BOSTON

USENIX '06
Annual Technical Conference

May 30–June 3, 2006

Don't miss 5 full days of top-level training and the latest in cutting-edge research at USENIX Annual Tech!

5 DAYS OF TRAINING
- Tuesday–Saturday, May 30–June 3
- 34 full- and half-day tutorials
- Learn from expert instructors
- Topics range from Ajax to VoIP

3-DAY TECHNICAL PROGRAM
- Thursday–Saturday, June 1–3
- Systems Practice & Experience Refereed Papers Track
- Keynote by Larry Peterson, Princeton and Planetlab
- Plenary by Greg Brandeau, Pixar
- Closing by Trevor Blackwell, Anybots

Plus invited talks, guru sessions, BoFs, poster and vendor sessions, and more!

TRAINING PROGRAM

Register by May 12 and save! • www.usenix.org/boston06

USENIX '06

Annual Technical Conference

Join leading researchers and practitioners for 5 full days on the latest technology.

Top 5 Reasons to Attend

#1 TOP-NOTCH TRAINING
Highly respected experts provide you with new information and skills you can take back to work tomorrow.

#2 INVITED TALKS
that feature industry luminaries discussing timely and important topics

#3 YOU'LL HEAR IT HERE FIRST
Check out the latest developments in cutting-edge research in the Systems Practice & Experience Refereed Papers Track and poster session.

#4 ANSWERS
to your toughest questions from industry experts in the Guru Is In sessions

#5 THE CHANCE TO MINGLE
with industry leaders and network with peers in the evening BoFs and receptions

EVERY TRAINING PROGRAM REGISTRATION INCLUDES:

- Admission to the tutorials you select
- Lunch on the day of your tutorials
- Training program CD-ROM, including all available tutorial presentations and materials
- Printed materials for your tutorials
- Admission to the receptions, BoFs, and other evening events
- Conference T-shirt
- Wireless connectivity in the conference session area

OUR GUARANTEE
If you're not happy, we're not happy. If you feel a tutorial does not meet the high standards you have come to expect from USENIX, let us know by the first break and we will change you to any other available tutorial immediately.

CONTENTS

USENIX has always been the place to present groundbreaking research and cutting-edge practices in a wide variety of technologies and environments, and 2006 is no exception.

USENIX Annual Tech in 2006 will feature:

Training: Tuesday–Saturday, May 30–June 3, 2006
The training program at USENIX '06 provides in-depth and immediately useful training on the latest techniques, effective tools, and best strategies. The 34 half- and full-day sessions are taught by well-known industry experts, selected for their ability to teach complex subjects. The many crucial topics include:

- Measuring Security, taught by Dan Geer

- Ajax and Advanced Responsive WebApp Development, taught by Alex Russell

- Administering Linux in Production Environments, taught by Æleen Frisch

Technical Sessions: Thursday–Saturday, June 1–3, 2006
The 3-day technical program includes:

- Refereed papers featuring the latest research in the new Systems Practice & Experience Track

- Expert-led invited talks, including the keynote by Larry Peterson, *Princeton University and PlanetLab Consortium;* the plenary by Greg Brandeau, *Vice President of Technology, Pixar Animation Studios;* and the closing by Trevor Blackwell, *Anybots*

- Guru Is In Sessions, where you can get answers to your most burning technical questions

- The opportunity to mingle with colleagues and industry leaders at the Birds-of-a-Feather sessions and other evening social events, including poster and vendor sessions and receptions

Register today at www.usenix.org/boston06.

USENIX '06 Organizers

PROGRAM CO-CHAIRS
Atul Adya, *Microsoft*
Erich Nahum, *IBM T.J. Watson Research Center*

PROGRAM COMMITTEE
Steven Bellovin, *Columbia University*
Ranjita Bhagwan, *IBM T.J. Watson Research Center*
Jeff Chase, *Duke University*
Mike Chen, *Intel Research, Seattle*
Jason Flinn, *University of Michigan*
Steven Hand, *University of Cambridge*
Gernot Heiser, *University of New South Wales* and *National ICT Australia*
Kim Keeton, *Hewlett-Packard*
Dejan Kostić, *EPFL*
Jay Lepreau, *University of Utah*
Barbara Liskov, *Massachusetts Institute of Technology*

Jason Nieh, *Columbia University*
Vivek Pai, *Princeton University*
Dave Presotto, *Google*
John Reumann, *Google*
Mendel Rosenblum, *Stanford University*
Stefan Saroiu, *University of Toronto*
Geoff Voelker, *University of California, San Diego*
Alec Wolman, *Microsoft Research*
Yuanyuan Zhou, *University of Illinois at Urbana-Champaign*

INVITED TALKS COMMITTEE
Matt Blaze, *University of Pennsylvania*
Christopher Small, *BBN Technologies*
Stephen Walli, *Optaros, Inc.*

POSTER SESSION CHAIR
Stefan Saroiu, *University of Toronto*

TRAINING AT A GLANCE

TUESDAY, MAY 30
Full Day: 9:00 a.m.–5:00 p.m.

T1 Advanced Perl Programming *(Christiansen)*

T2 Solaris 10 Performance, Observability, and Debugging *(Mauro & McDougall)*

T3 *NEW!* Building a Logging Infrastructure and Log Analysis for Security *(Singer)*

T4 Hands-on Linux Security Class: From Hacked to Secure in Two Days *Day 1 of 2 (Farrow)*

T5 *NEW!* Reliable, Fast, Lightweight Storage: A Berkeley DB Tutorial *(Seltzer)*

WEDNESDAY, MAY 31
Full Day: 9:00 a.m.–5:00 p.m.

W1 *NEW!* Ajax and Advanced Responsive Webapp Development *(Russell)*

W2 *NEW!* Introduction to VMware ESX Server *(Gannon & Arrasjid)*

W3 Implementing [Open]LDAP Directories *(Carter)*

WEDNESDAY *(continued)*

W4 Hands-on Linux Security Class: From Hacked to Secure in Two Days *Day 2 of 2 (Farrow)*

W5 Issues in UNIX Infrastructure Design *(Damon)*

W6 Linux System Administration *(Jensen)*

THURSDAY, JUNE 1
Full Day: 9:00 a.m.–5:00 p.m.

R1 Administering Linux in Production Environments *(Frisch)*

R2 Solaris 10 Security Features Workshop *(Galvin)*

Half Day: 9:00 a.m.–12:30 p.m.

R3 *NEW!* Wide Area Storage Networking: Server Consolidation and Data Protection Over the WAN *(Cucchi)*

R4 *NEW!* Security Without Firewalls *(Singer)*

R5 *NEW!* Server Consolidation and Containment Methodology for Intel Environments *(Gannon & Arrasjid)*

Half Day: 1:30 p.m.–5:00 p.m.

R6 *NEW!* UNIX on My Mind *(Cheswick)*

R7 *NEW!* Ethereal and the Art of Debugging Networks *(Carter)*

R8 *NEW!* Practical Project Management for Sysadmins and IT Professionals *(Chalup)*

INSTRUCTORS

John Arrasjid, VMware
Richard Bejtlich, TaoSecurity
Gerald Carter, Samba Team/HP
Heison Chak, SOMA Networks
Strata Rose Chalup, Consultant
Bill Cheswick, Lumeta
Tom Christiansen, Consultant
Michael Cucchi, Cambridge Computer
Lee Damon, U. Washington
Jacob Farmer, Cambridge Computer
Rik Farrow, Security Consultant
Æleen Frisch, Exponential Consulting
Peter Baer Galvin, Corporate Technologies
Simson Garfinkel, Harvard U.
John Gannon, VMware
Dan Geer, Geer Risk Services

Joshua Jensen, Cisco Systems
Tom Limoncelli, Google
James Mauro, Sun Microsystems
Richard McDougall, Sun Microsystems
Alex Russell, JotSpot, Inc.
John Sellens, Syonex
Margo Seltzer, Sleepycat Software
Abe Singer, SDSC
David Sklar, Ning Inc.
Theodore Ts'o, IBM

Register online at www.usenix.org/boston06

Want more information on the training program? See www.usenix.org/boston06

FRIDAY, JUNE 2

Full Day: 9:00 a.m.–5:00 p.m.

F1 *NEW!* Beyond Shell Scripts: 21st-Century Automation Tools and Techniques *(Frisch)*

F2 Network Security Monitoring with Open Source Tools *(Bejtlich)*

Half Day: 9:00 a.m.–12:30 p.m.

F3 *NEW!* Defense Against the Dark Arts: Repelling the Wily Hacker *(Cheswick)*

F4 *NEW!* Disk-to-Disk Backup and Eliminating Backup System Bottlenecks *(Farmer)*

F5 *NEW!* RSS vs. Information Overload *(Chalup)*

Half Day: 1:30 p.m.–5:00 p.m.

F6 *NEW!* Databases: What You Need to Know *(Sellens)*

F7 *NEW!* Next Generation Storage Networking *(Farmer)*

F8 Time Management: Getting It All Done and Not Going (More) Crazy! *(Limoncelli)*

SATURDAY, JUNE 3

Full Day: 9:00 a.m.–5:00 p.m.

A1 *NEW!* Learning PHP 5 *(Sklar)*

A2 *NEW!* Solaris 10 Administration Workshop *(Galvin)*

A3 System and Network Monitoring: Tools in Depth *(Sellens)*

A4 *NEW!* Measuring Security *(Geer)*

A5 *NEW!* Understanding and Programming Cryptography *(Garfinkel)*

A6 *NEW!* VoIP Principles and Practice *(Chak)*

A7 Inside the Linux Kernel (Updated for Version 2.6) *(Ts'o)*

Register today at www.usenix.org/boston06

Register by May 12 and save!

Attention Managers
WHY YOU SHOULD SEND YOUR EMPLOYEES TO USENIX '06

Hiring the best and the brightest is the ultimate goal for any employer. However, keeping current employees up to par is just as important. Technology continues to evolve: truly to stay ahead of the game, your employees must continue to enhance their skills.

The training program at USENIX '06 offers a cost-effective, one-stop shop for training current IT and development employees. Over 30 full- and half-day tutorials taught by the most respected leaders in the field provide an unparalleled opportunity to learn from the best. Tutorials cover a multitude of topics including open source technologies, system administration, security, and VoIP.

Combining full days of training with days of technical sessions on groundbreaking research makes the USENIX '06 experience even more valuable. Additionally, the Wednesday poster session, Thursday evening reception, and Birds-of-a-Feather sessions provide your staff with a chance to network with peers and industry leaders to gain that all-important insider IT knowledge that will keep your company current and running smoothly.

Keeping up with technology can be costly and time-consuming in this unforgiving economy: take full advantage of this opportunity to have your staff learn from the top researchers, practitioners, and authors all in one place, at one time.

TRAINING PROGRAM

T1 **ADVANCED PERL PROGRAMMING**

Tom Christiansen, Consultant

Who Should Attend:

Anyone with a journeyman-level knowledge of Perl programming who wants to hone Perl skills. This class will cover a wide variety of advanced topics in Perl, including many insights and tricks for using these features effectively. After completing this class, attendees will have a much richer understanding of Perl and will be better able to make it part of their daily routine.

Topics Include:

- Symbol tables and typeglobs
- Modules
- References
- Fancy object-oriented programming
- Managing exceptions and warnings
- Regular expressions
- Programming with multiple processes or threads
- Unicode and I/O layers

T2 **SOLARIS 10 PERFORMANCE, OBSERVABILITY, AND DEBUGGING**

James Mauro and Richard McDougall, Sun Microsystems

Who Should Attend:

Anyone who supports or may support Solaris 10 machines.

Topics Include:

- Solaris 10 features overview
- Solaris 10 tools and utilities
- Understanding memory use and performance
- Understanding thread execution flow and profiling
- Understanding I/O flow and performance
- Looking at network traffic and performance
- Application and kernel interaction
- Putting it all together

T3 **BUILDING A LOGGING INFRASTRUCTURE AND LOG ANALYSIS FOR SECURITY** *NEW!*

Abe Singer, San Diego Supercomputer Center

Who Should Attend:

System, network, and security administrators who want to be able to separate the wheat of warning information from the chaff of normal activity in their log files.

Topics Include:

- Problems, issues, and scale of handling log information
- Generating useful log information
- Collecting log information
- Storing log information
- Log analysis
- Legal issues

T4 **HANDS-ON LINUX SECURITY: FROM HACKED TO SECURE IN TWO DAYS** *DAY 1 OF 2*

Rik Farrow, Security Consultant

Who Should Attend:

System administrators of Linux and other UNIX systems; anyone who runs a public UNIX server.

Exercises Include:

- Searching for hidden files
- TCP/IP and its relation to probes and attacks
- Uses of ARP and ethereal
- hping2 probes
- nmap (connect and SYN scans)
- Buffer overflows in sample C programs
- Weaknesses in Web scripts (example in Perl)

Register by May 12 and save!

T5 **RELIABLE, FAST, LIGHTWEIGHT DATA STORAGE: A BERKELEY DB TUTORIAL** *NEW!*

Margo Seltzer, Sleepycat Software

Who Should Attend:

Application architects and developers; software development and program managers.

Topics Include:

- Databases and access methods
- Managing key/data pairs
- Using cursors
- Using secondary indices
- Database environments
- Application design
- Backup and recovery
- Berkeley DB database administration
- Application tuning
- Replication overview
- Berkeley DB XML overview
- Berkeley DB Java Edition overview
- Berkeley DB subsystems
- Performance tuning

W1 **AJAX AND ADVANCED RESPONSIVE WEBAPP DEVELOPMENT** *NEW!*

Alex Russell, JotSpot, Inc. (and Project Lead for the Dojo Toolkit)

Who Should Attend:

Developers who want to add Ajax and other responsive interface elements to Web applications.

Topics Include:

- Ajax: Good? Bad? Irrelevant?
- Ajax basics
- What to send over the wire, and when
- JavaScript and the DOM
- Defensive client-side development
- Debugging
- Dissection of common Ajax apps w/ debugging tools
- Toolkits to help
- Advanced JS and visual effects

W2 **INTRODUCTION TO VMWARE ESX SERVER** *NEW!*

John Gannon and John Arrasjid, VMware

Who Should Attend:

x86 sysadmins who want to dramatically improve the way they manage systems.

Topics Include:

- Virtual infrastructure and ESX Server overview
- ESX Server installation and configuration
- Virtual machine (VM) creation and operation
- Operations and administration
- Enabling disaster recovery and business continuity with ESX Server
- Migration strategies and the P2V process (Physical-to-Virtual)
- Advanced configuration

W3 **IMPLEMENTING [OPEN]LDAP DIRECTORIES**

Gerald Carter, Samba Team/Hewlett-Packard

Who Should Attend:

Both LDAP directory administrators and architects.

Topics Include:

- Replacing NIS domains
- Integration with Samba file and print servers
- Integrating MTAs such as Sendmail and Postfix
- Creating address books for mail clients
- Managing user access to HTTP and FTP services
- Integrating with DHCP and DNS servers
- Scripting with the Net::LDAP Perl module
- Defining custom attributes and object classes

TRAINING PROGRAM

W4 HANDS-ON LINUX SECURITY: FROM HACKED TO SECURE IN TWO DAYS *DAY 2 OF 2*

Rik Farrow, Security Consultant

Who Should Attend:

System administrators of Linux and other UNIX systems; anyone who runs a public UNIX server.

Exercises Include:

- John the Ripper, password cracking
- Misuses of suid shells, finding backdoors
- Disabling network services.
- Searching for evidence of rootkits
- Sleuth Kit (looking at intrusion timelines)
- netfilter

W5 ISSUES IN UNIX INFRASTRUCTURE DESIGN

Lee Damon, University of Washington

Who Should Attend:

Anyone who is designing, implementing, or maintaining a UNIX environment with 2 to 20,000+ hosts. System administrators, architects, and managers who need to maintain multiple hosts with few admins.

Topics Include:

- Administrative domains
- Desktop services vs. farming
- Disk layout
- Free vs. purchased solutions
- Homogeneous vs. heterogeneous
- The essential master database
- Policies to make life easier
- Push vs. pull
- Getting the user back online in 5 minutes
- Remote administration
- Scaling and sizing
- Security vs. sharing
- Single sign-on
- Single system images
- Tools

W6 LINUX SYSTEM ADMINISTRATION

Joshua Jensen, Cisco Systems

Who Should Attend:

System administrators who plan to implement Linux in a production environment.

Topics Include (with an emphasis on security):

- Installation issues
- Boot loaders and system startup
- Disk partitioning and LVM
- Software RAID
- The RPM package system
- Networking
- User management
- Automated system installation
- Network-based authentication
- User accounts and management
- Network services and xinetd
- SSH: port tunneling, keys, tricks
- New developments

R1 ADMINISTERING LINUX IN PRODUCTION ENVIRONMENTS

Æleen Frisch, Exponential Consulting

Who Should Attend:

Both current Linux system administrators and administrators from sites considering converting to Linux or adding Linux systems to their current computing resources.

Exercises Include:

- Recent kernel developments
- High-performance I/O
- Advanced compute-server environments
- High availability Linux: fault-tolerance options
- Enterprise-wide authentication
- Automating installations and other mass operations
- Linux performance tuning

Register by May 12 and save!

R2 SOLARIS 10 SECURITY FEATURES WORKSHOP

Peter Baer Galvin, Corporate Technologies

Who Should Attend:

Solaris systems managers and administrators.

Topics Include:

- N1 Grid Containers (aka Zones) (lab)
- RBAC (lab)
- Privileges (lab)
- NFSv4
- Flash archives and live upgrade
- Moving from NIS to LDAP
- DTrace
- FTP client and server enhancements
- PAM, auditing, Kerberos enhancements
- BSM
- Service Management Facility (lab)
- Solaris Cryptographic Framework
- Smartcard interfaces and APIs
- Packet filtering
- BART

R3 WIDE AREA STORAGE NETWORKING: SERVER CONSOLIDATION AND DATA PROTECTION OVER THE WAN

NEW!

Michael Cucchi, Cambridge Computer Services

Who Should Attend: ◑ HALF-DAY A.M.

System administrators, IT managers, and enterprise architects who are concerned with disaster recovery, data protection, server consolidation, and resource sharing over a WAN.

Topics Include:

- Remote site backup techniques
- Continuous data protection (CDP)
- Storage encryption
- Capacity-optimized storage devices and WAN accelerators
- Replication considerations
- Application failover
- Latency issues
- Wide area file services (WAFS)
- Email server consolidation

R4 SECURITY WITHOUT FIREWALLS *NEW!*

Abe Singer, San Diego Supercomputer Center

Who Should Attend: ◑ HALF-DAY A.M.

Administrators who want or need to explore strong, low-cost, scalable security without firewalls.

Topics Include:

- The threat perspective from a data-centric point of view
- How to implement and maintain centralized configuration management using cfengine
- Secure configuration and management of core network services
- Good system administration practices
- Implementing strong authentication for services such as POP/IMAP
- A sound patching strategy
- An overview of last year's compromise

R5 SERVER CONSOLIDATION AND CONTAINMENT METHODOLOGY FOR INTEL ENVIRONMENTS *NEW!*

John Gannon and John Arrasjid, VMware

Who Should Attend: ◑ HALF-DAY A.M.

System administrators/architects and IT managers responsible for multiple x86 servers.

Topics Include:

- Introduction to server consolidation
- Assessment metrics, tools, and practice
- Planning considerations and best practices
- Building momentum and mindshare
- Tools for migrating from physical to virtual (P2V)
- Management tools and ongoing management considerations
- Server containment policies

TRAINING PROGRAM

R6 **UNIX ON MY MIND** *NEW!*

Bill Cheswick, Lumeta

Who Should Attend: ◑ HALF-DAY P.M.

Anyone developing tools for UNIX or Linux, who wants to understand "the way things are done, and why that is the right way."

Topics Include:
- The UNIX style of prototyping
- Small instructional tasks in sysadmin, network admin, small languages, data mining of Internet mapping data, and HTML generation
- Bourne shell and bash programming, awk, sed, etc.
- Why real cats don't have options
- Why /dev/null shouldn't be special
- Why man pages are so important, and so hard to get right

R7 **ETHEREAL AND THE ART OF DEBUGGING NETWORKS** *NEW!*

Gerald Carter, Samba Team/Hewlett-Packard

Who Should Attend: ◑ HALF-DAY P.M.

System and network administrators interested in learning more about the TCP/IP protocol and how network traffic monitoring and analysis can be used as a debugging, auditing, and security tool.

Topics Include:
- Introduction to Ethereal for local and remote network tracing
- TCP/IP protocol basics
- Analysis of popular application protocols
- Security
- How some kinds of network attacks can be recognized

R8 **PRACTICAL PROJECT MANAGEMENT FOR SYSADMINS AND IT PROFESSIONALS** *NEW!*

Strata Rose Chalup, Project Management Consultant

Who Should Attend: ◑ HALF-DAY P.M.

System administrators who want to stay hands-on as team leads or system architects and need a new set of skills with which to tackle bigger, more complex challenges.

Topics Include:
- Quick basics of project management
- Skill sets
- Problem areas
- Project management tools

Register by May 12, 2006, and SAVE!
www.usenix.org/boston06

Want more information on the training program? See www.usenix.org/boston06

F1 BEYOND SHELL SCRIPTS: 21ST-CENTURY AUTOMATION TOOLS AND TECHNIQUES *NEW!*

Æleen Frisch, Exponential Consulting

Who Should Attend:

System administrators who want to explore new ways of automating administrative tasks.

Topics Include:

- Automating installations: tools, control, managing heterogeneous environments
- Cfengine: basic and advanced configurations, examples, when not to use it
- Other tools: Expect, Bacula, Nagios, RRDTool, Webmin, Oscar

F2 NETWORK SECURITY MONITORING WITH OPEN SOURCE TOOLS

Richard Bejtlich, TaoSecurity

Who Should Attend:

Engineers and analysts who detect and respond to security incidents.

Topics Include:

- NSM theory
- Building and deploying NSM sensors
- Accessing wired and wireless traffic
- Full content tools: Tcpdump, Ethereal/Tethereal, Snort as packet logger
- Additional data analysis tools: Tcpreplay, Tcpflow, Ngrep, Netdude
- Session data tools: Cisco NetFlow, Fprobe, Flow-tools, Argus, SANCP
- Statistical data tools: Ipcad, Trafshow, Tcpdstat, Cisco accounting records
- Sguil (sguil.sf.net)
- Case studies, personal war stories, and attendee participation

F3 DEFENSE AGAINST THE DARK ARTS: REPELLING THE WILY HACKER *NEW!*

Bill Cheswick, Lumeta

Who Should Attend: ◑ HALF-DAY A.M.

Anyone interested in learning practical security from a person whose job is to think both offensively and defensively. Systems administrators, security consultants, and software developers will all benefit from this class.

Topics Include:

- How to nail down freshly installed UNIX systems
- How to jail important server and client applications
- Software safety and resistance against outside attacks
- Demo of securing and then probing systems with common hacking tools
- How to secure a community of systems

F4 DISK-TO-DISK BACKUP AND ELIMINATING BACKUP SYSTEM BOTTLENECKS *NEW!*

Jacob Farmer, Cambridge Computer Services

Who Should Attend: ◑ HALF-DAY A.M.

System administrators involved in the design and management of backup systems and policymakers responsible for protecting their organization's data.

Topics Include:

- Identifying and eliminating backup system bottlenecks
- Conventional disk staging
- Virtual tape libraries
- Incremental forever and synthetic full backup strategies
- Block and object-level incremental backups
- Data replication
- CDP (Continuous Data Protection)
- Snapshots
- Capacity optimization

TRAINING PROGRAM

F5 RSS VS. INFORMATION OVERLOAD *NEW!*

Strata Rose Chalup, *Project Management Consultant*

Who Should Attend: ◑ HALF-DAY A.M.

People who want to manage incoming information streams and go "on beyond Slashdot."

Topics Include:

- RSS basics
- RSS in context
- Weed 'n' feed
- Getting the goodies
- If I had a hammer . . .
- Applied RSS
- The next generation
- Malice aforethought

F6 DATABASES: WHAT YOU NEED TO KNOW *NEW!*

John Sellens, *SYONEX*

Who Should Attend: ◑ HALF-DAY P.M.

System and application administrators who need to support databases and database-backed applications.

Topics Include:

- An introduction to database concepts
- The basics of SQL (Structured Query Language)
- Common applications of databases
- Berkeley DB and its applications
- MySQL installation, configuration, and management
- PostgreSQL installation, configuration, and management
- Security, user management, and access controls
- Ad-hoc queries with standard interfaces
- ODBC and other access methods
- Database access from other tools (Perl, PHP, sqsh, etc.)

F7 NEXT GENERATION STORAGE NETWORKING *NEW!*

Jacob Farmer, *Cambridge Computer Services*

Who Should Attend: ◑ HALF-DAY P.M.

Sysadmins running day-to-day operations and those who set or enforce budgets.

Topics Include:

- Fundamentals of storage virtualization
- SAN and NAS
- In-band and out-of-band virtualization architectures
- The latest storage interfaces
- Content-Addressable Storage (CAS)
- Information Life Cycle Management (ILM) and Hierarchical Storage Management (HSM)
- High-performance file sharing
- Parallel file systems
- Wide-area file systems (WAFS)

F8 TIME MANAGEMENT: GETTING IT ALL DONE AND NOT GOING (MORE) CRAZY!

Tom Limoncelli, *Google*

Who Should Attend: ◑ HALF-DAY P.M.

Sysadmins who want to improve their time-management skills, who want to have more control over their time and better follow-through on assignments.

Topics Include:

- Why typical "time management" books don't work for sysadmins
- How to delegate tasks effectively
- A way to keep from ever forgetting a user's request
- Why "to do" lists fail and how to make them work
- Prioritizing tasks so that users think you're a genius
- Getting more out of your Palm Pilot
- Having more time for fun
- How to leave the office every day with a smile on your face

Register by May 12 and save**!**

Want more information on the training program? See www.usenix.org/boston06

A1 LEARNING PHP 5 *NEW!*

David Sklar, Ning Inc.

Who Should Attend:

Programmers and system administrators who want to use PHP to build database-backed web applications.

Topics Include:

- Displaying and processing HTML forms
- Talking to a database
- Identifying users with sessions and cookies
- Securing your code against common hacker attacks
- Manipulating numbers, strings, and arrays
- Debugging and troubleshooting problems in your code
- Cleaning up your URL structure
- Using PEAR modules
- Generating dynamic images with GD
- Caching and tuning your application's performance
- Interfacing PHP with client-side Javascript
- Working with the Zend Framework

A2 SOLARIS 10 ADMINISTRATION WORKSHOP *NEW!*

Peter Baer Galvin, Corporate Technologies

Who Should Attend:

Solaris systems managers and administrators interested in learning the new administration features in Solaris 10 (and features in previous Solaris releases that they are not using).

Topics Include:

- Solaris releases
- Installing and upgrading to Solaris 10
- Service Management Facility (lab)
- The kernel
- Crash and core dumps
- Cool commands
- Zfs (lab)
- N1 grid containers (a.k.a. zones) (lab)
- DTrace
- IP multipathing
- Sysadmin best practices

A3 SYSTEM AND NETWORK MONITORING: TOOLS IN DEPTH

John Sellens, SYONEX

Who Should Attend:

Network and system administrators ready to implement comprehensive monitoring of their systems and networks using the best of the freely available tools.

Topics Include, for Nagios, Cricket, MRTG, & Orca:

- Installation
- Configuration, setup options, and how to manage larger and non-trivial configurations
- Reporting and notifications, proactive and reactive
- How to deal with interesting problems
- Extending the tools
- Dealing effectively with network boundaries and remote sites
- Security concerns and access control
- Ongoing operation

A4 MEASURING SECURITY *NEW!*

Dan Geer, Geer Risk Services

Who Should Attend:

Operations and security managers who need to design or interpret a metric structure for security risk management.

Topics Include:

- What management texts/schools mean when they say, "Measure what you manage"
- Methods of measurements from other fields that are applicable to security risk
- Modeling: Is there any unifying abstraction worth using?
- The state of the world and how to compare yourself to it
- Data fusion is dangerously powerful but essential
- Where to begin
- How to communicate what you find

TRAINING PROGRAM

A5 **UNDERSTANDING AND PROGRAMMING CRYPTOGRAPHY** *NEW!*

Simson Garfinkel, *Harvard University*

Who Should Attend:

Anyone with an interest in cryptography and a knowledge of Perl, Python, or C.

Topics Include:

- Encryption history and practice
- Encryption algorithms: DES, RC2, RC4, AES, RSA
- Analyzing tradeoffs between algorithms
- Cryptographic protocols: PGP, SSL, S/MIME
- Combining encryption algorithms in working cryptosystems
- Cryptographic tools
- Programming with OpenSSL
- Obtaining and using S/MIME certificates

A6 **VOIP PRINCIPLES AND PRACTICE** *NEW!*

Heison Chak, *SOMA Networks*

Who Should Attend:

Managers and system administrators involved in the evaluation, design, implementation, and deployment of VoIP infrastructures.

Topics Include:

- VoIP interaction and interface with the PSTN and IP networks
- CODECs
- Protocols
- IETF standards
- Toll by-pass
- Interactive voice response system
- Text-to-speech applications
- Analog telephone adapter provisioning
- Call detail record and blacklisting
- Echo training

A7 **INSIDE THE LINUX KERNEL (UPDATED FOR VERSION 2.6)**

Theodore Ts'o, *IBM*

Who Should Attend:

Application programmers and kernel developers who are reasonably familiar with C programming.

Topics Include:

- How the kernel is organized
- Ground rules of kernel programming
- Implementation and properties of the most important algorithms
- Comparison between Linux and UNIX kernels, with emphasis on differences in algorithms
- Details of the Linux scheduler
- The requirements for portability between architectures

Hotel Information

Hotel Reservation Discount Deadline: Tuesday, May 9, 2006

Boston Marriott Copley Place
110 Huntington Avenue
Boston, MA 02116
Telephone: (617) 236-5800
Toll-free: (800) 228-9290

Special Attendee Room Rates

$199 single/double, plus $20 for each additional person and 12.45% tax

You must mention USENIX to get the special rate. See www.usenix.org /boston06 for details. All requests for reservations received after the deadline of May 9 will be handled on a space-available basis.

Register by May 12 and save!

TECHNICAL SESSIONS

THE 3-DAY TECHNICAL PROGRAM presents the latest in groundbreaking research in its informative invited talks, refereed papers, and expert-led Guru Is In sessions, along with opportunities to mingle with peers. The program will include:

Invited Talks (as of February 1, 2006)

- Keynote: Larry Peterson, *Princeton University and PlanetLab Consortium,* on "PlanetLab: Evolution vs. Intelligent Design in Planetary-Scale Infrastructure"

- Plenary: Greg Brandeau, *Vice President of Technology, Pixar Animation Studios*

- Closing: Trevor Blackwell, *Anybots*

- Matt Welsh, *Harvard University,* on "Deploying a Sensor Network on an Active Volcano"

- Peiter "Mudge" Zatko, *BBN Technologies*

- Steven M. Bellovin, *Columbia University,* on "Permissive Action Links, Nuclear Weapons, and the History of Public Key Cryptography"

- And more industry experts (TBA in March)

Refereed Papers

The Systems Practice & Experience Track (formerly the General Session Refereed Papers Track) provides the premier forum for presenting the latest in groundbreaking research. The full program will be available in March at www.usenix.org/boston06.

Guru Is In Sessions

Join noted experts in informal sessions designed to allow you to get practical solutions to your most burning technical questions.

For complete technical program information, see www.usenix.org/boston06.

Registration Fees

Daily Rates

- 1 day of training: $625
- 1 half-day of training: $325 (second half-day only $300)
- 1 day of technical sessions: $250

SAVE! Choose One of Our Special Discount Packages

A. 3 Days of Technical Sessions: $650
   Save $100!
B. 2 Days of Training: $1200   *Save $50!*
C. 3 Days of Training: $1775   *Save $100!*
D. 4 Days of Training: $2300   *Save $200!*
E. 5 Days of Training: $2825   *Save $300!*
F. Thursday/Friday Half-and-Half Tech and Training: $875*

For maximum savings, combine Package A with Package B or C.

*Attend any combination of two half-days of training and two half-days of technical sessions on Thursday and Friday.

If you are *not* a member of USENIX, EurOpen.SE, or NUUG, add $115 to your technical sessions fees.

LATE FEES

- After May 12, members and nonmembers (not students), add $150 to your training program fees.
- After May 12, members and nonmembers (not students), add $150 to your technical sessions fees.

OPTIONAL COSTS

- Continuing Education Units (CEUs): $15 per training day

FULL-TIME STUDENTS

A limited number of tutorial seats are reserved for full-time students at the very special rate of $200 per day.

Full-time students may attend technical sessions for only $90 per day.

The Thursday/Friday Half-and-Half Tech and Training package (Package F) is not an option for students.

Students who are *not* members of USENIX, add $40 to your technical sessions fees.

Register online at www.usenix.org/boston06

USENIX

USENIX ASSOCIATION
2560 Ninth Street, Suite 215
Berkeley, CA 94710

510.528.8649
510.548.5738 fax
www.usenix.org/boston06

Join leading researchers
and practitioners for 5
full days on the latest
technology. May 30–
June 3, 2006.

USENIX

Annual '06
Technical
Conference

Register by
May 12 &

SAVE!

When you register, enter the priority code on this mailing label to receive an additional $25 discount!