

# Guest Editorial: Special Section on Security in Distributed Computing Systems

Wei Zhao, *Fellow, IEEE*

RESEARCH in the area of security of computing systems has always been of utmost importance, particularly in recent years as orchestrated attacks have sought to cripple critical infrastructures. Security issues in distributed computing systems involve reducing vulnerabilities as well as giving system management the insight and control needed to defend distributed information systems. All aspects of business and government operations and services are dependent upon the security and integrity of our information and communication infrastructures. Critical sectors such as energy, health, transportation, social and emergency services, manufacturing, processing, and logistics and distribution functions rely almost entirely on data processing and interchange. The recent attacks on government and commercial computers indicate that "hacking" has gone beyond the realm of domestic pranks and has entered the domain of state sponsored cyber-terrorism. Clearly, these information security threats to vital national infrastructures present risks of debilitating impact on the defense and economic security of the nation and the state. As such, these issues pose new challenges to researchers. Advances are rapidly being made in the following areas: anonymity and camouflaging, intrusion detection, dynamic coalition, distributed denial of service, security protocols, authentication and verification, and mobile code and agent security.

This special section of *IEEE Transactions on Parallel and Distributed Systems* is targeted at related issues in security of distributed computing systems. Response to the call for papers was overwhelming. From these excellent submissions, seven were accepted for publication in this special section. The first paper by M. Ahamad, S. Lakshmanan, and H. Venkateswaran explores the subject of responsive security for stored data. X. Zhang, L. Xiao, and Z. Xu discuss low-cost and reliable mutual anonymity protocols in peer-to-peer networks. Integrated access control and intrusion detection for Web servers is explained by T. Ryutov, C. Neuman, D. Kim, and L. Zhou. The paper by L. Wang, X. Zhao, D. Pei, R. Bush, D. Massey, and L. Zhang explores ways to protect BGP routes to top-level DNS servers. J. Xu and M. Sung introduce a technique for defending against internet DDoS attacks. The next paper, by H. Wang and K. Shin, describes a built-in protection

mechanism to counter DDoS attacks, known as Transport-Aware IP Routers. The final paper from A. Mei, L. Mancini, and S. Jajodia discusses a secure dynamic fragment and replica allocation in large-scale distributed file systems.

Finally, I would like to take this time to thank the contributing authors, reviewers, and the Editor-in-Chief, Dr. Pen-Chung Yew. Additional thanks goes to Mr. Sheng-quan Wang for Web management and Ms. Larisa Archer for administration of the review process. Without their contributions and support, this special section would not be possible.

Wei Zhao  
*Guest Editor*



**Wei Zhao** received the MSc and PhD degrees in computer and information science from the University of Massachusetts, Amherst, in 1983 and 1986, respectively. He completed his undergraduate program in physics at Shaanxi Normal University, Xian, China, in 1977. He is currently an associate vice president for research at Texas A&M University. In 1990, he joined the faculty of Texas A&M University. Between 1997 and 2001, he served as a department head.

Dr. Wei Zhao is a fellow of the IEEE. His current research interests include secured real-time computing and communication, distributed operating systems, databases, and fault tolerant systems. He has played critical leadership roles in projects NetEx and NetCamo. His research group has been recognized by various awards and prizes, including the outstanding paper award from the IEEE International Conference on Distributed Computing Systems in 1992, the best paper award from the IEEE National Aerospace and Electronics Conference in 1997, an award on technology transfer from the Defense Advanced Research Program Agency (DARPA) in 2002, and the second prize in the international ACM student research contest in 2002. Dr. Zhao is an inventor for two US patents and has published more than 180 papers in journals, conferences, and book chapters. Dr. Zhao is active in professional services. Dr. Zhao was an editor of the *IEEE Transactions on Computers* between 1992 and 1996. He is currently on the editorial board of the *IEEE Transactions on Parallel and Distributed Systems*. He was program and general chair of the IEEE Real-Time Technology and Applications Symposia in 1995 and 1996, respectively. He served as program and general chair of the IEEE Real-Time Systems Symposia in 1999 and 2000, respectively. He was the coprogram chair for the IEEE International Conference on Distributed Computing Systems in 2001. He will be the cogeneral chair of the IEEE International Conference on Distributed Computing Systems in 2003.

- The author is with the Office of the Vice President for Research, Texas A&M University, College Station, TX 77843-1112.  
E-mail: zhao@cs.tamu.edu.

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