



# Mid-Atlantic Crossroads

Advanced Regional Internetworking for  
Higher Education and Research

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

January 31, 2008

## Welcome

Welcome to the January 2008 edition of the MAX Newsletter, better a little late than not at all. 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

MAX has initiated a process to update our mission statement, values, and benefits of participating in our community. We are looking at what our Regional Optical Network and GigaPoP colleagues across the country say about themselves on these topics, what “fits” for MAX, and the key commitments we want to make and aspire to.

This effort marks the beginning of a strategic planning process that we expect to have sufficiently articulated for discussion at our Spring All-Hands meeting in early May. A date for the meeting is still being worked out and will be announced in the next few weeks.

We have also begun a detailed three year analysis of all cost elements associated with the delivery of our network services, in total and, to the extent where it makes sense, by individual Layer 1, Layer 2, and Layer 3. This is an important piece of background work to allow us to then examine our service pricing list and make recommended adjustments where they appear warranted. We will convene a meeting with our Technical Advisory Council to review any changes before bring-

ing them for further discussion at the All-Hands meeting.

Thanks for reading and if you have comments or suggestions, please send them along.

- Peter O’Neil

## Happy Birthday TCP/IP

As Jeff Caruso wrote in Network World, “Believe it or not, it has been a mere 25 years since TCP/IP walked into our lives and changed them forever.

It was Jan. 1, 1983, when Internet precursor ARPANET switched over fully to TCP/IP. TCP/IP is so well-known that it's one of those acronyms we no longer spell out at Network World, but in honor of the date, we should address this under appreciated and taken-for-granted bit of engineering by its full name, Transmission Control Protocol / Internet Protocol.

The occasion was largely missed by the mainstream press, but Google honored the anniversary on Tuesday



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with its logo - reproduced [here](#) - though you might easily have thought all that confetti was simply for the New Year. Blogger Philipp Lenssen writes that clicking on the "Google Doodle" logo led to a search result for the query "January 1 tcp/ip".

Apparently, sharp eyes also found an "easter egg" in the confetti in the Google logo, which apparently read "SYN SYN/ ACK ACK," according to Lenssen - an "inside joke" for the network geek set.

Work on the protocol actually began about a decade earlier than 1983, and several versions were hashed out before the ARPANET switchover. Vint Cerf and Robert Kahn were credited for the invention and were later awarded the Presidential Medal of Freedom.

It all started with a simple yet extraordinarily powerful idea - to bring all networks together, to let communications happen across them, regardless of any differences among those networks. The eventual result, of course, is today's Internet - a vast sea of everything mankind has to communicate, from the highest-minded endeavors to the lowest grunting urges, washing across the world in a constant, tidal motion."

[http://www.networkworld.com/newsletters/lans/2008/1231lan2.html?nlhtarch=ts\\_010308&nladname=010308networkarchitectureal](http://www.networkworld.com/newsletters/lans/2008/1231lan2.html?nlhtarch=ts_010308&nladname=010308networkarchitectureal)

## 2007 IPv4 Address Use Report

In 2007, the number of available IPv4 addresses went down from 1300.65 million to 1122.85 million, a difference of 177.8 million addresses. The number of usable addresses is 3706.65 million, so on January 1, 2007 we were at 64.9% utilization and a year later we're at 69.7%.

These figures are derived from the records published on the FTP servers of the five Regional Internet Registries (RIRs): [Afrinic](#), which gives out address space in Africa, [APNIC](#) (Asia-Pacific region), [ARIN](#) (North America), [LACNIC](#) (Latin American and the Caribbean) and the [RIPE NCC](#) (Europe, the former Soviet Union and the

Middle East). There are two other ways to interpret the same data. The first is simply add up all the address space with a date indicating that it was given out in 2007. That number is 186.93 million addresses.

The third method is to compensate for ARIN's record keeping peculiarities (see [this Internet Protocol Journal article](#)). This brings the total for 2007 to no less than 196.77 million, the highest number ever. The second-highest was 1991 with 189 million addresses. The 196.77 million figure is approximately 19% higher than the 2005 and 2006 numbers, which were largely the same. All numbers only include addresses that are still in use. For the first time in many years, in 2007 one of the old class A blocks was returned to IANA: block 46.0.0.0/8, 16.78 million addresses in size, is now part of the global pool of free address space. This accounts for most of the difference between the 177.8 and 196.77 numbers.

<http://www.bgpexpert.com/addrspace2007.php>

## NIST IPv6 Profile Document

NIST was tasked with an effort to evaluate the need for additional standards and testing infrastructures to support USG plans for IPv6 adoption. As part of this effort, NIST examined the state of IPv6 specifications published by the IETF; the present state of maturity of commercial implementations; the evolving Department of Defense IPv6 profile and product testing program; and, national and international profiles and testing programs driven by the vendor communities. The objective of this analysis was to determine: (a) where significant technical gaps exist in the near term technical landscape for IPv6 deployment; (b) what, if any, additional standards and testing infrastructures and processes are needed to assist Federal agencies to achieve safe and economical adoption of this new technology.

The findings from these efforts include:

1. A subset of network layer IPv6 specifications has stabilized and operationally viable commercial implementations of these specifications are becoming available. Agency budgeting, procurement and deployment plan-



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ning, could benefit from a common identification and definition of such IPv6 capabilities.

2. While significant commercial implementations have and continue to emerge, broad vendor product lines are currently at varying levels of maturity and completeness. Until there is time for significant market forces to effectively define *de facto* standard levels of completeness and correctness, product testing services are likely needed to ensure the confidence and to protect the investment of early IPv6 adopters.

3. The current state of IPv6 security and network protection technologies and operational knowledge lags behind that of IPv4 and the existing Internet. Additional efforts are required to “raise the bar” in these areas to ensure the safety of IPv6 deployments in operational Federal information technology systems.

4. While, in general, the proliferation of technology standards is to be avoided, the existing DoD and industry profiling and testing efforts are currently not well suited in content, or governance, for the perceived requirements of the USG as a whole. In the near term, the broad requirements of civilian agencies can be better met by a distinct profile and testing program. In the long term, it would be desirable to converge and harmonize these efforts into broader collaborative user/vendor profiling and testing initiatives in which the technical and process requirements of the USG can be fully accommodated.

5. Some key IPv6 design issues remain unresolved. As the USG begins to undertake significant operational deployments and investments in IPv6 technology, additional efforts are warranted to ensure that the eventual resolution of these design issues remains consistent with USG requirements and investments.

This document recommends a technology acquisition profile for common IPv6 devices to be procured and deployed in operational USG IT systems. It is intended to address several aspects of findings 1, 3, 4 and 5 above

and will be augmented by additional documents and activities including:

- Development of operational guidance for the secure deployment of IPv6 to further address findings 3 and 5.
- Development of an open public testing program for IPv6 technologies to further address finding 2.

<http://www.antd.nist.gov/usgv6/usgv6-v1-draft2.pdf>

## IANA Updates DNS Root Zones for IPv6

The DNS root zone was updated Monday with AAAA resource records for six of the root servers. To minimize reachability issues to the new root server IPv6 addresses that are located in micro-allocation infrastructure (/47s or /48s) but not to root servers located in /32s, now is the time to check your IPv6 route filters to permit up to at least /48s from the appropriate micro-allocation blocks.

<http://iana.org/reports/root-aaaa-announcement.html>

<http://www.icann.org/committees/security/sac018.pdf>

## American Geophysical Union Report

The American Geophysical Union released a new statement on climate change on January 24th, that says, "Earth's climate is now clearly out of balance and is warming." The statement, an update of the AGU's 2003 climate change position statement, says that when the scientific data related to warming is studied, "the human footprint on Earth is apparent." In releasing Human Impacts on Climate Change, the organization's strongest statement to date on the impact of global warming, AGU president

Timothy Killeen said, "the changes we're seeing are best explained by greenhouse gas emissions and aerosol loading in the atmosphere caused by human activity."

[http://www.agu.org/sci\\_soc/policy/positions/climate\\_change2008.shtml](http://www.agu.org/sci_soc/policy/positions/climate_change2008.shtml)

John Marburger's AGU "Union Lecture" can be found at: <http://www.ostp.gov/html/jhm%20AGU%2012-10-07%20refs.pdf>



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## A Blueprint for Big Broadband

Educause released a report citing studies that our “homes and businesses will need a minimum of 100 megabits per second (Mbps) of capacity within the next three to five years and will need even greater capacity going forward. While other nations are preparing for the future, the United States is not.” The report calls for the U.S. to take “aggressive action” and “proposes the creation of a new federal Universal Broadband Fund (UBF) that, together with matching funds from the states and the private and/or public sector, should be used to build open, big broadband networks of at least 100 Mbps (scalable upwards to 1 Gbps) to every home and business by 2012.”

<http://www.educause.edu/ir/library/pdf/EPO0801.pdf>

## Undersea Cable Cuts

Many in our region have experienced communications failures impacted by undersea cable cuts in the mid-east. As background on the details of handling undersea fiber optic cables, a classic article on the subject was written by Neal Stephenson for Wired Magazine in 1996.

[http://www.wired.com/wired/archive/4.12/ffglass\\_pr.html](http://www.wired.com/wired/archive/4.12/ffglass_pr.html)

## Rural Utilities Service Funds

The USDA Rural Development Telecommunications program announced the Fiscal Year 2008 Distance Learning & Telemedicine grant application window opened on January 28, 2008 with an announcement in the Federal Register. While different from the recent Rural Health grant program offered by the FCC, the intent is similar. This would be a wonderful opportunity for health care organizations in Maryland and Virginia to submit proposals.

<http://www.usda.gov/rus/telecom/dlt/dlt.htm>

[http://www.usda.gov/rus/telecom/dlt/pdf\\_files/2008DLTN\\_OFA.pdf](http://www.usda.gov/rus/telecom/dlt/pdf_files/2008DLTN_OFA.pdf)

## Summer Reading

As daylight increases a few minutes each day, and what tries to pass for winter in these parts is only a limited approximation, its never too early to start thinking about your summer reading list. Here’s one worth adding to it.

### “How do objects and images move? How can animals move? What is motion?”

How does a rainbow form? Is levitation possible? Do time machines exist? What does 'quantum' mean? What is the maximum force value found in nature? Is 'empty space' really empty? Is the universe a set? Which problems in physics are still unsolved?

This site provides a free physics textbook that tells the story of how it became possible, after 2500 years of exploration, to answer such questions. The book is written for the curious: it is entertaining, surprising and challenging on every page. With little mathematics, starting from observations of everyday life, the text explores the most fascinating parts of mechanics, thermodynamics, special and general relativity, electrodynamics, quantum theory and modern attempts at unification. The essence of these fields is summarized in the most simple terms. For example, the text presents modern physics as consequence of the notions of minimum entropy, maximum speed, maximum force, minimum change of charge and minimum action.

<http://www.motionmountain.net/>

## Network Neutrality Paper

Andrew Odlyzko from the University of Minnesota has written a paper entitled "*Network neutrality, search neutrality, and the never-ending conflict between efficiency and fairness in markets.*" One of his points is that “providing more funding for current operators is likely to be wasteful, in that it would either be pocketed as extra profit, or spent in wasteful ways. The one thing that has been well documented is that established service providers are terrible at innovation in services. Their core expertise is in widespread delivery of basic connectivity.”

<http://www.dtc.umn.edu/~odlyzko/doc/net.neutrality.pdf>



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## Learning Curves of Editors

While some may not find this worth smiling over, those who prefer emacs will:

<http://unix.rulez.org/~calver/pictures/curves.jpg>

## Google Hosting TB of Open Source Science Data

Sources at Google have disclosed that the humble domain, <http://research.google.com>, will soon provide a home for terabytes of open-source scientific datasets. The storage will be free to scientists and access to the data will be free for all. The project, known as Palimpsest and [previewed](#) to the scientific community at the [Science Foo camp](#) at the Googleplex last August, missed its original launch date will debut soon.

Building on the company's acquisition of the data visualization technology, [Trendalyzer](#), from the oft-lauded, [TED presenting Gapminder](#) team, Google will also be offering algorithms for the examination and probing of the information. The new site will have YouTube-style annotating and commenting features.

The storage would fill a major need for scientists who want to openly share their data, and would allow citizen scientists access to an unprecedented amount of data to explore. For example, two planned datasets are all 120 terabytes of Hubble Space Telescope data and the images from the [Archimedes Palimpsest](#), the 10th century manuscript that [inspired the Google dataset storage project](#). <http://blog.wired.com/wiredscience/2008/01/google-to-provi.html> and <http://pimm.wordpress.com/2007/09/25/googles-palimpsest-project-promiscuous-distribution-of-all-science-data-sets/>

## Member Spotlight

### American University

MAX welcomes American University as the newest participant to our community.

On Friday, American University Chairman of the Board Gary Abramson formally installed Neil Kerwin as the 14th president. The trustees presented President Kerwin with two symbols of office—the text of the 1893 Act of Incorporation along with the 1891 Bylaws, and the president's medallion, which bears the seal of the university and symbolizes the authority of the president.

Abramson's remarks follow:

“The board of trustees of American University, fulfilling one of the most significant responsibilities which it has been charged by an act of Congress of the United States of America, has chosen you, Corneilus Kerwin, to be the 14 th president of American University. Those who founded American University saw higher education as a dynamic force which must be responsive to the world around it, and must at the same time help to shape its future.”

“Those founders recognized that human aspirations, human needs and human potential are ever-changing. They knew that their concerns in the 19th century would not be those of the 20th century, nor centuries to come. But they were convinced, that the challenges of any age, can be met meaningfully by women and men provided with insights from the accumulated knowledge and wisdom of history, and from their own times, and who are endowed with an understanding of commitment to enduring human values.”

“To assist in the formation of such women and men is the greatest contribution that any university can make to the world... And that is the primary goal of American University . More than 100 years later, our goals still remain lofty. You begin your tenure at a period in our nation's, indeed our world's, history when loft ideals and their relationship to our daily conduct are undergoing renewed scrutiny and debate. In this time of great challenge, we look to you to lead this university – our university – with concern for these high ideals and also for the needs of the campus, the community, the nation and the world.”



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“We all pledge to you our support in this endeavor. Today, Friday February 8 th , 2008, the board of trustees in the presence of the faculty, administrations, staff, students, parents, alumnae and alumni, international, national and local officials, educational and professional associations, representatives of other colleges and universities, your family and your friends, today we are proud to install you officially, as the 14 th president of American University.”

“Will faculty trustee Jonathan Loesberg and student trustee Mark Tomik please join me at the podium?”

“We present you now with two symbols of this office: first, this copy of the original act of incorporation and by-laws of American University . These are the legal documents that establish the university and by whose terms, you have been elected its chief executive officer.”

“In addition, I invest you with this presidential medallion. It bears the seal of the university, and symbolizes the authority of your office, and the trust placed in you this day.”

“Congratulations.”



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## MAX Participants

### 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:

- American University
- 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