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and

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July, 2003

Professional Activities

Currently:

- Dept. head, Distributed Systems Dept., Computational Research Division, Lawrence Berkeley National Lab

  This Dept. consists of groups doing work in Grids, secure collaboration, collaborative systems, and high-speed networking and distributed systems. See http://www-itg.lbl.gov/.

- Project Architect for NASA's Information Power Grid Project, NASA Ames Research Center

  This project entails defining and implementing a fully distributed computing model for CPU, storage, instrument, and human resources across the NASA enterprise. The work also involves designing and implementing new organizational structure to deal with this new service delivery model.

- Principal investigator for the DOE research project – "The DOE Science Grid." See http://doesciencegrid.org/

- Area Director for Architecture, Global Grid Forum (http://www.ggf.org/)

Previous responsibilities:

- Principal investigator for the DOE research projects - "High Speed Distributed Computing", "Distributed Collaboratory Environments", "Distributed Security Architectures"

- Principal investigator for the ARPA research project - "Distributed Storage Systems in High Speed Wide Area Networks" (part of the MAGIC gigabit network testbed)

- Co-Chairperson, President's Commission on Critical Infrastructure Protection, taskforce for Research & Development Priorities for Communications and Information Infrastructure Assurance
- Lecturer in Computer Science, San Francisco State University

Research Interests

- Computing and Data Grids
- High-speed, wide area network-based distributed applications and data storage systems
- Security architectures and automated negotiation to support dynamic construction of large-scale configurable systems based in wide-area public network environments
- Use of the global Internet to enable remote access to scientific, analytical, and medical instrumentation
- Distributed systems supporting the use of digital video as computer data for dynamic object analysis and laboratory systems control

Skills

- Topic and scenario analysis
- Development of software approaches to computing problems in-the-large
- Design of systems and software architectures for scientific problems and computing infrastructure middleware services
- Leading computer science R&D teams that develop experimental and prototype systems
- Managing computer science R&D groups
- Designing and managing a high-speed distributed computing lab that includes multiple computing systems, multiple high speed network connections, specialized networks, etc.
- Actualizing professional potential (I have spun off several successful groups.)

Previous and Related Work Experience

- Author of numerous proposals and strategic documents, including
  - Technical Rationale chapter of the winning proposal that brought the NERSC Center to LBNL in Jan., 1996 – abstracted in [1]
  - Five year NERSC program renewal (Jan., 2001) – see [2]
  - ESnet Strategic plan (2002) – see [3]
- Principal investigator for the DOE research projects "High-Speed, Distributed Data Handling for High Energy and Nuclear Physics"
- Program manager for a $4M, two year DOE program in Distributed Collaboratories
- Group leader for groups as large as 20 computer scientists and a similar number of students, and a $4M+ budget

- Teaching
  - senior-level computer science courses in computer graphics (15 years)
  - graduate courses in imaging and image processing
  - supervision of numerous graduate students and service on their thesis committees
- Participation on the committee that provided expert advice to NSF during the NSFNet backbone transition to the public sector
- Co-designer (with David Robertson) one of the first, very successful, interactive 3D, educational Web sites. More than a million people a year from 170 different countries visit this site to do "virtual frog dissection": Interactive 3D visualization of a large volume dataset of real frog anatomy. (www-itg.lbl.gov/frog)

Education

- M.A., Mathematics, San Francisco State University, 1972 (Thesis: Mathematical Foundations of Huygens' Principle);

Recent Publications

(Most of these papers are available at http://www-itg.lbl.gov/~johnston)

[4-7, 3, 8-10, 2, 11]

[1] Rationale and Strategy for a 21st Century Scientific Computing Architecture: The Case for Using Commercial Symmetric Multiprocessors as Supercomputers, W. E. Johnston. International Journal of High Speed Computing, 1998. 9(3): p. 191-222. http://www-itg.lbl.gov/~johnston/papers.html

[2] Future Directions in Scientific Supercomputing for Computational Physics, C. W. McCurdy, H. D. Simon, W. T. C. Kramer, R. F. Lucas, W. E. Johnston and D. H. Bailey. Compute Physics Communications, 2002(147): p. 34-40. http://www.nersc.gov/~simon/Papers/Future_directions2002.pdf

[3] A Vision for DOE Scientific Networking Driven by High Impact Science, W. E. Johnston, W. T. C. Kramer, J. F. Leighton and C. Catlett. http://www.lbl.gov/CS/Network_Vision_Whitepaper.pdf

[4] Implementing Production Grids, W. E. Johnston, in *Grid Computing: Making the Global Infrastructure a Reality*, F. Berman, G. Fox and T. Hey, Editors. 2003, John Wiley. http://www.itg.lbl.gov/~johnston/Grids/homepage.html#Implement

[5] Implementing Production Grids for Science and Engineering, W. E. Johnston, J. M. Brooke, R. Butler, D. Foster and M. Mazzucato, in *The Grid*, I. Foster and C. Kesselman, Editors. 2003, Morgan Kaufmann. http://www.itg.lbl.gov/~johnston/Grids/homepage.html#Grid2ed

[6] Computational and Data Grids in Large-Scale Science and Engineering, W. Johnston. Future Generation Computer Systems, 2002. http://www.itg.lbl.gov/~johnston/Grids/homepage.html#JFCS2002

[7] Multi-Disciplinary Simulations and Computational and Data Grids, W. E. Johnston. In *Parallel CFD 2002*. 2002. JAERI-KRE, Kansai Science City, JAPAN

[8] NSF CISE Grand Challenges in e-Science Workshop Report, M. h. Brown, D. Brutzman, C. Catlett, R. Crutcher, T. h. DeFanti, I. Foster, R. Grossman, T. Hanss, W. Huntoon, R. Hutchins, R. Johnson, J. Kennedy, T. Lehman, J. h. Leigh, J. h. Mambretti, K. K. Mish, B. Nickless, P. Papadopoulos, T. Prudhomme, T. Rimovsky, D. Sandin, B. Schüttler, E. Seidel, J. Shalf, S. Simmons, L. Smarr, B. St. Arnaud, R. Stevens, V. Taylor, S. Wallace, L. Winkler, P. Woodward, C. Johnson, H. Newman, K. Droegemeier, M. Ellisman, W. Johnston and D. Keyes. http://www.evl.uic.edu/activity/NSF/final.html

[9] NASA's Information Power Grid, W. Johnston. http://www.itg.lbl.gov/~johnston/Grids/homepage.html#IPGIT

[10] The Computing and Data Grid Approach: Infrastructure for Distributed Science Applications, W. E. Johnston. Computing and Informatics - Special Issue on Grid Computing, 2002. http://www.itg.lbl.gov/~johnston/Grids/Grid_Applications-J.Computing_and_Informatics.pdf

[11] Creating Science-Driven Computer Architecture: A New Path to Scientific Leadership, C. W. McCurdy, R. Stevens, H. D. Simon, W. T. C. Kramer, D. H. Bailey, W. E. Johnston, Charlie Catlett, R. Lusk, T. Morgan, J. Meza and J. Hules. October 2002, Lawrence Berkeley National Laboratory. http://www.nersc.gov/news/ArchDevProposal.5.01.pdf