



Advance Program

acm sigcomm 2003

Karlsruhe / Germany

August 25 – 29, 2003

A Data Communication Festival

Conference: Aug. 26 – 29 Workshops & Tutorials: Aug. 25, 27

<http://acm.org/sigcomm/sigcomm2003>

With support from:



Welcome

Welcome to SIGCOMM 2003

Welcome to the premier computer communication technical conference! SIGCOMM 2003 broadens the traditional scope of the conference in a number of ways. The conference technical program contains significantly more papers, with the goal of diversifying the topic set and balancing theory and practice. Additionally, a wide range of viewpoints is represented in the position paper session, and a poster session will showcase work-in-progress with particular emphasis on student research. A set of workshops and tutorials are interleaved with the technical conference to encourage participation by all attendees. Five workshops are held for the first time, covering networking research (MoMeTools & NREDS), future architectures (FDNA), network-I/O convergence (NICELI), and a QoS retrospective (RIPQoS). The highly successful education workshop (NetEd) returns for a second year. Tutorials given by renowned experts cover network security and self-similar traffic. As usual, the keynote address will be given by the SIGCOMM award winner. The conference social event in Heidelberg provides an outstanding setting for technical (and non-technical) conversation.

We hope you will join us for a week of learning, sharing ideas, meeting with colleagues, and enjoying the outstanding conference venue. Remember to consider extra time in your travel plans to visit the sights in and around Karlsruhe.

Contents	Page
Welcome	2
Tutorials	3
Workshops	4-5
Program	6-7
Organization	8

Location of SIGCOMM 2003
University of Karlsruhe, Germany

Welcome to Karlsruhe

This year's SIGCOMM is hosted in a typical German town: Karlsruhe, a multifaceted vibrant and friendly city. Karlsruhe, pop. 425,000, was founded in 1715 and is located in the famous Rhine Basin at the border of the beautiful Black Forest close to France. This region has more days of sunshine than any other German city. The oldest Technical University in Germany, our conference location, and many other research institutions contribute to recommend Karlsruhe as an excellent location for science. The city is easily reachable, e.g., via Frankfurt, Zürich, Stuttgart, or Strasbourg airports or by train.

Among the various attractions in Karlsruhe are several palaces, among them the Baroque Karlsruhe palace (1750) where the reception will take place. Quite a number of gardens (including the botanical garden), churches, squares, monuments, etc. invite closer exploration. Karlsruhe hosts Germany's two highest courts. Not to be missed either are the Baden State Museum and the ZKM Center for Art and Media. Alternatively take a trip on the Rhine or visit such nearby attractions as Strasbourg's Cathedral or the famous castle in Heidelberg, which we will explore during the social event.

We hope that you will feel at home during the conference and have a chance to sample the many fun places, enjoy the great food and excellent beer and wine. Maybe you will even find time to visit a working German brewery.

Important Dates	
Student poster deadline	<i>June 8, 2003, 23:59 EDT</i>
Student travel grant deadline	<i>June 13, 2003, 23:59 EDT</i>
Hotel reservation deadlines	<i>June 24 – July 12, 2003</i>
Early SIGCOMM registration	<i>July 26, 2003, 23:59 EDT</i>

Tutorials

Monday, August 25

Tutorial 1

Network Security Protocols: Today and Tomorrow

Radia Perlman
Sun Microsystems

Charlie Kaufmann
IBM

This tutorial covers the concepts in network security protocols, describes the current standards and vulnerabilities, and suggests areas that need research. It approaches the problems first from a generic conceptual viewpoint, covering the problems and the types of technical approaches for solutions. For example, how would encrypted email work with distribution lists? What are the performance and security differences in basing authentication on public key technology versus secret key technology? What kinds of mistakes do people generally make when designing protocols? Armed with a conceptual knowledge of the toolkit of tricks that allow authentication, encryption, key distribution, etc., we describe the current standards, including Kerberos, S/MIME, SSL, IPsec, PKI, and web security.

Radia Perlman is a Distinguished Engineer at Sun Microsystems and received an S.B. and S.M. in mathematics and a Ph.D. in computer science from MIT. Currently, she is teaching network security protocols at Harvard. Her research contributions include bridging (spanning tree algorithm) and routing (link-state routing) as well as security (sabotage-proof networks).

Charlie Kaufman is a Distinguished Engineer at IBM, where he is Chief Security Architect for Lotus Notes and Domino. Recently he has been involved in analyzing IKE, the authentication portion of IPsec, and designing a replacement protocol, which has been adopted by IETF. He currently serves on the IAB, the architecture board of the IETF.

Wednesday, August 27

Tutorial 2

10 Years of Self-Similar Traffic Research: A Circuitous Route Towards a Theoretical Founda- tion for the Internet

John Doyle
Caltech

Walter Willinger
AT&T Labs-Research

The original paper on the self-similar nature of network traffic appeared 10 years ago. Since then, research on self-similar traffic has generally thrived, but has also seen its fair share of wrong turns, dead ends, and specious claims. In regard to recent such claims, an early success story (that explains self-similarity in network traffic in terms of heavy-tailed phenomena exhibited by its constituent components) has become an illuminating test case for future research in this area. It has identified the Internet as an ideal proving ground for a scientific exploration of the broader issues of robustness in complex system. Most importantly, it has led to the development of a nascent theoretical foundation for the Internet that potentially provides a sound framework for understanding both successes and shortcomings of existing Internet technologies.

John C. Doyle is Professor of Control and Dynamical Systems, Bioengineering, and Electrical Engineering at Caltech. He has a B.S. and M.S. in EE, from MIT, 1977 and a Ph.D. in mathematics, UC-Berkeley, 1984. His current research interests are in theoretical foundations for complex networks in engineering and biology.

Walter Willinger is a member of the Information and Software Systems Research Center at AT&T Labs-Research, Florham Park, NJ. He received the Diplom (Dipl. Math.) from the ETH Zurich, Switzerland, and the M.S. and Ph.D. degrees from the School of ORIE, Cornell University. He has been a leader of the work on the self-similar ("fractal") nature of data network traffic.

Models, Methods, Tools for Reproducible Network Research (MoMeTools)

Chairs

Georg Carle (*University of Tübingen*)

Hartmut Ritter (*Freie Universität Berlin*)

Klaus Wehrle (*ICSI Berkeley*)

Compared with other scientific areas such as experimental physics, network research appears significantly less mature concerning methodology. The goal of this workshop is to critically assess the current models, methods and tools of network research for identifying shortcomings of the state-of-the-art, and to discuss approaches for improvements and innovation. The workshop aims for sharing knowledge about how to apply today's tools most successfully, and for generating a common understanding about what is needed for network research to progress more rapidly and to ensure widely reproducible results. The workshop solicited submissions that improve our understanding of the current state-of-the art, and that help to identify improved models, methods and tools.

Networking Education: How to Educate the Educators? (NetEd)

Chair

Shawn Ostermann (*Ohio University*)

This second ACM SIGCOMM-sponsored workshop devoted to the topic of networking education will bring together faculty from a broad spectrum of colleges and universities, industry engineers and scientists, and others with an interest in education to discuss curriculum design and teaching practices in the field of computer networks. The workshop will give both new and experienced educators an opportunity to share their views and experiences on the do's and don'ts of networking education, including content, teaching techniques and teaching paradigms. The discussion topics are undergraduate and graduate curriculum, tips for new networking educators, hands-on projects in networking courses, and a comparison and discussion of networking education around the globe. *This workshop is still soliciting submissions.*

Network Research: Exploration of Dimensions and Scope (NREDS)

Chair

Karen Sollins (*MIT*)

Two years ago, the Computer Science and Telecommunications Board took a first exploratory examination of what the field of networking research might become in *Looking Over the Fence at Networks: A Neighbor's View of Networking Research*. This workshop is intended to be the next step in that process, beginning to take a more organized look. Not only is it valuable to consider specific directions that research might move, but we also expect to explore "meta-level" issues, such as the nature of our field, how it relates to others and how we evaluate new research. Participation will be largely through discussion on selected topics. The final report of the workshop will be published in CCR. *Participation in this workshop will be by invitation based heavily on position papers.*

Network-I/O Convergence: Experience, Lessons, Implications (NICELI)

Chairs

Allyn Romanow (*Cisco*)

Jeff Mogul (*HP Labs*)

The performance and commodity price advantages of modern LANs have created a convergence of networks and I/O. This convergence promises both price efficiencies and true interoperability, for storage and for cluster interconnect. The NICELI workshop provides a forum for researchers and practitioners to discuss the merits, drawbacks, applications, and practical implications of protocol and implementation designs. Approaches based on Internet protocols are of particular interest. NICELI is a forum for research results, protocol design rationales, significant implementation experience, and architectural papers related to the convergence of networks and interconnect.

Future Directions in Network Architecture (FDNA)

Chair

John Wroclawski (*MIT*)

The current Internet architecture has been remarkably successful as the underpinning of a global, general-purpose, decentralized data communication network. Architectural decisions made 30 years ago have allowed the Internet to quickly support new applications and adapt itself to dramatic changes in technology. Now, new forces—new classes of special-purpose networks and the changing requirements facing general purpose networks—argue that reflection on the current state of network architecture and consideration of new architectural principles, structures, and strategies is timely. FDNA-03 is a forum for presenting research results, promising directions, and rising challenges related to the broad topic of new developments in network architecture.

Revisiting IP QoS: Why do we care, what have we learned? (RIPQoS)

Chair

Grenville Armitage (*Swinburne University of Technology*)

For over a decade the Internet engineering and research community has debated, designed, and ignored IP Quality of Service tools and techniques. There's a sense that something might be needed, but little agreement on why and who will pay. At times the very notion of QoS has seemed to be a pointless waste of time, almost a solution waiting for a problem. This workshop is an opportunity for researchers and practitioners to discuss the history of IP QoS research and development, review what could have been done better, and perhaps develop a new focus going forward.

Program

Monday, August 25

- 09:00-17:00 **Tutorial 1: Network Security Protocols: Today and Tomorrow Workshops**
- Models, Methods and Tools for Reproducible Network Research (MoMeTools)
 - Networking Education: How to Educate the Educators? (NetEd)
 - Network Research: Exploration of Dimensions and Scope (NREDS)
- 17:30-19:30 **Reception at Schloss Karlsruhe**

Tuesday, August 26

- 09:00-10:15 **Keynote by David Cheriton (SIGCOMM 2003 Award winner)**
- The Internet Architecture: Its Future and Why It Matters.
- 10:45-12:30 **Session 1: Position Papers (*David Wetherall*)**
- A Knowledge Plane for the Internet.
David D. Clark (MIT), Craig Partridge (BBN Technologies), J. Christopher Ramming (SRI)
 - A Routing Underlay for Overlay Networks.
Akihiro Nakao, Larry Peterson, Andy Bavier (Princeton University)
 - Greening of the Internet.
Maruti Gupta, Suresh Singh (Portland State University)
 - A Delay-Tolerant Network Architecture for Challenged Internets.
Kevin Fall (Intel)
- 14:00-15:30 **Session 2: Routing (*Ramesh Govindan*)**
- Routing Using Potentials: A Dynamic Traffic-Aware Routing Algorithm.
Anindya Basu (Bell Labs), Alvin Lin (MIT), Sharad Ramanathan (Bell Labs)
 - Network Routing with Path Vector Protocols: Theory and Applications.
João Luís Sobrinho (Instituto de Telecomunicações, Instituto Superior Técnico)
 - Design Principles of Policy Languages for Path Vector Protocols.
Timothy G. Griffin (AT&T), Aaron D. Jaggard (U Pennsylvania), Vijay Ramachandran (Yale)
- 15:30-16:45 **Poster Session (*Karen Sollins*)**
- 16:45-18:15 **Session 3: Denial-of-Service (*Stefan Savage*)**
- Low-Rate TCP-Targeted Denial of Service Attacks (The Shrew vs. the Mice and Elephants).
Aleksandar Kuzmanovic, Edward W. Knightly (Rice University)
 - Robustness to Inflated Subscription in Multicast Congestion Control. *Sergey Gorinsky, Sugat Jain, Harrick Vin (University of Texas at Austin), Yongguang Zhang (HRL Labs)*
 - A Framework for Classifying Denial of Service Attacks.
Alefiya Hussain, John Heidemann, Christos Papadopoulos, (USC/ISI)

Wednesday, August 27

- 09:00-17:00 **Tutorial 2: 10 Years of Self-Similar Traffic Research Workshops**
- Future Directions in Network Architecture (FDNA)
 - Network-I/O Convergence: Experience, Lessons, Implications (NICELI)
 - Revisiting IP QoS: Why do we care, what have we learned? (RIPQoS)
- Evening **Social Event: Dinner & tour of Heidelberg and its Castle**

Thursday, August 28

- 09:00-10:30 **Session 4: Measurement (*Srinivasan Seshan*)**
- Quantifying the Causes of Path Inflation.
Neil Spring, Ratul Mahajan, Tom Anderson (University of Washington)
 - The Impact of Address Allocation and Routing on the Structure and Implementation of Routing Tables. *Harsha Narayan (UC San Diego), Ramesh Govindan (USC), George Varghese (UC San Diego)*
 - Automatically Inferring Patterns of Resource Consumption in Network Traffic.
Cristian Estan, Stefan Savage, George Varghese (UC San Diego)

- 11:00-12:30 Session 5: Overlays (*Ellen Zegura*)**
- On Selfish Routing in Internet-Like Environments.
Lili Qiu (Microsoft), Yang Richard Yang (Yale), Yin Zhang (AT&T), Scott Shenker (ICSI)
 - Forwarding in a Content-Based Network.
Antonio Cazaniga, Alexander L. Wolf (University of Colorado)
 - Peer-to-Peer Information Retrieval Using Self-Organizing Semantic Overlay Networks.
Chunqiang Tang (U Rochester), Zhichen Xu (HP Labs), Sandhya Dwarkadas (U Rochester)
- 14:00-15:30 Session 6: Forwarding (*Craig Partridge*)**
- Scaling Internet Routers Using Optics.
Isaac Keslassy, Shang-Tse Chuang, Kyoungsik Yu, David Miller, Mark Horowitz, Olav Solgaard, Nick McKeown (Stanford)
 - Longest Prefix Matching using Bloom Filters.
Sarang Dharmapurikar, Praveen Krishnamurthy, David E. Taylor (Wash. Univ., St. Louis)
 - Packet Classification Using Multidimensional Cuts.
Sumeet Singh, Florin Baboescu, George Varghese (UC San Diego), Jia Wang (AT&T)
- 16:00-17:30 Session 7: Miscellany (*Joe Sventek*)**
- Quantum Cryptography in Practice. *Invited Paper.*
Chip Elliott, David Pearson, Greg Troxel (BBN Technologies)
 - A low complexity packet scheduler with bandwidth fairness and bounded delay.
Sriram Ramabhadran, Joseph Pasquale (UC San Diego)
 - A Comparison of Hard-state and Soft-state Signaling Protocols.
Ping Ji, Zihui Ge, Jim Kurose, Don Towsley (University of Massachusetts)
- 17:30-18:30 SIGCOMM Business Meeting**

Friday, August 29

- 09:00-10:30 Session 8: Queue Management (*Dina Katabi*)**
- The Effects of Active Queue Management on Web Performance.
Long Le, Jay Aikat, Kevin Jeffay, F. Donelson Smith (UNC Chapel Hill)
 - Design of a Robust Active Queue Management Algorithm Based on Feedback Compensation. *Zhang Heying, Liu Baohong, Dou Wenhua (NUDT, China)*
 - Persistent Dropping: An Efficient Control of Traffic Aggregates.
Hani Jamjoom, Kang G. Shin (University of Michigan)
- 11:00-12:30 Session 9: Traffic Engineering (*Christophe Diot*)**
- An Information-Theoretic Approach to Traffic Matrix Estimation.
Yin Zhang, Matthew Roughan, Carsten Lund (AT&T), David Donoho (Stanford)
 - Making Intra-Domain Routing Robust to Changing and Uncertain Traffic Demands: Understanding Fundamental Tradeoffs. *David Applegate, Edith Cohen (AT&T)*
 - Estimating Flow Distributions from Sampled Flow Statistics.
Nick Duffield, Carsten Lund, Mikkel Thorup (AT&T)
- 13:30-15:00 Session 10: Measurement (*Geoff Voelker*)**
- A High-Level Programming Environment for Packet Trace Anonymization and Transformation. *Ruoming Pang (Princeton University), Vern Paxson (ICSI)*
 - A Measurement-Based Analysis of Multihoming.
Aditya Akella (CMU), Bruce Maggs (CMU/Akamai), Srinivasan Seshan (CMU), Anees Shaikh (IBM), Ramesh Sitaraman (University of Massachusetts/Akamai)
 - Towards an Accurate AS-Level Traceroute Tool. *Zhuoqing Morley Mao (UC Berkeley), Jennifer Rexford, Jia Wang (AT&T), Randy Katz (UC Berkeley)*
- 15:30-17:00 Session 11: Peer-to-Peer (*Antony Rowstron*)**
- The Impact of DHT Routing Geometry on Resilience and Proximity.
Krishna P. Gummadi (U Washington), Ramakrishna Gummadi (USC), Steven D. Gribble (U Washington), Sylvia Ratnasamy (Intel), Scott Shenker (ICSI), Ion Stoica (UC Berkeley)
 - Graph-Theoretic Analysis of Structured Peer-to-Peer Systems: Routing Distances and Fault Resilience. *Dmitri Loguinov, Anuj Kumar, Vivek Rai, Sai Ganesh (Texas A&M)*
 - Making Gnutella-like P2P Systems Scalable.
Yatin Chawathe (AT&T), Sylvia Ratnasamy (Intel), Lee Breslau (AT&T), Nick Lanham (UC Berkeley), Scott Shenker (ICSI)

ACM SIGCOMM 2003

Karlsruhe, Germany, August 25 – 29, 2003

General Chairs

Anja Feldmann
Martina Zitterbart

Conference Coordinator

Chris Edmondson-Yurkanan

Local Organization

Steffen Blödt
Marcus Schöller

Publicity Chair

James Sterbenz

Student Travel Grant Chair

Dan Rubenstein

Treasurer

Thomas Fuhrmann

Tutorial Chair

Burkhard Stiller

Workshop Chair

Craig Partridge

Program Committee Chairs

Jon Crowcroft
David Wetherall

Program Committee

Ross Anderson
John Byers
David Clark
Christophe Diot
Ramesh Govindan
David Hutchison
Sugih Jamin
Frans Kaashoek
Dina Katabi
Randy Katz
Steven McCanne
Greg Minshall
Robert Morris

Poster Session Chair

Karen Sollins

Craig Partridge
Balaji Prabhakar
Antony Rowstron
Stefan Savage
Srinivasan Seshan
Joe Sventek
David Tennenhouse
Jon Turner
Geoff Voelker
Ian Wakeman
Jennifer Yates
Ellen Zegura
Hui Zhang

ACM

1515 Broadway

New York, NY 10036-5701 USA



The first Society in Computing