



Mid-Atlantic Crossroads

Advanced Regional Internetworking for
Higher Education and Research

Office: 8400 Baltimore Avenue
Suite 102
College Park, Maryland 20740
301.405.6666

November 30, 2007

Welcome

Welcome to the November 2007 edition of the MAX Newsletter. In these updates we highlight current technical activities and policy initiatives amongst our staff, our participants, the Regional Optical Network and national networking communities. Please let us know your thoughts, and especially your suggestions.

Executive Director Message

In late November the Office of Management and Budget announced the Trusted Internet Connections (TIC) initiative to optimize individual network services into a common solution for the federal government. The proposed approach aims to reduce the number of our external connections, including Internet points of presence, to a target of fifty. The announcement directs each agency to develop a comprehensive plan of action and milestones (POA&M) with a target completion date of June 2008. Initial agency plans are to be sent to the Department of Homeland Security's (DHS's) National Cyber Security Division (NCSD) by January 8, 2008, for review and agreement with OMB, DHS, and the agency.
<http://www.whitehouse.gov/omb/memoranda/fy2008/m08-05.pdf>

A planning guidance document was also circulated.
http://www.whitehouse.gov/omb/egov/documents/TIC_ImplementationPlanningGuidance.pdf

While we can all sympathize with the complexity of a growing number of Cyber Security threats and need to address them, a centralized approach like that proposed here can just as likely hurt the ability to benefit from redundant diverse connections, increase the complexity associated with routine maintenance updates, impose constraints on research initiatives, and dramatically hurt end-

to-end network performance. MAX is monitoring this initiative closely through our involvement with the NSF hosted Joint Engineering Task Force (JET).

- Peter O'Neil

All-Hands Meeting November 29th

MAX hosted our bi-annual meeting and we had some very good discussion and suggestions for future meetings. Thank you all for your time and participation. Slides and notes from the meeting are available at:
<http://wiki.maxgigapop.net/twiki/bin/view/MAX/Fall2007Presentations>

NSFnet Anniversary Celebration

In late November a 2 day event was held celebrating the 20th anniversary of the National Science Foundation sponsoring the creation of NSFnet. It was wonderful to once again see so many colleagues who contributed so much and hear their stories and recollections of our network history. Presentations and video archives are available from the event at: <http://www.nsfnet-legacy.org/>



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IETF Journal

The Internet Society periodically publishes the "IETF Journal" to provide an overview of key IETF standards initiatives. The most recent edition can be found at:

<http://www.isoc.org/ietfjournal/>

The Green Grid

The Green Grid is a consortium of information technology companies and professionals seeking to improve energy efficiency in data centers around the globe. The Green Grid takes a broad-reaching approach to data center efficiency focusing on data center "power pillars" that span the gamut of technology, infrastructure and processes present in today's data center environments. The consortium's working focus includes research, standards writing, published studies and continuing education.

<http://www.thegreengrid.org/home>

Energy Efficient Networks

Recently Bruce Nordman from the DOE Lawrence Berkeley Lab gave a talk on energy efficient networks at the GENI Engineering Conference and IETF meetings. With computational and data requirements increasing, his research on this topic is highly relevant.

<http://eetd.lbl.gov/ea/nordman/>

<http://efficientnetworks.lbl.gov/enet-pubs.html>

Second Life

If you thought dealing with one life is more than enough, it may well be time to pull up those bootstraps and consider a virtual one. NOAA and NASA already have. Can the rest of us be far behind?

NOAA's online world comprises a rapidly growing population from 100 countries around the globe. Residents themselves create and build everything from homes, vehicles, stores, and landscapes to educational areas. On NOAA's island, one can soar through a hurricane on the wing of a research aircraft, rise gently through the atmosphere atop a weather balloon, or search for a hidden un-

derwater cave on a side trip from a NOAA submarine.

<http://www.esrl.noaa.gov/outreach/sl/>

<http://www.youtube.com/watch?v=is8YX32GAyQ>

NASA is interested in immersive synthetic environments (ISEs) because they have the capacity of providing greatly enriched educational opportunities and outreach. The organization maintains an Immersive Synthetic Environment Research (NISER) team that has members from NASA sites across the country; it meets monthly. NASA uses SecondLife for much of its internal collaboration.

<http://colab.arc.nasa.gov/>

<http://www.youtube.com/watch?v=kr3vXuxEPB8>

NASA Goddard Award

NASA Goddard Space Flight Center in Greenbelt, Md. proudly announced that its method for manufacturing high-quality carbon nanotubes (CNT) has been named a winner in the third annual Nanotech Briefs Nano 50 awards in the Technology category. This award was celebrated at the Nano 50 awards dinner November 14 at the NASA Tech Briefs National Nano Engineering Conference (NNEC 2007) in Boston, Mass.

Judged by a panel of nanotechnology experts, the Nano 50 awards recognize the top 50 technologies, products, and innovators that have significantly impacted (or are expected to impact) the state of the art in nanotechnology. The winners of the Nano 50 awards are the "best of the best"—the innovative people and designs that will move nanotechnology to key mainstream markets. For more on the award see:

<http://www.nasa.gov/centers/goddard/news/topstory/2007/nanotube.html>

Multics



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Multics (Multiplexed Information and Computing Service) is a mainframe timesharing operating system begun in 1965 and used until 2000. Multics began as a research project and became an important influence on operating system development. In order to preserve the ideas and innovations that made Multics so important in the development of computer systems, Bull HN has provided the source code for the final Multics release, MR 12.5 of November 1992 to MIT. It is a generous contribution to computer science knowledge and is provided for academic purposes.

It's a wonderful site with many many great historical links <http://www.multicians.org/>. A humorous recommended link is: <http://www.multicians.org/multics-humor.html>

Biometrics

Even Dilbert is paying attention to research on biometric security.

<http://www.dilbert.com/comics/dilbert/archive/dilbert-20071117.html>

NPAD Server in College Park

MAX recently brought up an NPAD server in College Park. Feel free to use it from your campuses and labs for pointers to tuning your operating systems and assessing last mile latency issues. <http://npad.maxgigapop.net/>

Qwest Commodity Internet Price Decrease

The collective purchasing power of the Regional Optical Networks through the Quilt has led to new aggregate pricing from Qwest the MAX will be passing along to our participants. The new rate will be going from \$28.50 per meg down to \$26 per meg effective mid November.

Member Spotlight

NCSA ACCESS Center

NCSA and University of Illinois to build the first sustained-petascale supercomputer

In August 2007, the National Science Board approved a resolution authorizing the National Science Foundation to fund the acquisition and deployment of the world's first sustained-petascale computing system for open scientific research at NCSA. Blue Waters, as the system is known, will be capable of sustained performance of one quadrillion calculations per second. It is expected to come online in 2011.

Blue Waters is a joint effort of the University of Illinois at Urbana-Champaign, NCSA, IBM, and the Great Lakes Consortium for Petascale Computation. This partnership is dedicated to encouraging the widespread and effective use of petascale computing to advance scientific discovery and the state-of-the-art in engineering, to increasing regional and national competitiveness, and to training tomorrow's computational researchers and educators.

The context for such Petascale computing can be seen from an editorial written by Ardent Bement and Dan Atkins from the National Science Foundation.

http://gladiator.ncsa.uiuc.edu/PDFs/access/fall07/enhancing_us.pdf

Advances in networking and information technologies underlie most of the 10 flatteners that Thomas Friedman, in his book *The World is Flat*, asserts have leveled the playing field for 21st Century global, knowledge-based, economic competition. While the world may be flat, its landscape is not without spikes and occasional peaks—technological advances creating powerful spires of excellence for discovery, learning, and innovation and broadening participation.

Economic leaders will not only create the tallest spires of excellence, but will connect spires into effective distributed virtual organizations that assemble complementary



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expertise, distributed information, observatories, computational resources, and other unique facilities. Using the same “collaboratory” platforms to support not only discovery but also learning and rapid response to unexpected events will offer even further leverage and advantage.

National Science Foundation investments in cyberinfrastructure, cyber-enabled discovery and learning, and computational thinking are defining and pursuing a revolutionary vision of 21st Century discovery appropriate to leadership in a competitive, flat world with spires on its skyline. Collectively, outcomes are expected to produce paradigm shifts in our understanding of a wide range of science and engineering phenomena and socio-technical innovations that create new wealth and enhance the national quality of life.

Achieving this vision requires virtuous circles of interaction among three types of activity: 1) research, advanced development, and provisioning of shared and connecting cyberinfrastructure for supporting and bridging science and engineering, research, and learning; 2) transformative application of cyberinfrastructure to produce transformative research; and 3) identification and transfer of the relevant results of technological and social research into future generations of cyberinfrastructure.

First, cyberinfrastructure creation and provisioning are cross-foundational at NSF, but coordinated and catalyzed by an executive-level Cyberinfrastructure Council (CIC) and the Office of Cyberinfrastructure (OCI). The activities are organized around four themes: high-performance computing, data and data interaction, virtual organizations for distributed communities, and learning and workforce development. The creation of infrastructure, cyber or otherwise, is a long-term, socio-technical process to build diverse systems, nurture interoperability and consolidation among systems, build supporting institutions, conduct evaluation, and create enhancements.

Advanced cyberinfrastructure investments in leading-edge shared computational resources include the recent petascale (“Track1”) award to NCSA at the University of

Illinois, and the continuing investment in interoperable computational resources (“Track2”) through the TeraGrid. The aggregate peak compute power for the Teragrid will soon be over 1.6 petaflops and is growing.

Digital data are increasingly both the products of research and the starting point for new research and education activities. New investments address infrastructure for data curation, stewardship, interoperability, and interaction through a new solicitation for sustainable digital data preservation and access network partners (DataNet). Investments in cyberinfrastructure to support virtual organizations include international networking partnerships, middleware, portal, and workflow environments, as well as the practical applications of academic understanding of social architecture for collaboration in distributed teams. Learning and workforce activities address both learning about cyberinfrastructure and learning with cyberinfrastructure.

The second and third activity types—transformative application to produce transformative research and the re-generation of even more revolutionizing cyberinfrastructure—comprise the new NSF-wide initiative entitled “Cyber-enabled Discovery and Innovation” (CDI). CDI is intended to create revolutionary science and engineering research outcomes made possible by innovations and advances in cyber-enabled computational thinking. Computational thinking is comprehensively defined to encompass computational concepts, methods, models, algorithms, and tools. Applied in challenging science and engineering research and education contexts, computational thinking promises a profound impact on the nation’s ability to generate and apply new knowledge.

CDI seeks ambitious, transformative, multidisciplinary research proposals within or across three thematic areas: From Data to Knowledge: enhancing human cognition and generating new knowledge from a wealth of heterogeneous digital data; Understanding Complexity in Natural, Built, and Social Systems: deriving fundamental insights on systems comprising multiple interacting elements; and Building Virtual Organizations: enhancing



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discovery and innovation by bringing people and resources together across institutional, geographical, and cultural boundaries, perhaps in ways better than being there.

Congruent with these thematic areas, CDI projects will enable transformative discoveries that have the potential to identify patterns and structures in massive datasets; exploit computation as a means of achieving deeper understanding of natural and social systems; simulate and predict complex, stochastic or chaotic behavior; explore and model nature's interactions, connections, complex relations, and interdependencies, scaling from sub-particles to galactic and from cellular to societal; and train future generations of scientists and engineers in the use of cyber-resources.

Creative, cyber-enabled, boundary-crossing collaborations, including those with industry and international partners, will contribute to advancing the frontiers of science and engineering, broadening participation in science, technology, engineering, and math (STEM) research, and educating an inclusive STEM workforce for the 21st Century.

Numerous community workshop and study panel reports contend that we have entered a nascent revolution through computational thinking in what, how, and who will be involved in future discovery and learning. These emerging cyber-enabled foundations will support the development of new and valuable technologies and services that will keep America globally competitive in today's world, a goal to which NSF is fully committed.



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Federal Labs and Agencies:

- ATDnet - NRL, LTS, DISA
- D.C. Government
- Energy Sciences Network (ESNet)
- Laboratory for Telecommunications Sciences
- Library of Congress
- NASA / GSFC
- National Archives and Records Administration (NARA)
- National Institutes of Health (NIH)
- National Institute of Standards and Technology
- National Library of Medicine (NLM)
- National Oceanic and Atmospheric Administration (NOAA)
- National Science Foundation (NSF)
- USDA, Beltsville Agricultural Research Center
- U.S. Department of Health and Human Services
- U.S. Department of State (through GWU)
- U.S. Geological Survey
- U.S. Holocaust Memorial Museum

Higher Education:

- Baltimore Education & Research Network
- Catholic University
- GEANT
- Georgetown University
- George Mason University
- George Washington University
- Johns Hopkins University

- Johns Hopkins University - Applied Physics Laboratory (JHU-APL)
- Montgomery College
- National Consortium for Supercomputing Applications / ACCESS
- Network Virginia
- Smithsonian Institution
- Southern Universities Research Association (SURA)
- University of California, D.C. campus
- University Consortium for Advanced Internet Development (UCAID / Internet2)
- University of Maryland, College Park
- University of Maryland, Baltimore
- University of Maryland, Baltimore Co.
- Univ. System of Maryland Network
- University of Southern California, Information Sciences Institute / East
- Washington Research Library Consortium

Corporate and Non-profit:

- Columbia Telecommunications Corporation (CTC)
- Howard Hughes Med. Institute
- Fujitsu Labs of America
- Inter-American Development Bank (IADB)
- Northrop Grumman Corporation
- The Institute for Genomic Research
- Windber Professional Services, Inc.
- World Bank
- The Venter Institute