenue
Boston, MA 02116

Toll Free: 800.228.9290

Telephone: 617.236.5800

Reservation Fax: 617.236.5885

Single/Double Occupancy \$134.00
(plus applicable state and local taxes, currently at 12.45%)

Need a Roommate?

Usenet facilitates room sharing. If you wish to share a room, post to and check comp.org.usenix.roomshare

Discount Air Fares

Special airline discounts will be available for USENIX attendees. Please call for details:

JNR, Inc.

Toll Free in US and Canada:

1.800.343.4546

Telephone: 1.949.476.2788

Airport to Hotel Transportation

The hotel is only 6 miles from Logan International Airport. City Transportation provides shuttle service every 30 minutes to and from the airport at a cost of \$7.50 one way. Catch the shuttle from outside the baggage claim area on the lower level at the airport. Taxi service cost is approximately \$16 one way.

Parking/Local Transportation

Boston parking is scarce and expensive; currently the Marriott is charging \$22/day. Consider using the "T", Boston's subway. It links all sections of the city and nearby communities. The fare is just \$.85 one way and it runs from 5:00am to 12:45am. Both the Copley Place Stop on the Green Line and the Back Bay Station on the Orange Line are located nearby the hotel.

ABOUT BOSTON

Boston offers several attractions and sights to see. Some points of interest include:

- Museums
 - The Boston Computer Museum
 - The Museum of Science
 - The Museum of Fine Arts
 - The Isabella Stewart Gardiner Museum
 - The USS Constitution Museum
 - Fogg Art Museum
 - Busch Reisinger Museum of Germanic Art

- Boston Pops
- Skywalk Observation Deck
- Samuel Adams Brewery
- Trolley Tours
- Basketball Hall of Fame
- City of Cambridge
 - Harvard
 - MIT
- Boston's North End
 - Little Italy
 - China Town
- Historic Lexington and Concord

For more detailed information about Boston visit:

http://city.net/countries/united_states/massachusetts/boston/

QUESTIONS?

Email: conference@usenix.org

Phone: 1.949.588.8649

Fax: 1.949.588.9706

Updates:

<http://www.usenix.org/events/lisa98/>

Conference Activities and Services

Conference Activities

Schedule a BoF! Talk to an expert! Present a new work! Don't miss these special activities, designed to maximize your time at LISA.

Birds-of-a-Feather Sessions (BoFs)

Tuesday, Wednesday, and Thursday evenings

Do you have a topic that you'd like to discuss with others? The always popular evening Birds-of-a-Feather Sessions are very informal, attendee-organized gatherings of persons interested in a particular topic. BoFs may be scheduled during the conference at the registration desk or in advance by contacting the USENIX Conference Office by phone at 1.949.588.8649 or by sending email to conference@usenix.org. BoFs are open to all attendees. Topics are announced at the conference.

Works-in-Progress Reports (WIPs)

Friday, December 11, 11:00 AM–12:30 PM

Do you have interesting work you would like to share, or a cool idea that is not yet ready to be published? The USENIX audience provides valuable discussion and feedback. Short, pithy, and fun, Works-in-Progress Reports (WIPs) introduce interesting new or ongoing work. We are particularly interested in presentation of student work. Prospective speakers should send a short one or two paragraph report, to lisawips@usenix.org. A schedule of presentations will be posted at the conference and the speakers will be notified in advance. Works-in-Progress Reports are five-minute presentations; the time limit will be strictly enforced.

The Guru is IN

Have a question that's been bothering you? Try asking a USENIX guru! Experts from the USENIX community will be available to spark controversy and answer questions. These are informal discussions among participants, one more way at the conference to transmit information. Please send email to Lee Damon at lisaguru@usenix.org if you would like to volunteer your expertise.

Joint Session: SAGE Community Meeting & Candidates Forum

Find out how to get involved in SAGE, and hear from the SAGE Executive Committee on their recent and upcoming activities. The committee will be on hand to answer your questions, and to solicit your ideas and feedback on how to better serve SAGE members. You will also hear from the candidates running in the upcoming SAGE election. Everybody is welcome.

Social Activities

Conference Orientation

Sunday, December 6, 6:00pm–7:00pm

Exhibition Reception

Wednesday, December 9, 5:30pm–7:00pm

Reception

Thursday, December 10, 6:30pm–7:30pm

Conference Services

Terminal Room

The Terminal Room will have Internet access via PCs running a free version of UNIX, and laptop drops. Additionally you can dial in to the network from your Marriott hotel room, and dial out using your favorite credit card.

The Terminal Room will be available Monday–Thursday from 7:00 am–2:00 am and Friday from 7:00 am–2:00 pm.

Want to volunteer? Send email to <mcginley@usenix.org>.

Attendee Message Service

Email will be available Monday, December 7 through Friday, December 11. Email to conference attendees should be addressed:

first_lastname@conference.usenix.org

Telephone messages during the conference may be left by telephoning the Boston Marriott Copley Place Hotel at 617.236.5800 and asking for the USENIX Message Center Desk. The Message Center will be open beginning on Sunday, December 6, 7:30am–5:00pm, and continuing during conference hours until Friday, December 11, at 3:30pm.

Conference Publications and CD-ROMs

One copy of the conference proceedings and one copy of the Invited Talks booklet may be picked up at the conference by all technical program registrants. The Conference CD-ROM is provided to each Tutorial Program attendee. The CD-ROM includes tutorial notes, proceedings and Invited Talks. Additional copies of the proceedings or CD-ROMs may also be purchased by tutorial and technical session attendees on-site. After the conference, proceedings and CD-ROMs may be purchased from the USENIX Association Executive Office, telephone 1.510.528.8649 or send email to office@usenix.org.

For more information, contact:

USENIX Conference Office, 22672 Lambert St., Suite 613, Lake Forest, CA USA 92630
Phone: 1.949.588.8649 Fax: 1.949.588.9706
Email: conference@usenix.org
Hours: M–F, 8:30 am–5:00 pm Pacific Time

Registration Information and Fees

Tutorial Fees

(December 6–8, 1998)

Tutorial fees include:

- Admission to the tutorial(s) you select
- Printed tutorial notes for your selected courses
- CD-ROM including tutorials and conference proceedings
- Admission to the Products Exhibition
- Lunch

Early registration deadline is October 30, 1998. On-site fees apply after that date.

Tutorials may be taken in any combination, so long as there is no overlap (i.e. selecting two AM tutorials on the same day.) Full-day tutorials cannot be split.

To calculate your tutorial fees:

To determine your total tutorial registration fee, add the total number of units you have selected and refer to the fee schedule below (a maximum of 2 units per day may be selected):

- One half-day tutorial = 1 unit
- One full-day tutorial = 2 units

# Units Selected	Tutorial Fee (until Oct 30)	Tutorial Fee (after Oct 30)	CEU Credit (optional)
1 unit	\$200.00	\$250.00	\$15.00
2 units	\$345.00	\$395.00	\$15.00
3 units	\$495.00	\$545.00	\$23.00
4 units	\$640.00	\$690.00	\$30.00
5 units	\$790.00	\$840.00	\$38.00
6 units	\$935.00	\$985.00	\$45.00

Technical Sessions Fees

(December 9–11)

Early registration deadline is Friday,

October 30. On-site fees apply after that date.

	Pre-Registration	On-Site
Member*	\$355	\$405
Non-Member or Renewing Member	\$450	\$500
Full-Time Student	\$ 75	\$ 75

(Must provide copy of current student I.D. Card)

*The member fee applies to current individual members of USENIX, EurOpen groups, JUS, AUUG, or SAGE-AU.

Join or renew your USENIX/SAGE individual membership for no additional charge. Just check the box on the registration form, and pay the non-member technical sessions fee. \$95 of the registration fee will be designated as dues in full for a one year individual USENIX/SAGE memberships.

Current USENIX members who wish to join SAGE: you may join SAGE at the USENIX Membership Booth during the conference.

Payment

Payment by check or credit card MUST accompany the registration form. Purchase orders, vouchers, telephone reservations and email registrations cannot be accepted.

CANCELLATION POLICY If you must cancel, all refund requests must be in writing and postmarked no later than Friday, November 27, 1998. Telephone cancellations cannot be accepted. You may substitute another in your place. Contact the Conference Office for details.

Student Discounts and Stipends

Tutorials: A limited number of seats in each tutorial are reserved for full-time students at the very special rate of \$70.00 for either two half-day tutorial classes or one full-day tutorial (2 units). To take advantage of this, you MUST telephone the conference office to confirm availability and make a reservation. You will receive a reservation code number which MUST appear on your registration form. Your registration form with full payment and a photocopy of your current student I.D. card MUST arrive within 14 days from the date of your reservation. If they do not arrive by that date, your reservation will be canceled. This special fee is non-transferable.

Technical Sessions: USENIX offers a special discount rate of \$75 for its technical sessions for full-time students. You must include a copy of your current student I.D. card with your registration. This special fee is not transferable.

Student Stipends: A limited number of student stipends are available to pay for travel, living, expenses, and registration fees to enable full-time students to attend the conference. To apply for a stipend, read comp.org.usenix six to eight weeks before the conference, visit our Web site, <http://www.usenix.org/students> or email <students@usenix.org> for more information.

Copy this form as needed. Type or print clearly.

Registration Form *LISA '98 December 6-11, 1998*

The address you provide will be used for all future USENIX mailings unless you notify us in writing.

Name		First	Last
_____		_____	_____
First Name for Badge		Member Number	
_____		_____	
Company / Institution			

Mail Stop		Mail Address	
_____		_____	
City	State	Zip	Country
()		()	
Telephone No.		Fax	
_____		_____	
Email Address (1 only please)		WWW	
_____		_____	

Attendee Profile

Please help us serve you better. By answering the following questions, you help us plan our activities to meet members' needs. All information is confidential.

- I do not want to be on the attendee list.
- I do not want my address made available except for USENIX mailings.
- I do not want USENIX to email me notices of Association activities.

What is your affiliation (check one):

- academic commercial gov't R&D

What is your role in the purchase decision (check one):

- 1. final 2. specify 3. recommend 4. influence 5. no role

What is your primary job function (check one):

- 1. system/network administrator 2. consultant 3. academic/researcher
- 4. developer/programmer/architect 5. system engineer
- 6. technical manager 7. student 8. security 9. webmaster

How did you first hear about this meeting (check one):

- 1. USENIX brochure 2. newsgroup/mailling list 3. :login:
- 4. Web 5. from a colleague 6. magazine 7. SunWorld email
- 8. from an exhibitor

What publications or newsgroups do you read related to systems administration issues? _____

Please complete this registration form and return it along with full payment to:

USENIX Conference Office
22672 Lambert St., Suite 613
Lake Forest, CA USA 92630
Phone: 1.949.588.8649 Fax: 1.949.588.9706

You may fax your registration form if paying by credit card. To avoid duplicate billing, please do not mail an additional copy.

Tutorial Program

Tutorials may be taken in any combination, so long as there is no overlap (i.e. selecting two AM tutorials on the same day.) Full-day tutorials cannot be split. Check the boxes next to the tutorial number(s) you wish to attend:

Carry total units to end of each column for each day.			
Sunday	Monday	Tuesday	
<input type="checkbox"/> S1 <input type="checkbox"/> S6	<input type="checkbox"/> M1 <input type="checkbox"/> M5	<input type="checkbox"/> T1 <input type="checkbox"/> T5	Full-day class = 2 units
<input type="checkbox"/> S2 <input type="checkbox"/> S7	<input type="checkbox"/> M2 <input type="checkbox"/> M6	<input type="checkbox"/> T2 <input type="checkbox"/> T6	
<input type="checkbox"/> S3 <input type="checkbox"/> S8	<input type="checkbox"/> M3 <input type="checkbox"/> M7	<input type="checkbox"/> T3 <input type="checkbox"/> T7	Half-day class = 1 unit
<input type="checkbox"/> S4 <input type="checkbox"/> S9	<input type="checkbox"/> M4	<input type="checkbox"/> T4	
<input type="checkbox"/> S5 <input type="checkbox"/> S10	<input type="checkbox"/> M8AM <input type="checkbox"/> M11PM	<input type="checkbox"/> T8AM <input type="checkbox"/> T11PM	
	<input type="checkbox"/> M9AM <input type="checkbox"/> M12PM	<input type="checkbox"/> T9AM <input type="checkbox"/> T12PM	
	<input type="checkbox"/> M10AM <input type="checkbox"/> M13PM	<input type="checkbox"/> T10AM <input type="checkbox"/> T13PM	
_____ units/day (max. 2)	_____ units/day (max. 2)	_____ units/day (max. 2)	
TOTAL UNITS (max 6):			_____

Tutorial Program Fee Schedule	Units	Tutorial Fee (until Oct. 30*)	CEU Fee (optional)
Full-day class = 2 units	1 unit	\$200.00	\$15.00
Half-day class = 1 unit	2 units	\$345.00	\$15.00
	3 units	\$495.00	\$23.00
	4 units	\$640.00	\$30.00
	5 units	\$790.00	\$38.00
	6 units	\$935.00	\$45.00
*After Oct. 30 add \$50 to total fee			

Tutorial Program Fees (Sunday-Tuesday, Dec 6-8)

Enter total tutorial fee from fee schedule above \$ _____

CEU units surcharge from fee schedule above \$ _____

Late fee applies if postmarked after Friday, October 30, 1998.....Add \$50.00 \$ _____

Full-time student, pre-registered or on-site (Attach photocopy of current student ID)

CODE NO. _____ \$70.00 \$ _____

CODE NO. _____ \$70.00 \$ _____

CODE NO. _____ \$70.00 \$ _____

Technical Sessions Fees (Wednesday-Friday, Dec 9-11)

Current member fee..... \$355.00 \$ _____
(Applies to individual members of USENIX, EurOpen national groups, JUS, AUUG, and SAGE-AU)

Non-member fee* \$450.00 \$ _____

*Join or renew your USENIX/SAGE memberships, AND attend the conference for the same low price. Check here:

Late fee applies if postmarked after Friday, October 30, 1998..... Add \$50.00 \$ _____

Full-time student** fee, pre-registered or on-site \$75.00 \$ _____

Full-time student** fee including USENIX membership fee..... \$100.00 \$ _____

**Students: Attach a photocopy of current student ID

TOTAL DUE \$ _____

REFUND/CANCELLATION POLICY If you must cancel, all refund requests must be in writing with your signature, and postmarked no later than November 27, 1998. Telephone cancellations cannot be accepted. You may substitute another in your place. Call the conference office for details: 1.949.588.8649.

Payment must accompany this form

Payment (U.S. dollars only) must accompany this form. Purchase orders, vouchers, email, and telephone registrations cannot be accepted.

Payment enclosed. Make check payable to USENIX Conference.

Charge to my: VISA MasterCard American Express Discover

Account No. _____ / Exp. Date _____

Print Cardholder's Name _____

Cardholder's Signature _____



[LISA '98]

December 6-11, 1998

12th Systems Administration Conference

Marriott Copley Place Hotel, Boston, Massachusetts

*The Only Conference
by and for System
Administrators*

Sign up now for best tutorial selection. See pages 4-17.
Hotel Discount Deadline: November 16, 1998
Register by October 30 and save \$100

Sponsored by USENIX, The Advanced Computing Systems Association and by
SAGE, The System Administrators Guild

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USENIX Conference Office
22672 Lambert Street, Suite 613
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Phone: 1.949.588.8649

Fax: 1.949.588.9706

Email: conference@usenix.org

Office hours: 8:30 am-5:00 pm Pacific Time

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Please pass the brochure along to a colleague!