COMPUTER SCIENCE
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A New Era after the Convergence of Network Centric and Data Centric Computing

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Abstract:

Clouds The Internet today has grown to an enormously large scale. Devices large and small are connected globally from anywhere on the earth. Therefore, we can argue that we are in a network centric era. With the rapid advancement of technology, we now also have cheap and small devices with high computing power and large storage capacity. These devices are designed to improve our daily life by monitoring our environment, collecting critical data, and executing special instructions. These devices have gradually become a dominant part of our Internet. Many imaging, audio and video data are converted from analog to digital. As a result, unprecedented amount of data are collected by these devices and are available via Internet. How to manage and look for the desired information becomes a great challenge. Therefore, we can certainly also say that we are in a data centric era. In this talk, we will examine the challenges in the convergence of both network centric and data centric computing. At the same time, many emerging applications like service-oriented, security and real-time demand much better support than the current Internet can offer. To meet these challenges, National Science Foundation also has started a major effort, called GENI (Global Environment for Networking Innovations) to resign the Internet from scratch. However, how the future Internet should look like is still undetermined. In this talk, we will present a vision of content addressable future Internet. What are the essential changes in data representation, information retrieval, storage systems and networking design will be discussed. We believe an object-oriented intelligent storage is an essential part of the solution to this new computing and communication environment. We will also present a number of research projects that are currently under investigation in our NSF I/UCRC Center on Intelligent Storage. These projects include data deduplication, long-term data preservation, data center power management, and solid state drives.

Biography:

Dr. David Du is currently the Qwest Chair Professor of Computer Science and Engineering at University of Minnesota, Minneapolis. He has served as a Program Director at National Science Foundation CISE/CNS Division from March 2006 to September 2008. At NSF, he was responsible for NeTS (networking research cluster) NOSS (Networks of Sensor Systems) Program and worked with two other colleagues, Karl Levitt and Ralph Wachter, on Cyber Trust Program. Dr. Du received a Ph.D. degree from University of Washington (Seattle) in 1981. He joined University of Minnesota as a faculty since 1981.

Dr. Du has a wide range of research expertise including multimedia computing, mass storage systems, high-speed networking, sensor networks, cyber security, high-performance file systems and I/O, database design, and CAD for VLSI circuits. He has authored and co-authored over 210 technical papers including 100 referred journal publications in these research areas. He has graduated 50 Ph.D. and 85 M.S. students in the last 30 years. Dr. Du is an IEEE Fellow (since 1998) and a Fellow of the Minnesota Supercomputer Institute. He is currently serving on the Editorial Boards of several international journals. He has also served as Conference Chair and Program Committee Chair for several major conferences in multimedia, networking, database and security areas. Recently, he was the General Chair of the 30th IEEE Symposium on Security and Privacy (2009) and Program Committee Co-Chair for the 37th International Conference on Parallel Processing (2009). He is currently the General Chair for IEEE Conference on Distributed Computing Systems (ICDCS) 2011. He has had research grants from many federal funding agencies including NSF, DARPA, ONR, and DOE. He has a strong tie with many industrial researchers and has collaborated with a number of companies including IBM, Intel, Cisco, Symantec, Seagate, Sun Microsystems, Honeywell, etc.