

Merit News

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Merit Adds Regional Fiber Rings

Merit has significantly expanded its networking assets in recent months. Realizing the importance of controlling its own facilities for local traffic as well as for long-haul routes, Merit has obtained a number of Regional Fiber Rings. The rings offer redundant service as well as fiber-to-the-premise access for local Members and Affiliates.

The rings are located in Grand Rapids, Lansing and Chicago, IL. Each fiber ring is a vital part of Merit's future plans. Utilizing a facilities-based network, including fiber directly to the customer, will provide Merit's Members and Affiliates the ability to participate in high-performance networking opportunities without the typical proportional increase in circuit cost.

Each ring offers gigabit Ethernet service and uses fiber optic multiplexers to split wavelengths and increase capacity.

Merit activated a regional fiber ring in Lansing in spring 2004. Michigan State University, the Legislative Council and

the State of Michigan, among others, are connected, or are in the process of, attaching to the ring. The Grand Rapids ring was announced August 3rd, and Grand Valley State University is the first attachment.

Merit plans to connect these rings to Michigan LambdaRail (MiLR), a Technology Tri-Corridor fiber initiative that is being driven by the research needs of Michigan State University, University of Michigan, and Wayne State University in conjunction with Merit. These links between Merit's Regional Fiber Rings and MiLR will provide additional redundancy to Merit Members and Affiliates and will stabilize transport costs for all of Merit.

The Chicago ring, acquired from Looking Glass Networks, replaces a leased telecommunications circuit between the Doral Plaza and the Equinix exchange point. This provides Merit its own four gigabit link between the sites, providing numerous opportunities for advanced networking applications with other research organizations beyond Michigan.

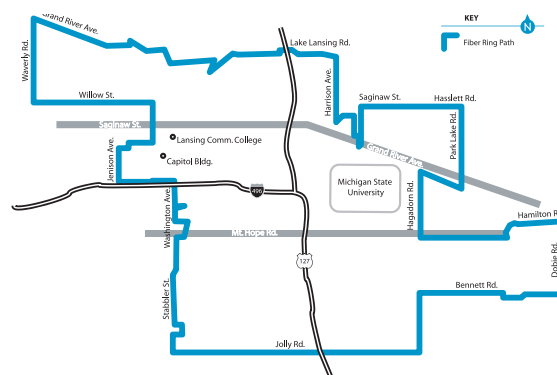
Currently, Merit is developing a Regional Fiber Ring in the metropolitan Detroit area. The Metro Detroit ring will connect Wayne State University, University of Michigan-Dearborn, and Merit's other backbone sites in Southfield. In addition, the Detroit ring will be used to interconnect Merit with the Optical Regional Advanced Network of Ontario (ORANO), Merit's research and education network counterpart in Ontario, Canada. This will create a fiber path to Toronto and eventually on to New York.

These regional fiber rings will give Merit greater direct control over its backbone circuits, providing the ability to offer additional advanced network services while controlling the cost of basic services to its Members and Affiliates. Merit will continue its effort to provide a facilities-based high-performance network throughout the state in the coming months.

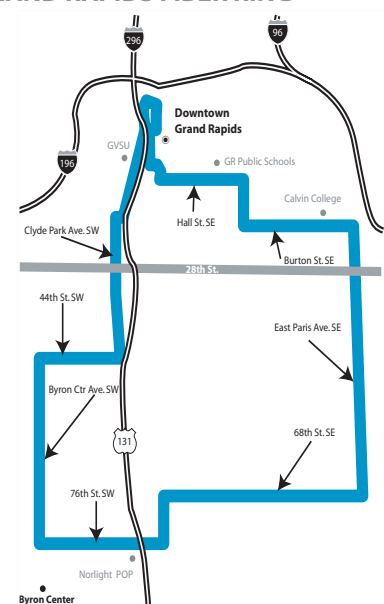
By: Jennifer Wolf

Each ring offers gigabit Ethernet service and uses fiber optic multiplexers to split wavelengths and increase capacity.

LANSING FIBER RING



GRAND RAPIDS FIBER RING



Dear Colleagues,

We are writing to let you know of recent events at Merit, and a change in leadership. First, Hunt Williams, who has served as president and CEO of Merit Network, Inc. for the past three years, has resigned his position effective October 15, 2004. Hunt has led the organization through a time of dramatic industry and economic change and we sincerely thank him for his efforts.

The Board of Directors is naming an Interim CEO and will commence a search in academia and industry for a permanent CEO. During the transition, Merit staff will report to us jointly. We are quite comfortable with this arrangement because of our experience with the high quality of Merit's line management and staff, and our great confidence in their ability to run Merit on a day-to-day basis to meet the needs of all Merit Members and Affiliates.

Second, the Board undertook an organizational review of Merit early this past summer. The results were informative, and the discussion around those results helped the Executive Committee of the Board to reaffirm our commitment to Merit. We continue to believe that where educational institutions and advanced networking come together, great things happen.

Another outcome of the organizational review was the realization by the Executive Committee that the Board has focused the past few years on Merit's cost structure, and has been less strategically involved in Merit's operations broadly than in years past. As a result, we have committed to refocus our efforts as we work with Merit to address the ongoing challenge of finding the best ways to maximize the potential of education and networking at a price that is manageable.

Through many changes in the industry, technology, economy and the organization, Merit has remained steadfast in its original mission. It has evolved and grown through these changes. We believe that Merit has served members and affiliates well and that it will continue to do so as we look to the future.

We understand that there are continuing economic challenges for all of Merit's Members and Affiliates, and we want to assure each of you of our optimism about Merit's ability to meet these challenges as it continues to evolve and aggressively pursue its facilities-based/owned fiber network strategy.

David Gift
Chair, Merit Board of Directors

James Hilton
Vice Chair, Merit Board of Directors

Merit Board Appoints McPherson as Interim President and CEO

The Merit Board of Directors is pleased to announce the appointment of Michael R. McPherson as Interim President and CEO of Merit Network, Inc., effective December 1, 2004.



Michael has also been appointed as a special counsel to the Provost at the University of Michigan and he will

continue holding a partial appointment in the College of Literature, Science and the Arts. Michael will serve Merit in the capacity of interim president on a 75%-time basis, while Merit organizes and conducts a search for a permanent president.

Michael has most recently been Director of Information Technology for the College of Literature, Science and the Arts at the University of Michigan, the university's largest college that serves approximately 15,000 undergraduate students, 2,000 graduate students, 1,200 faculty and 800 staff in over 50 departments, programs and service units.

Please join us in welcoming Michael to the Merit Network family.



Merit to Launch Interactive Video Service Winter 2004

Interactive video over IP is considered by many to be the next “killer application” in networking. While other data applications may be more bandwidth-intensive, video is far more sensitive to Quality of Service issues than pure data transmissions.

While much advancement has been made in the production of one-way streaming video, interactive video still has numerous challenges. The issues are complicated by a large legacy base of ISDN videoconferencing installations in current use. The two current transmission types (IP H.323 and ISDN H.320) use distinct protocols which are similar, but do not allow direct connections between IP and ISDN video endpoints.

As a result of these issues, many organizations with videoconferencing capabilities require assistance in providing quality interactive video to their end users, particularly when the videoconference requires connecting ISDN, IP and voice only endpoints.

Using a Multipoint Control Unit (MCU), Merit will be launching an interactive video service this winter. The service will provide Members and Affiliates the ability to bridge these different protocols into a single conference. A unique feature of the MCU unit is that different endpoints can connect at different bandwidth levels; no longer is every location held to the bandwidth of the slowest connection.

Conferences are pre-scheduled and each participant receives a confirmation with instructions to pre-register and test their endpoint. This pre-planning eliminates many of the difficulties experienced with videoconferencing. In addition, each conference is monitored by Merit’s world-class NOC.

Merit Interactive Video Service will be available to Members and Affiliates on either a one-time basis or at a reduced subscription rate for those organizations with higher video conferencing needs.

For more information, please contact your Support Team at <http://www.merit.edu/mn/support/>.

By: Jennifer Wolf

Merit Focus on Measurement and End-To-End Performance

Network-intensive applications such as videoconferencing are increasingly being used on Merit’s Member and Affiliate networks and across Merit, Internet2 and the commodity Internet. These applications may require sustained low-latency and high-bandwidth connections.

Merit is developing a network measurement infrastructure of servers and testing tools that can provide a regular

health report on the backbone. Measurement servers will be deployed at Merit’s ingress/egress locations to the commodity Internet and to Internet2. Currently, three measurement servers are being deployed; one at Chicago, one at Wayne State University and one at Merit’s data center in Ann Arbor. Merit Network will be able to run performance tests between these boxes and other measurement nodes located on

Keystone Conference

Bringing Interactive Video to the K-12 Community

With today’s tight budgets and rapidly changing technology, interactive video holds great promise for expanding educational opportunities when traditional means for doing so are cut off or are dwindling.

Merit is pleased to have participated in the Keystone Conference October 25-26. This first nationally accessible, K-12 interactive videoconferencing event focused on best practices for implementing video in the classroom. Educators, policy makers, and industry representatives from across the nation convened in Indianapolis, while others participated virtually via video.

The Keystone Conference comprised four simultaneous tracks that were made available to remote participants. The tracks or “strands” were cascaded in a branching architecture from central servers across multiple MCUs throughout the US. Individual participants received the strands via regional MCUs. This architecture accommodated a large number of participants without placing too great a load on any individual MCU. Merit was both a cascading server to other MCUs and provided strands to Michigan participants.

For more information, please visit, <http://www.k12videoconf.org/>

By: Lawrence Kirchmeier

A Day for Michigan Legislators: “Networking for Michigan’s Future”

The event included a live broadcast from the Titanic shipwreck.

On June 1st, Merit and Internet2® hosted “Networking for Michigan’s Future” for state legislators in Lansing. The event highlighted demonstrations and presentations on research and education applications that depend on high-performance networking.

House Speaker Rick Johnson sponsored the event and introduced the featured presentation. “This event demonstrates the importance of high-speed networking to education in Michigan,” said Speaker Johnson “With high-speed Internet, Michigan residents have access to incredible learning resources across the state and around the world.”

The featured presentation included an interactive IP videoconference with Dr. Robert Ballard, discover of the Titanic shipwreck. Dr. Ballard spoke with attendees live from the deck of his research ship, directly over the Titanic’s location. Attendees interacted with Dr. Ballard and observed the launching of submersibles during the presentation.

Presentations from Merit/Internet2 Members and Affiliates demonstrated to legislators how critical high-performance networking is to the future of Michigan. In particular, the event underscored that the state already has many of the essential advanced networking resources at its fingertips and they need ongoing support in order to make Michigan a leader in technology.

“Merit and Internet2 share a vision to develop and implement the next generation of high-performance networking,” said Hunt Williams. “Our co-location in Michigan benefits the entire state by enhancing educational opportunities and fostering economic development.”



Michigan-based participants included Michigan State University, Port Huron and Algonac High Schools, Madison Heights Lamphere Schools, Ann Arbor Hands-on Museum, Central Michigan University, University of Michigan, Steelcase, Arbor Networks, Lansing Public Schools, Malcom X Academy, Wayne State University, Superiorland Library Co-op, Western Michigan University, Port Huron ISD, St. Clair ISD and Wayne County RESA.

Other demonstrations included virtually controlling a robot in the Upper Peninsula from Lansing, watching schoolchildren operate an underwater submersible, remote use of electron microscopes, and listening to a virtual high school band concert occurring in multiple locations.

By: Jennifer Wolf



Real time Student Assessment

GoObserve v.2 Released September 1, 2004

Last year, in partnership with the Michigan Association of Secondary School Principals (MASSP/<http://michigan-principal.org>) and GoKnow, Inc. (<http://goknow.com>), Merit Network, Inc. created GoObserve (<http://observe.merit.edu>). Working closely with user focus groups, GoObserve received a substantial update in its new version 2 release.

GoObserve is an application that resides on a Windows desktop/laptop and is synchronized with a Palm OS handheld. A Pocket PC version is due for release in fall 2004.

GoObserve helps schedule teacher and pre-service teacher observations throughout the year. Scheduling is done

with a desktop computer, and is then synchronized to become a part of a handheld calendar.

In the classroom, the GoObserve handheld component allows users to unobtrusively “script” classroom activities. Using categorization and time-stamping features, GoObserve records, minute-by-minute, what’s happening in the classroom.

When synchronized to the desktop, GoObserve downloads a complete record of the observation and allows the user to edit and print the report in Microsoft Word using its grammar and spellchecking tools. The report also

includes a bar graph or pie chart that visually displays how instructional time was spent.

Classroom observations are one of the most important jobs of a school principal or university faculty assigned to supervise pre-service teachers. GoObserve™ is a one-of-kind software application that helps efficiently schedule classroom observations, effectively capture teaching that occurs during these observations and, because of its design flexibility, works in any school setting.

Michigan Teacher Network (MTN) Uses Statistics to Serve Users Better

User statistics are an important way for Web sites to know how many people are using their site and what time of day they are using it. The Michigan Teacher Network (MTN) <http://michiganteacher.net> staff regularly use two sources of statistical data to characterize user behavior. Logs of Web site activity indicate that MTN receives between half a million and a million visits per month, with a high proportion of unique users. MTN staff also review the search strings typed into the site search box. Analysis of search strings indicates that MTN users seek curriculum planning resources, job listings, professional development events, Michigan education information, and more. Overwhelmingly, MTN users are looking for resources relating to classroom management and any aspect of science education.

Statistics can only begin to tell the tale of what users can find at the site. MTN’s collection of more than 8,000

items includes far more than curriculum resources! On your next visit, be sure to check out the “Other Places to Look” section, which features a subsection called “Assessment Items.” In this subsection, you can view test questions from the National Assessment of Educational Progress (NAEP), also known as the Nation’s Report Card. Each of the test items is described for educators using MTN’s unique scheme and correlated to the Michigan Curriculum Framework. NAEP also includes overall performance information, scoring rubrics, and exemplary answers for each item. The “Special Collections” subsection features not only full-text, archived articles from the Michigan Association for Media in Education (MAME) journal, Media Spectrum, but also articles related to educators’ information-seeking behaviors, information literacy conference proceedings, and the latest addition, Internet Video Resources from MTN’s Viewing the Future grant project.

Viewing the Future

Viewing the Future is a National Science Foundation National Science Digital Library grant that selects and describes streaming Internet video from the University of Washington’s ResearchChannel and UWTV collections for the Michigan Teacher Network.

A complete project proposal can be seen at: <http://vtf.merit.edu>

Currently, MTN has created records for about 50 of these Internet video segments with Virage video processing and transcription software.

A list of the videos in Michigan Teacher Network can be seen at: http://michiganteacher.net/resources/collections/internet_video_resources.html

By: Marcia Mardis

By: Marcia Mardis

Merit Rides the Wave

Research and educational networks, like MichNet, have always been large consumers of Internet capacity. So it comes as no surprise that they are pushing to reduce the network operating costs and new service delivery delays of leased carrier circuits by direct purchase of optical fiber, both for their metro access and long-haul inter-city links.

Services of many different bandwidths and protocols currently run across fiber optic paths, but the cost and management of the protocols run across these newly-acquired facilities are often controlled by employing the technology most familiar to campus environments, ethernet.

Network topologies that employ ethernet switches with industry standard modular, hot-swappable optical transceivers for connecting to aggregation switches across campus could be expanded to include the metro environment with the longer range optics that project their signals using 1310nm or 1550nm wavelengths. This is also used in the carriers' environment – for medium (up to 15km) and long range (up to 100km) fiber paths.

But wide area fiber assets are still a limited resource, so scaling to meet the varied applications and capacity demands of communities such as research and education becomes the next hump in the road. Merit has begun to deploy a technology called wavelength division multiplexing (WDM) that provides both the opportunity to increase overall bandwidth available across a single fiber pair, as well as, to create private paths for individual applications or organizations.

Fiber optic multiplexer cables (a sort of "Y" cable) that combine two wavelengths onto a single fiber through purely optical means (refraction) - and thus without the need for electrical power - have provided an easy, inexpensive first step in the direction of adding link capacity. One (or both) of the 1310 and 1550 "colors" can be dedicated to an individual point-to-point service, or to sites that are daisy-chained together. One color can be shared amongst multiple sites' switches by adding and dropping it at each site using the same fiber mux cables, while the other color is passed through ("expressed") undisturbed. In this way, power outages or

failures of equipment using one color do not interrupt service to a site using the other color. Merit has employed this technique in its new Lansing, Grand Rapids, and Chicago fiber rings.

Wavelengths determined to be successfully combined in this fashion have been specified in international standards and grouped according to the amount of inter-signal space left between wavelengths ("coarse" or "dense") within the useable spectrum supported by the various fiber types deployed today. Some of these wavelengths (8 to 16, depending on the vendor) are already available in the gigabit transceivers used in ethernet switches. Merit can continue to add and customize capacity, using the same passive multiplexing techniques as the need arises. Since the multiplexers are bandwidth transparent, further gains will be realized with the eventual deployment of 10GbE-capable switches with similar modular, optical transceivers supporting the same wavelengths.

By Bert Rossi

Merit Network's New Suite of Security Services

Today, networks are bombarded with attacks from hackers, worms, Trojan Horses and viruses. From the Blaster virus to Denial of Service (DoS) attacks, network security is fast becoming a serious concern for both business and IT professionals alike.

According to a study completed by Ferris Research and Computer Economics, in 2003, businesses incurred costs of \$23 billion dollars due to spam and viruses. Over 7,000 new viruses, worms and Trojan Horses were identified and industry experts anticipate that number to significantly escalate in the years to come. Lost productivity, wasted and damaged resources and interruption of services are all symptomatic of ineffective network security.

At Merit, we understand that organizations may find it difficult to meet all the needs of their network users and specialize in services such as network security. In addition, regulatory or audit requirements may demand that organizations demonstrate that they have taken the steps necessary to secure their networks and critical data. A first step to securing a network is identifying where your network may be vulnerable to attacks.

Merit's Network Security Consulting Services, launched in August 2004, provide organizations with access to knowledgeable security consultants who evaluate networks to identify vulnerabilities or irregularities that leave your network open to attack. The security consultants are available to review existing authentication procedures, firewall,

backup and restoration procedures, business continuity planning and review critical business functions from a systems contingency planning perspective. A security assessment report documents the findings and presents industry best practices for consideration.

Network security is not just needed to ensure data integrity, but to ensure business continuity.

For more information on Merit's suite of security services, please contact a Network Sales Consultant at sales@merit.edu or your Support Team at <http://www.merit.edu/mn/support/>.

By: Vicki Childress

NANOG Strengthens ARIN Partnership at Annual Joint Meeting

NANOG, the North American Network Operators' Group, held its third joint meeting with ARIN, the American Registry for Internet Numbers (www.arin.net), in mid-October. NANOG has been coordinated by Merit since the group first met in 1994, and is the foremost international forum for information exchange among backbone network operators. ARIN is responsible for distributing IP addresses and Autonomous System numbers in North America, a portion of the Caribbean, and sub-Saharan Africa. The joint meeting was held in Reston, Virginia ([see www.nanog.org/mtg-0410/](http://www.nanog.org/mtg-0410/)).

NANOG meets three times each year and attracts up to 600 attendees from more than 20 countries around the world. NANOG's annual meeting with ARIN benefits the community by providing information on engineering topics of interest to both groups. For example, topics include management of IP address space by ISPs and campus/enterprise users, allocation of scarce resources such as unique network identifiers, and operation of Internet registries such as Merit's Routing Assets Database.

NANOG is widely recognized as:

- The most important international venue for presentations on Internet operations, implementation, and research
- The home of the major email list for reporting network problems (www.nanog.org/maillinglist.html)
- The only Internet conference that brings together operators, researchers, and vendors

NANOG's international visibility highlights Merit's continuing role as a national leader in high-speed networking. With a focus on education, NANOG meetings are known for providing impartial information about Internet engineering practices. Presentations are strictly vetted for vendor bias, and vendor displays are limited to modest tabletop exhibits.

The focus on unbiased information sharing is part of what makes the NANOG meetings such a success. The community sees NANOG as a trusted resource for the latest information about network engineering and operations.

Engineers from the MichNet community will find much of interest at NANOG meetings, from tutorials on routing protocols to case studies on the effects of the latest worm on campus wireless nets.

The next NANOG meeting will be held January 30-February 1, 2005 in Las Vegas, and more information can be found at www.nanog.org. Please join us!

by Susan Harris



Merit News

www.merit.edu

Editors

Vicki Childress, Elwood J. Downing, Susan Harris,
Jennifer Wolf

Contributors

Vicki Childress, Susan Harris, Lawrence Kirchmeier,
Marcia Mardis, Bert Rossi, Jennifer Wolf

Art Direction

Steve Burdick

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1000 Oakbrook Drive
Suite 200
Ann Arbor, Michigan 48104

2004 Service Awards Program

The following Merit staff have milestone anniversaries this year:

Betty Burke, 30 years (6/3/74)
Susan Harris, 20 years (3/13/84)
Deb Kozub, 20 years (5/21/84)
Bill Bulley, 10 years (4/11/94)
Steve Weiland, 10 years (4/11/94)

2003 award recipients:

David Belenky, 10 years (7/19/93)
Teresa Raymond, 10 years (6/28/93)
Gayle Terkeurst, 10 years (7/2/93)



From left to right: Teresa Raymond, Betty Burke, Susan Harris, Gayle Terkeurst, Steve Weiland