



MichNet News

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<http://www.merit.edu>

Network Monitoring &

Verify Your Diagnostic Phone Line Is In Place and Update Your Contact Information

One great advantage to obtaining your Internet access through Merit's MichNet Network is the 24-hours-a-day, 7-days-a-week network monitoring provided by MichNet's Network Operations Center (NOC). In many instances, the NOC discovers you have a connectivity problem, solves the problem, and then lets you know what happened before you are even aware of it. This smooth chain of events will only occur, however, if specific items are in place.

Diagnostic Modem – Dedicated Phone Line

When Merit first attached your organization to MichNet, one of your required responsibilities was to install a dedicated voice phone line (or POTS line – plain old telephone service) for a diagnostic modem. This POTS line must go directly to the modem, not through a switchboard. Unfortunately some organizations, especially those that never have problems or interruptions in their network service, may forget what this line is for and eventually disconnect it.

“At organizations where there is a high turnover rate in the individuals responsible for network services, this item can get overlooked,” said **Elwood Downing**, Manager, Merit Member and Affiliate Services. “Of



Is your contact information in Merit's database up-to-date?

course, it then suddenly becomes very important if there is a network problem.”

The diagnostic modem line is also used during upgrades. When Merit needs to change your router configuration, Merit dials in to the router and makes any necessary changes. If the diagnostic modem line is not in place, then there may be an unnecessary delay for your upgrade. Either Merit will need to wait for the necessary line, or you will need to pay for a Merit technician to travel to your site.

Proper Contact Information

In an emergency situation, the NOC may need to contact your organization directly. The first call

See Pitfall to Avoid on page 3

Internet2 News

Internet2 is a cooperative effort of a large number of United States universities to create an environment that allows the implementation of network applications that are not possible on today's commodity Internet. Merit operates the Michigan GigaPoP, which provides Internet2 access to organizations throughout the state. Access to Internet2 is available to the university members of Internet2, as well as to sponsored organizations working in collaboration with an Internet2 member university.

WMU Receives Internet2 Access

Western Michigan University is the most recent Michigan organization to get access to Internet2. WMU's T3 (45M bps) access to Internet2's Abilene network was enabled on March 26, 2000. WMU joins Michigan State University (155M bps), Michigan Technological University (45M bps), the University of Michigan Ann Arbor (622M bps), Wayne State University (155M bps), and the University Corporation for Advanced Internet Development (155M bps).

Internet2 Access to be Extended to All of Michigan's Public Universities

At their June meeting, the Merit Board of Directors approved plans to extend Internet2 access to the eight public universities in Michigan that do not currently have it. The eight universities will become "Abilene Sponsored Participants." Internet2 access is also being extended to the University of Michigan Dearborn.

Network Upgrades

The OC3c (155M bps) link between Ann Arbor and East Lansing was upgraded to an OC12c

(622M bps) during August. This link carries both commodity and Internet2 traffic. The upgrade provides MSU with better access to the existing OC12c link to Abilene from Ann Arbor and provides UM, WSU and UCAID better access to the OC3c Abilene link from Chicago. Access to WMU will be upgraded to 155M bps this fall when the OC12c link from Kalamazoo to Chicago is complete. Work is also underway to replace the existing OC3c link from East Lansing to Chicago with an OC12c link from East Lansing to Kalamazoo.

Internet2/Abilene Premium Service Test Program Launched

To support the QBone, an inter-domain quality of service (QoS) test-bed initiative, Internet2 announced in April the launch of the Abilene Premium Service (APS) test program.

APS is built on the Expedited Forwarding (EF) per-hop behavior defined by the IETF (Internet Engineering Task Force) Differentiated Services working group. The basic packet conditioning and forwarding service is complemented by a measurement infrastructure that will provide detailed QoS performance data to support end-to-end debugging and analysis of QoS-enabled paths. During the initial phase of the APS test program, EF-marked traffic injected by a participating connector will be policed according to an agreed-upon service profile. No preferential forwarding treatment will be given to APS traffic as it transits Abilene. However, because Abilene is still fairly lightly loaded, this is not expected to be a significant problem for those involved in testing QoS-sensitive applications. Subsequent phases of APS testing will include partial EF forwarding through the Abilene core and policing and/or

MichNet News

<http://www.merit.edu/michnet/mnn/>

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monitoring at all connector interfaces to protect EF capacity.

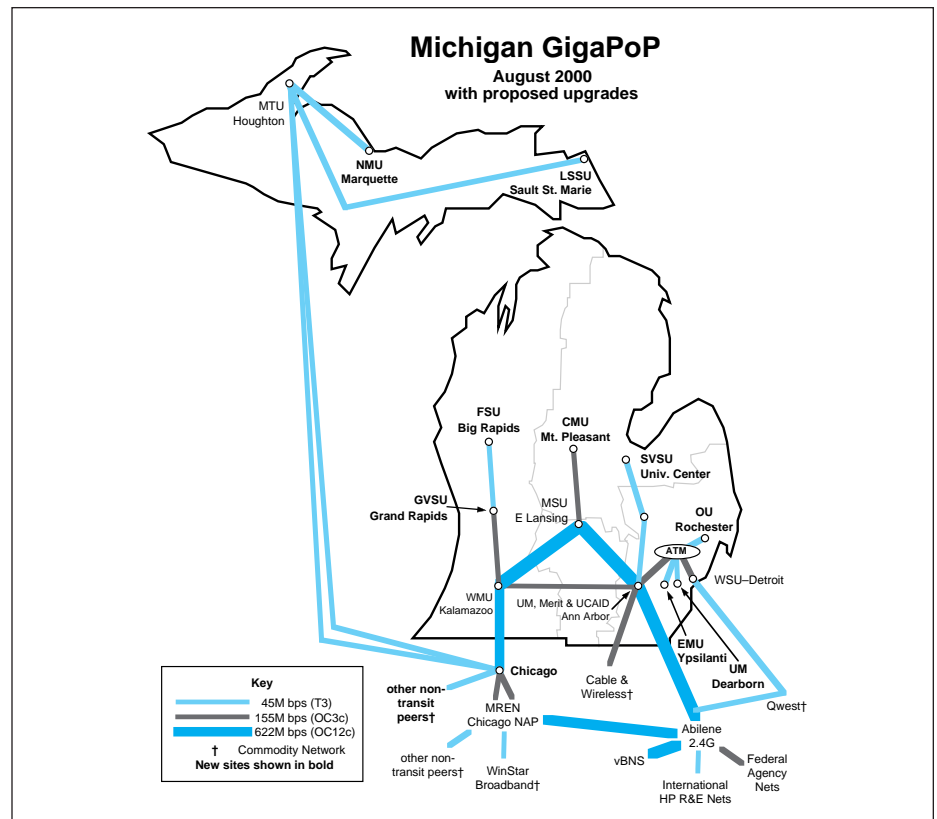
IPv6 Is Now Available Over Internet2/Abilene

In May Internet2 announced it has established four core IPv6 (Internet Protocol version 6) nodes on its Abilene network and is peering with several other research and education networks using IPv6, including the Department of Energy's ESnet network and Canada's CANet3. Most Internet2 traffic, like most traffic on the commodity Internet, is still carried using the original IPv4.

More Information About Internet2, Abilene and the Michigan GigaPoP

For more information, see <http://www.merit.edu/i2/> or <http://www.internet2.edu>.

—Jeff Ogden, Merit 



Pitfall to Avoid

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will go to the technical contacts listed in Merit's database. If the technical contacts are not available, the next call will go to the administrative contact. If it has been several years since your installation, or, if you are aware of any turnover in your staff, you should check with your Member and Affiliate Services support team to see what information is currently in Merit's database. You may be surprised when you find out who is listed! As you update your information, keep in mind that you can list more than one technical contact, and you can prioritize this list.

While Your Are Updating Your Information ...

While you have your Merit support team member on the phone,

you may wish to check a few additional items.

- **Merit Joint Technical Staff (MJTS) e-mail list** – mjts@merit.edu is a closed list. If you utilize more than one e-mail address, the one that Merit sends MJTS messages to is the only one you can use to post something to mjts@merit.edu. Otherwise your message will get "bounced." This could be especially confusing if you automatically forward e-mail from one address to another. Check with your support team member to find out or change what address is utilized for mjts@merit.edu mailings.
- **Domain Name Registration** – your organization's information in the domain name registration database is another piece that can get

out-of-date. Check with your support team member to find out what information is listed, and if it needs to get updated.

Contact Member and Affiliate Services

Please contact your Member and Affiliate Services Support Team (<http://www.merit.edu/merit/m&a.services.html>) if you have any questions regarding your organization's diagnostic modem line and to update your contact information. If you have all the necessary pieces in place, a small network problem will remain exactly that ... small.

—Candice Russell, Merit



As Another School Year Starts: Network Security/Abuse



As another school year starts we can expect a new rash of network abuse incidents. Most of them will be minor: SPAM, chain letters, and the like. Some may be a bit more serious: unauthorized port scanning, forged e-mail, etc.

Still others may be very serious: denial of service attacks, bomb threats, threats to or harassment of others, child porn, and threats to the President of the United States or other government officials. Each year Merit is asked to assist in a half dozen incidents of one sort or another that involve law enforcement agencies (which isn't too bad when you consider how many users we have, but it would still be good if there were fewer of these incidents).

Now is probably a good time to do what you can to remind your network users of your Acceptable Use Policy (AUP). If you don't have an AUP of your own, you should tell your users about Merit's AUP (and think seriously about writing your own AUP that can be written with any special local requirements in mind).

Make sure that all of your users know that there are laws and other rules that need to be followed when using the Internet — that the Internet and computers are not in a special "no rules zone". To see a copy of Merit's AUP check <http://www.merit.edu/michnet/>

[policies/acceptable.use.policy.html](http://www.merit.edu/michnet/policies/acceptable.use.policy.html).

Try to include some mention of acceptable user behavior in new user agreements, in other introductory information, and during training classes. Take steps to discourage the sharing of user accounts and passwords. Teach people how to select good passwords and impress on them the need to keep passwords secret. For an article on selecting good passwords, see <http://www.merit.edu/michnet/mnn/1997-01/passwords.html>.

www.merit.edu/michnet/mnn/1997-01/passwords.html.

Try to keep anonymous network access to a minimum. When you must allow anonymous access, consider what can be done to minimize the chances of network abuse from an anonymous session, such as limiting applications and/or network services available to anonymous sessions. Give advanced thought to how you will respond to any complaints of network abuse that might arise from anonymous sessions that you allow.

All sites should have an email alias such as: "abuse@mydomain.com"

Organizations should have an action plan in place for responding to reports of Internet abuse, both to and from your site. For information on how to report and deal with network abuse incidents see: <http://www.merit.edu/michnet/policies/abuse.html>

Or you might want to look at the Merit Network Security special interest group: <http://www.merit.edu/michnet/netsec/>, or even join the netsec@merit.edu e-mail group.

— Mike Mosher, Merit Network, Inc.

New on Merit's Website: Updated Security Information

Network security is an intimidating subject. There are hundreds of websites about security, but many of these sites use language that assumes you already understand the topic. For individuals that are new to security, Merit's security specialist Paul Howell has created a "Top Five" list of security websites (available online at <http://www.merit.edu/michnet/netsec/top.html>). This list serves as a great starting point to learn about network security.

For those that want to delve deeper into the topic, Merit offers two additional online security resources. First, an extensive list of security websites — actually a copy of Paul's favorite bookmarks — is located at <http://www.merit.edu/michnet/netsec/bookmarks.html>.

Second, the "netsec" listserve provides a forum for discussing security issues. Anyone can join this listserve. Send e-mail to majordomo@merit.edu, with the words "subscribe netsec" in the body of the e-mail. And now, with the addition of a searchable index, if you want to find out what netsec members have to say about specific issues, you can now search the netsec archives. For information, see <http://www.merit.edu/mail.archives/netsec/>.

Merit can help you with network security at your site. For more information, please contact your Member and Affiliate Services Support Team (<http://www.merit.edu/merit/m&a.services.html>).



Distributed Denial of Service (DDoS): What You Need to Know, What You Should Do

The Hype

It's official . . . recently I added *DDoS attacks* to my growing list of "mysterious computer acronyms that people drop into daily office conversation" (also on my list you will find MP3, T3, OC12c, AUP, and the Merit-specific MJTS, HVP, MAC, and MTN). So, when I was asked to write an article explaining DDoS attacks in simple terms, I was glad — I would finally have the motivation to learn what DDoS actually means. If I could figure this out, then surely the explanation would be in terms that anyone could understand.

There are references to DDoS attacks everywhere. Sometimes when I hear a word often enough, I actually start to think I know what it means. A quick review of my actual DDoS knowledge, however, revealed only the following:

1. DDoS attacks are really bad. They will shut down your network.
2. There is nothing you can do to prevent a DDoS attack.

Sounds pretty grim, I know. The DDoS research I did (there is tons of DDoS information available on the Internet) confirmed both statements. I also discovered there are several things that all network administrators should do to prevent the spread of DDoS attacks.

A DDoS Attack in Layman's Terms

DDoS stands for Distributed Denial of Service. "Denial of Service" simply means making a resource unavailable. For example, Joe Meanguy attacks the Amazon.com website, eventually shutting it down, and now I can't get to the site to order the book I want. I have been "denied service." A "distributed" denial of service

attack is a well-planned attack coming from many different sources. This doesn't mean that Joe calls his friend Bob Hacker, and they both attack at the same time. It means that Joe is able to mount his attack from numerous locations simultaneously.

One key to all of Joe's attacks is that he doesn't want to get caught. Unfortunately, starting the attack, and doing it in a way that disguises where the attack is coming from, is relatively easy, even for the hacker who is just learning. See the sidebar for a description of how an attack is set up, taken from "Distributed Denial of Service Attacks" by Bennett

Todd (Copyright 2000 OVEN Digital, <http://packetstorm.securify.com/distributed/btodd-whitepaper.txt>).

The hacker uses insecure systems as the source of his/her attacks. The actual mechanics of the specific attack can differ, but basically the hacker breaks into an insecure computer, Computer A, and then uses Computer A to attack Computer B. Sounds like a bad made-for-TV movie, I know. The attack can be as straightforward as Computer A requesting a web page from Computer B. In a DDoS attack, thousands of "Computer As" make the same

See DDoS on page 6

Preparing for a DDoS Attack (From the Attacker's Perspective)*

. . . the perpetrator starts by breaking into weakly secured computers, using well-known defects in standard network service programs, and common weak configurations in operating systems. On each system, once they break in, they perform some additional steps. First, they install software to conceal the fact of the break-in, and to hide the traces of their subsequent activity. . . . Then they install a special process, used to remote control the burgled machine.

This process accepts commands from over the Internet, and in response to those commands it launches an attack over the Internet against some designated victim site. And finally, they make a note of the address of the machine they've taken over. All these steps are highly automated. A cautious intruder will begin by breaking into just a few sites, then using them to break into some more, and repeating this cycle for several steps, to reduce the chance they are caught during this, the riskiest part of the operation. By the time they are ready to mount the kind of attacks we've seen recently (gigabytes per second of traffic dumped on Yahoo, according to reports in SANS) they have taken over thousands of machines and assembled them into a DDoS network; this just means they all have the attack software installed on them, and the attacker knows all their addresses (stored in a file on their control system).

Now comes time for the attack. The attacker runs a single command, which sends command packets to all the captured machines, instructing them to launch a particular attack (from a menu of different varieties of flooding attacks) against a specific victim. When the attacker decides to stop the attack, they send another single command.

*Taken from "Distributed Denial of Service Attacks" by Bennett Todd (Copyright 2000 OVEN Digital).

Distributed Denial of Service

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request of Computer B all at once. Computer B is not able to handle all the simultaneous requests and shuts down.

What You Should Do

While you cannot actually stop a DDoS attack from targeting your network, you can easily prevent your network from being the source of an attack (one of the thousands of "Computer As" in the previous example). There are two things you should do right now:

1. Install egress filters at your network edges.

When one computer wants to send a message to another, it divides the message into pieces, called "packets." Each packet contains a pair of addresses: the source and destination. When each packet is sent over the Internet, its first path is through the nearest router, which will decide which direction to send the packet. When a hacker uses Computer A to attack Computer B, each packet sent from Computer A will contain a forged source address.

Routers located at your network's borders (the routers that separate your internal network from the Internet) which contain egress filters will check each packet leaving your network to make sure it is coming from a legitimate address on your network. Since

the DDoS attack packets contain forged source packets, the egress filters will identify and throw away these packets, thereby preventing the hacker from using your network.

Merit has already placed egress filters on each MichNet router, so any packet leaving your network and entering MichNet is already being checked for a legitimate source address. You may have other connections to the Internet, however, which will need filters installed. In addition, your organization may be part of a consortium with its own WAN (wide area network), and you will need to install filters to ensure your computers cannot be used to attack other organizations within your WAN.

2. Disable re-directed broadcast on your network.

A second type of DDoS attack, commonly called a SMURF attack, uses the broadcast address on networks. If your network allows packets addressed to your broadcast address, then a hacker can send a packet to the broadcast address with a forged "reply to" address of Computer B (remember, Computer B is the one that keeps getting attacked). Each machine on your network will send a "reply" to Computer B.

Packets directed to the broadcast address that originate from

outside your network are called IP Directed Broadcast packets. You can easily block these packets from your network. The command to do this for Cisco™ routers is "no ip directed-broadcast".

Merit has disabled this re-directed broadcast option on all Merit-managed routers.

In theory, recent attacks on well-known sites such as Yahoo! could not possibly originate from any MichNet sites due to the egress filters and proper setup of all Merit-managed routers.

Where to Find Help, More Information

I was able to quickly find a wealth of DDoS information by doing a standard search on the Internet (I used Metacrawler and entered "DDoS" as the item I was searching for). Two sources I found extremely helpful included (1) *The Alliance for Internet Security* (<http://www.icsa.net/html/communities/ddos/alliance/>), and (2) Bennett Todd's *Distributed Denial of Service Attacks* white paper (already mentioned in the sidebar). In addition, joining Merit's netsec listserve (netsec is short for network security) is a great way to keep up-to-date on DDoS and other security issues. You can view instructions for joining netsec and searching the archives at <http://www.merit.edu/mail.archives/netsec/>. Finally, you can always contact your Member and Affiliate Services Support Team (<http://www.merit.edu/merit/m&a.services.html>) if you have additional questions or need assistance.

—Candice Russell, Merit

In theory, recent attacks on well-known sites such as Yahoo! could not possibly originate from any MichNet sites, due to the egress filters and proper setup of all MichNet-managed routers.



AAA and GateD Consortiums Form New Companies

As a nonprofit corporation, Merit is charged with promoting computer networking in Michigan and beyond. This means that in addition to providing connectivity for Merit's Members and Affiliates, Merit employees have the opportunity to work on a wide variety of special projects, many at the national level. Two of these projects have been so successful they outgrew their ability to work within the confines of a nonprofit organization. After extensive negotiations, both the AAA and GateD software consortiums have spun off to form separate for-profit companies.

AAA becomes Interlink Networks, Inc.

On June 14, 2000, the University of Michigan on behalf of Merit licensed



the Merit AAA (Authentication, Authorization, and Accounting) Server technology to a new start-up company named Interlink Networks, Inc. Both the University and Merit believe this valuable technology will be better served through a for-profit enterprise that can devote adequate attention and resources to its development. Merit first started licensing its dial-in software worldwide as part of the AAA Consortium in 1996.

It should be noted that Merit still uses AAA servers to operate MichNet, and will continue to license the AAA server software to its Members and Affiliates as before.

GateD becomes NextHop Technologies, Inc.

In early May 2000, the University of Michigan and Merit announced the creation of NextHop Technologies, Inc., a spinoff of the GateD software consortium. Merit has nurtured the GateD activity since assuming leadership from Cornell University in 1995. The project has flourished, and Merit believed it was time to move GateD to the next stage — emergence as an independent, commercial venture. Creation of the spinoff was a collaborative initiative of U-M, Merit, and the GateD staff.

—Eric Aupperle, Merit



Merit Meetings, Events

In the past four months Merit has hosted a variety of meetings and special events. The headliner was the second Merit Annual Meeting, "Creating Online Communities," held May 23-24, at Ferris State University's Holiday Inn Hotel and Conference Center. Over 90 Merit Members, Affiliates, and staff attended. Other events included the



Enjoying lunch at the Merit Annual Meeting.

September 14 Merit Joint Technical Staff (MJTS) meeting in East Lansing, and the September 19 MichNet Seminar, "Planning and Using Internet Technology for Your User Community."

The Annual Meeting featured a lively plenary speech by Patrick Douglas Crispin, co-author of the Internet Tourbus (<http://www.tourbus.com/>).

In addition, attendees were treated to t-shirts, dinner, raffles (with prizes donated by Merit Member institutions), numerous networking opportunities, and fabulous presentations put on by Member and Affiliate representatives and Merit staff.

Merit is now broadcasting all seminars and MJTS



Brian Baas (Calvin College) and Scott Gerstenberger (Merit)

meetings using RealVideo. With the addition of video, the online audience has increased dramatically, with 21 seminar and 30 MJTS online participants.



DIALING INTO MICHNET

All MichNet shared dial-in users must authenticate with an Access ID issued by their organization. For information on how to obtain Access IDs, contact the network support staff at your site.

Dial-in users can connect to a network access server (NAS) by using Point-to-Point Protocol (PPP) or VT-100 terminal emulation programs. Terminal emulation users should set their **communication settings** to 8 data bits, no parity, 1 stop bit.

All MichNet sites support the v.34 (28.8/33.6 Kbps) protocol and older, slower protocols. More than half now support v.90 (40-52 Kbps actual).

MichNet modems support the error correction protocols v.42 and MNP4, as well as the data compression protocols v.42bis and MNP5.

Local Access Numbers:

Before configuring your modem to automatically dial a MichNet access number, check Merit's Dialaccess searchbase to make sure it is a local number. Merit's Dialaccess searchbase is available on the web at:

http://www.merit.edu/cgi-bin/db/dialaccess__new.pl

Note: Merit Network, Inc. is not responsible for any telephone charges that might occur should you dial a non-local number.

Recommended Settings:

The following settings are recommended for use with PPP and MichNet dial-in access numbers.

Flow Control	CTS/RTS	On
	XON/XOFF	Off

CTS/RTS flow control must be enabled in your modem and your modem cable must be able to pass CTS and RTS signals. Since XON/XOFF flow control may interfere with binary file transfers, it is not recommended.

DCE/DTE Speeds	DCE (phone line) speed	DTE (computer port) speed
	34,667 to 52,000 bps (v.90)	230,400 or 115,200 bps
	33,600 bps (v.34)	115,200 or 57,600 bps
	28,800 bps (v.34)	115,200 or 57,600 bps

The DCE speed is negotiated to the highest reasonable speed by the modems and is not usually set by the user. The v.34 standard supports a range of speeds from 19,200 to 33,600 Kbps. Since many phone lines are of insufficient quality to support 33,600 Kbps, v.34 modems will often negotiate to a lower speed. Similarly, the v.90 standard supports a range of speeds from 34,667 to 52,000 bps, but typically users will see speeds in the 40,000 to 46,667 bps range.

The DTE speed (computer port) should be set higher than the DCE (phone line) speed to take advantage of compression when using terminal emulation or PPP.

About the Shared Dial-in Listing


Online listing: For the most current listing of dial-in numbers, check: <http://www.merit.edu/michnet/dial-in/numbers/>


Terminal emulation users can find current numbers by entering **help** at the **host:** prompt and then selecting **MichNet Dial-in Numbers**.


Modem speeds: All MichNet dial-in sites are served by Network Access Servers (NASs). Details on NAS modems are contained in "Dialing Into MichNet." All dial-in sites support carrier speeds of at least 33.6K bps. Since many phone lines are of insufficient quality to support 33.6K bps, v.34 modems will often negotiate to a lower speed. More than half also support v.90, commonly called "56K." However, v.90 modems generally provide actual speeds in the 40 to 52K bps range.

Number of lines: The number of lines listed is the total number of priority and no-priority lines in a hunt group.

Limited Access Numbers: One number provides access primarily for Oakland University (OU) users and is so marked. This number provides limited access for other users.

Greater Detroit Numbers: A star (★) indicates numbers reaching a common hunt group called "Greater Detroit." See "Greater Detroit" for the number of lines available to users dialing these numbers. 

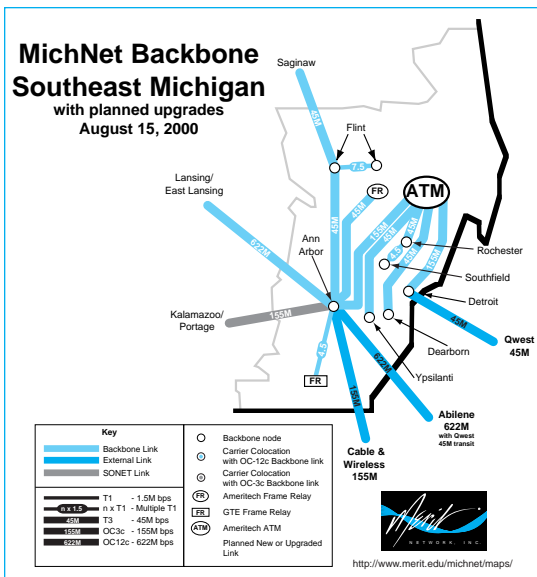
SE Michigan Numbers: A number sign (#) indicates numbers reaching a common hunt group called "SE Michigan." See "SE Michigan" for the number of lines available to users dialing these numbers. 

Upper Peninsula Numbers: A plus sign (+) indicates numbers reaching a common hunt group called "Upper Peninsula." See "Upper Peninsula" for the number of lines available to users dialing these numbers. 

✓ 56K/v.90 ★ See Greater Detroit
 # See SE Michigan † See Upper Peninsula

MichNet Shared Dial-in Numbers

City	Phone No.	Lines	City	Phone No.	Lines	City	Phone No.	Lines
MICHIGAN			✓ Goodrich	810 230-8103	#	✓ Newberry	906 293-2982	†
Addison	517 547-5621	12	Grand Haven	616 846-2617	60	Northport	231 386-5029	7
✓ Adrian	517 265-6689	45	✓ Grand Rapids	616 224-7020	460	Onaway	517 733-8968	28
✓ Albion	517 629-7450	56	✓ Grayling	517 348-9405	36	Ontonagon	906 884-6495	11
Allegan	616 686-0008	11	✓ Greater Detroit		644	✓ Oscoda	517 215-2200	#
✓ Alma	517 466-5322	72	Greenville	616 754-6816	7	✓ Owosso	517 729-7205	42
✓ Alpena	517 356-0704	150	✓ Hadley	810 245-0204	#	Petersburg	734 279-1839	7
✓ Ann Arbor	734 489-2200	391	✓ Harrisville	517 724-5989	61	Petoskey	231 347-1715	48
✓ Atlanta	517 785-4927	48	Hart	231 873-7798	20	Pinconning	517 879-6940	10
Au Gres	517 876-4180	10	Hastings	616 945-0348	30	✓ Pontiac	248 232-7800	★
✓ Avoca	810 966-8812	#	Hillsdale	517 439-9102	29	Pontiac (OU)	248 370-4311	16
Bad Axe	517 269-2693	11	✓ Holland	616 355-0026	144	✓ Port Huron	810 455-2200	#
Baldwin	231 745-3182	8	✓ Holly	248 531-2200	#	Portland	517 647-5008	20
✓ Battle Creek	616 963-9975	48	✓ Hope	517 832-0144	#	✓ Powers	906 497-4081	†
✓ Bay City	517 922-2200	#	✓ Houghton	906 483-3120	84	Prescott	517 873-4837	6
Belding	616 794-1046	12	Houghton Lake	517 366-4125	42	✓ Rock	906 356-6691	†
✓ Bergland	906 575-1035	†	Howard City	231 937-6069	6	Rogers City	517 734-3794	11
✓ Big Bay	906 345-9496	†	✓ Howell	517 586-2200	#	✓ Romeo	810 894-7800	★
✓ Big Rapids	231 592-1040	96	Hudson	517 448-2087	7	✓ Roscommon	517 275-5134	57
Blissfield	517 486-2072	7	Indian River	231 238-4962	22	Rose City	517 685-2109	27
Boyne City	231 582-7492	32	Ionla	616 527-0685	29	✓ Saginaw	517 921-2200	#
✓ Brevort	906 292-5522	†	✓ Iron Mountain	906 776-1202	†	✓ St. Clair	810 328-2200	#
Bridgman	616 465-3590	19	✓ Iron River	906 265-4810	†	✓ St. Ignace	906 643-0077	†
Buchanan	616 695-0168	54	✓ Ironwood	906 932-9914	†	✓ St. Johns	517 224-0502	37
Cadillac	231 779-0683	36	Jackson	517 788-6300	109	✓ St. Joseph	616 983-1965	120
Capac	810 395-4623	25	✓ Kalamazoo	616 387-2070	648	Sand Creek	517 436-3266	8
Caro	517 673-1422	5	Kalkaska	231 258-8479	9	✓ Sandusky	810 682-2200	#
Carson City	517 584-6831	13	Kent City	616 678-4177	5	✓ Sanford	517 832-0144	#
Caseville	517 856-9215	7	✓ Keweenaw	906 289-1045	†	✓ Sault Ste. Marie	906 635-1533	†
Cassopolis	616 445-8618	15	Lake City	231 839-6760	6	✓ SE Michigan		1449
Cedar Springs	616 696-4941	5	Lakeview	517 352-7571	5	Sidney	517 328-3300	22
✓ Central Lake	231 544-3056	20	L'Anse	906 524-5644	4	South Haven	616 639-1909	25
✓ Charlotte	517 543-1631	53	✓ Lapeer	810 538-2200	#	Sidney	517 328-3300	21
Chatham	906 439-5901	5	✓ Lawrence	616 674-3296	12	South Haven	616 639-1909	32
Cheboygan	231 627-2220	29	✓ Lennon	810 230-8103	#	Springport	517 857-4336	7
Chesaning	517 845-2917	4	✓ Ludington	231 843-7167	114	Standish	517 846-1189	17
✓ Clare	517 421-2200	#	✓ Mackinac Island	906 847-0083	†	Stephenson	906 753-2185	48
✓ Coldwater	517 279-7694	24	Mancelona	231 587-0545	7	✓ Stockbridge	517 851-7382	38
Colon	616 432-3245	14	Manistee	231 398-0302	21	✓ Sturgis	616 659-0774	37
Concord	517 524-9047	9	Manistique	906 341-5977	9	Tecumseh	517 424-4100	13
✓ Curtis	906 586-3257	†	Marcellus	616 646-2608	10	Temperance	734 847-6662	24
✓ Decatur	616 423-6023	19	✓ Marquette	906 226-3891	†	✓ Three Rivers	616 279-5400	37
✓ Detroit	313 586-7800	★	Mason	517 676-7671	25	✓ Traverse City	231 941-9826	92
✓ Dowagiac	616 782-4568	47	McBain	231 825-8232	7	✓ Trenton	734 559-2200	#
Dryden	810 796-3333	21	Memphis	810 392-9964	26	✓ Trout Lake	906 569-0013	†
Dundee	734 529-5614	18	✓ Menominee	906 863-1002	†	Twining	517 867-4141	7
East Lansing	517 353-3500	876	✓ Mesick	231 885-2962	5	✓ Upper Peninsula		288
✓ East Lansing	517 432-7200	1564	✓ Michigamme	906 323-1001	†	✓ Warren	810 693-7800	★
Edmore	517 427-5957	10	✓ Midland	517 923-2200	#	✓ Watersmeet	906 358-9879	†
Edwardsville	616 663-5502	7	✓ Mio	517 826-1229	57	Wayland	616 792-1211	17
Elsie	517 862-4141	13	✓ Monroe	734 349-2200	#	✓ West Branch	517 216-2200	#
✓ Engadine	906 477-8096	†	Montrose	810 639-4895	9	Westphalia	517 587-4451	7
✓ Escanaba	906 789-2034	†	Morenci	517 458-2206	7	✓ Williamston	517 655-1370	12
Ewart	231 734-6497	10	✓ Mount Clemens	810 723-7800	★	Yale	810 387-2157	31
✓ Farmington	248 522-7800	★	✓ Mount Pleasant	517 774-2224	415	NEW YORK CITY		
Fennville	616 561-7111	9	✓ Munger	517 895-6493	#		212 509-5270	10
✓ Flint	810 249-0300	#	Munising	906 387-3245	5	WASHINGTON D.C.		
Frankfort	231 352-4134	10	✓ Muskegon	231 728-4253	95		202 484-4160	14
Fremont	231 924-5662	10	✓ New Baltimore	810 684-2200	#	MERIT FOR-FEE		
✓ Gaylord	517 732-1596	80	✓ New Boston	734 415-2200	#	800 NUMBER	800 232-3379	24
			New Buffalo	616 469-5907	19			



Upper Peninsula

Several new T1 frame relay links at Sault Ste. Marie are complete. Sault Ste. Marie now has 7.5M bps of frame relay connectivity.

A new T3 frame relay link at Houghton is complete. Houghton now has 45M bps of frame relay connectivity.

These upgrades provide increased capacity between Sault Ste. Marie and Houghton, as well as increased capacity for other Upper Peninsula sites connected to MichNet with Ameritech's frame relay service. These new T1s are actually a stop-gap to support the bandwidth load until a T3 is in place (see below.)

A related result of this Upper Peninsula work will be the removal of a Point-to-Point T1 between Marquette and Sault Ste. Marie.

Other Upgrades in the Works

Upper Peninsula

Merit has ordered a second T3 between Houghton and Chicago. We expect completion of this circuit this fall. The first T3 is nearing capacity. (Merit only just installed the first T3 in August '99!)

We've also ordered a frame relay T3 to replace the multiple frame relay T1s for Sault Ste. Marie into Ameritech's frame relay cloud in the

Upper Peninsula LATA. We expect completion of this circuit in October.

Norlight Services — Ann Arbor, Kalamazoo, Lansing, and Chicago

Merit will be co-locating MichNet backbone equipment at Norlight's Portage POP (a stone's throw South of Kalamazoo). Bundled with this co-location effort, Merit will have:

- A "local-loop" OC3c between WMICH and the Norlight Portage POP,
- An OC12c between Chicago and the Norlight Portage POP,
- An OC12c between Lansing and the Norlight Portage POP, and
- An OC3c between Ann Arbor and the Norlight Portage POP.
- A "local loop" OC12c between MSU and the Norlight Lansing POP.

The OC3c above was originally intended to go from Ann Arbor to Chicago, but the co-location agreement and other factors led us to this more comprehensive design.

Jackson <—> East Lansing

The four T1s (6.0M bps total) between Jackson and East Lansing are slated to be replaced with T3 frame relay service, for a total of two T3s into Ameritech's frame relay cloud in the Lansing LATA. We expect completion of these circuits this fall. A related result of this work will be the removal of the 3 T1s between Jackson and Ann Arbor.

Mt. Pleasant <—> East Lansing

We've ordered an OC3c to replace the existing T3 between Mt. Pleasant and East Lansing. We expect completion of this circuit in the third or fourth quarter.

Dearborn <—> ATM T3

We've ordered an Ameritech ATM T3 to replace the existing multiple T1s (6.0M bps) between Dearborn and Detroit, as well as the T1 between Dearborn and Ypsilanti.

UM-Flint <—> FLPOP

We've ordered an additional T1 between UM-Flint and FLPOP, in Flint, increasing the available bandwidth there from 6.0M bps to 7.5M bps. Completion of this circuit is expected this fall.

Commodity Internet Access

As of mid-September Merit now receives an additional T3s worth of commodity bandwidth in Ann Arbor from Qwest (this is in addition to the existing Qwest T3 link in Detroit). Qwest is using a portion of the existing OC12c local access circuit to Abilene to carry this traffic to Qwest's commodity national backbone.

Merit has a contract for two T3s (90M bps total) of commodity bandwidth from Ann Arbor to Cable & Wireless. We've renegotiated this service and have ordered replacement of the two T3s with an OC3c. We've also recently chosen to purchase an OC3c of commodity bandwidth from Cable & Wireless in Chicago.

The installation of the OC12c link from Kalamazoo to Chicago will allow Merit to do increased non-transit peering at the Ameritech NAP and possibly other peering points in Chicago. Non-transit peering is often an excellent strategy for garnering additional bandwidth access to the greater Internet without increased costs.

Send questions and comments on this report to your MichNet Support Team (<http://www.merit.edu/merit/m&a.services.html>).

—Mike Mosher and Brian Cashman,
Merit Network



Key

T1	1.5M bps
T3	45M bps
OC3c	155M bps
OC12c	622M bps
POP	Point of Presence
NAP	Network Access Point

Upcoming Dial-in Changes

Ovid Dial-in Users Must Switch to Owosso Number by September 28

The MichNet dial-in number in Ovid (517-834-2258) was retired on September 28, 2000.

This does not constitute a reduction in the MichNet dial-in coverage area, because users in Ovid are also able to make a local call to the MichNet dial-in location in Owosso.

Users who currently dial the Ovid number should be instructed to instead call the **Owosso dial-in location, 517-729-7205**. No other calling areas are affected by this change.

A list of realms that have used the Ovid dial-in number in the past few months is provided below. Administrators of these realms should make a special effort to inform their Ovid users of this change.

Clare Dial-in Users Must Switch to New Clare Number by October 10

Lines in the MichNet SE-Michigan dial-in location will replace the MichNet dial-in location in Clare. The large SE-Michigan location — now with 1449 lines — serves a broad portion of the eastern Lower Peninsula, from Monroe to

Oscoda. New lines at the SE-Michigan location will match those currently at Clare; organizations that have owned lines in Clare now have an equivalent number of lines at SE-Michigan. **The new number for Clare users is 517-421-2200.**

The new number is available immediately, and users should begin using it now. With this change, Clare users have immediate local access to both V.90 and ISDN service. In addition, they effectively have a priority "local access" at any of the SE-Michigan dial-in locations.

The old Clare number will be retired and taken out of service on Tuesday, October 10, 2000. During transition, the number of lines in service at the old Clare number have been gradually reduced.

A list of realms that have used the Clare dial-in number is provided below. Merit urges you to publicize this change to your dial-in user community as soon as possible, and to make it known that the old number will be removed from service. All MichNet dial-in numbers are listed at: <http://www.merit.edu/michnet/dial-in/numbers/>

—Andy Rosenzweig, Merit Network, Inc.



What Dial-in Locations Do My Users Call?

How can you find out what dial-in locations your users are calling? It's easy using Merit's website. Simply follow these steps:

1. Go to <http://www.merit.edu>.
2. Using the Quick Links in the upper left hand corner, select "Stats, Dial-in."
3. In the list on the right hand side, under Authorization Stats choose "Monthly Reports".
4. Scroll down to Reports for 2000. Here, under the month of your choice, choose "Realm Reports - Individual."
5. You will now see a list of every available realm group. Scroll down to your realm and select it.

The report will include a listing of all the dial-in locations that your users from this realm have accessed, including how many sessions were supported at each location. If your organization supports more than one realm (in the userid anyuser@anyschool.edu, "anyschool.edu" is the realm), you will need to look at each realm report for your organization.

If you have questions, or need help interpreting any of your dial-in statistics, please contact your Member and Affiliate Services Support Team (<http://www.merit.edu/merit/m&a.services.html>).

Realms that have used the Ovid dial-in location in recent months include:

a1access.net	cmich.edu	edzone.net	gvsu.edu	mcc.edu	msu.edu	umich.edu
baker.edu	cps.cmich.edu	ferris.edu	lansing.cc.mi.us	mideastern.lib.mi.us	oe.k12.mi.us	wmich.edu

Realms that have used the Clare dial-in location in recent months include:

a1access.net	delta.edu	k12.mindnet.org	mindnet.org	northlink.net	usol.com
alma.edu	ds.k12.mi.us	kirtland.cc.mi.us	miqvf.org	online.emich.edu	walshcol.edu
baker.edu	edzone.net	leslie.k12.mi.us	mjc.state.mi.us	remcen.ehhs.cmich.edu	wash.k12.mi.us
bay.k12.mi.us	ejourney.com	lssu.edu	mlc.lib.mi.us	resa.k12.mi.us	wmich.edu
bignet.net	engin.umich.edu	matchbbs.org	moisd.k12.mi.us	sunny.ncmc.cc.mi.us	wwnet.net
cmich.edu	ferris.edu	merps.k12.mi.us	msu.edu	svsu.edu	
cooley.edu	gvsu.edu	mich.com	mtu.edu	tln.lib.mi.us	
cps.cmich.edu	hs.evart.k12.mi.us	midmich.cc.mi.us	mvcc.com	umich.edu	

Secretary Miller Debuts SMART LINK At Shopping Malls

Merit Provides Connectivity for New Department of State Customer Service Kiosks

This past June, Merit Network, Inc. installed routers to provide connectivity for the Department of State's newest customer service initiative — SMART LINK kiosks. SMART LINK kiosks are now located in the Macomb Mall in Roseville and the Wonderland Mall in Livonia as part of a pilot program. Kiosks were also on display at this year's Michigan State Fair in Detroit and the Upper Peninsula State Fair in Escanaba. Additional kiosks are planned for Sterling Heights City Hall and other sites across Michigan. Merit is providing the Internet connectivity for each kiosk.

SMART LINK is a web-based kiosk that allows residents to access Secretary of State services and information online in malls and other public areas.

"By locating our kiosks in public areas such as shopping malls, we are making Secretary of State services available to our customers at convenient locations," Secretary of State **Candice S. Miller** said. "This new customer service initiative really allows us to bring government directly to the people."

"Merit has provided the Department of State with a proposal for locating these kiosks throughout Michigan," said **Elwood Downing**, Merit Member and Affiliate Services Manager. "We are excited about the opportunity to partner with the State and provide this valuable service for Michigan residents."

The name, SMART LINK, is an acronym for State of Michigan Automated Response Terminal Licensing and Information Network Kiosk. The initiative uses proven technology currently being supported by department staff. It offers Secretary of State customers an alternative to visiting a branch office

to obtain information or perform some of the most common transactions such as vehicle registration renewals.

SMART LINK features touch-screen menus that direct people to a variety of services and information. The state-of-the-art kiosk provides all of the e-commerce options available on the Department of State's web site allowing customers to:

- Renew license plates
- Register watercraft
- Subscribe to Michigan History Magazine
- Access the Bureau of Automotive Regulation online complaint form
- Request Secretary of State forms be mailed to their home address
- Enroll in the Michigan Organ and Tissue Donor Registry

In addition to services, SMART LINK provides residents with instant access to Secretary of State information, including:

- Branch office locations and hours
- Graduated Driver License program
- Michigan Historical Center, museum sites, state symbols and the State Archives



SMART LINK kiosk at the Wonderland Mall in Livonia. (Photo by Jason Russell)

- Consumer tips on buying, leasing and repairing vehicles
- Frequently asked questions about driver licenses, disability license plates and placards

SMART LINK was first introduced to residents in January at the 2000 North American International Auto Show at Cobo Hall in Detroit.



Merit Provides Connectivity for Special Events

Merit continues to be the network provider of choice for conferences, state fairs, and other non-profit events. Recent events that Merit provided connectivity for include:

Upper Peninsula State Fair	Escanaba	August 14-19
Lower Peninsula State Fair	Detroit	August 22-September 4
Michigan Library Association Conference	Detroit	October 3-6

Merit can provide connectivity for your special event. Please contact your Member and Affiliate Services Support Team for more information.

USF Status: Year 2, Year 3, and Year 4

Trying to sort through all your Universal Service Fund deadlines? Getting paperwork for Years 2, 3, and 4 confused? Jeff Ogden has summarized where you should be with each funding year, including what paperwork is due, when you might hear from the FCC, and where you can get more help.

I hope everyone had a good summer and for those of you at schools, I hope fall classes are off to a good start. This note is an update that outlines where we are in the Universal Service Fund (USF) program for K-12 schools and libraries for the close of Year 2, the start of Year 3, and new applications for Year 4.

— Jeff Ogden, Merit

Year 2

- Year 2 ended on June 30, 2000. All Year 2 USF participants received an automatic extension to the end of September for one-time costs (usually internal connections, but possibly one-time costs associated with telecommunications services or Internet access as well).
- Most schools and libraries should have filed their Year 2 form 486 and in some cases form 472 (BEAR) paperwork and should

- have received their discounts from vendors by now. If you haven't filed the required form 486, you should do that right away. Filing form 472 (BEAR) isn't required for everyone. If you haven't received your discount, check with your vendor(s) to figure out what the status is.
- A few sites may be waiting to finish up some Year 2 work with one-time costs by the September 30th deadline and they can file

- their form 486s and 472s when the one-time work is complete.
- Some schools and libraries are waiting for the results of appeals.
- A few schools and libraries filed "out of window" form 471s for Year 2 and are waiting to receive their Year 2 Funding Commitment Decisions Letters (FCDLs). Request Acknowledgement Letters (RALs) have been sent to approximately 80% of these applicants.

See USF Status on page 15

Grant Project Update

Merit's Center to Support Technology in Education (CSTE) is involved in a variety of grant-funded projects. Here is a quick update on two of these projects – the Michigan Teacher Network and a new National Science Foundation grant.

Michigan Teacher Network: Search for Resources by Curriculum Standards

The Michigan Curriculum Framework Content Standards are now available on CSTE's Michigan Teacher Network. The standards, in an easy to navigate format, can be browsed at <http://mtn.merit.edu/mcf/>.

Individual curriculum benchmarks are correlated to resources in the Michigan Teacher Network

collection. To see an example, go to <http://mtn.merit.edu/mcf/SOC.I.1.MS.html> and click on the blue "Resources for Benchmark" links shown, if available, under the description of each benchmark.

CSTE Participating in NSF Grant

In conjunction with Eastern Michigan University (EMU), CSTE had been awarded a National Science Foundation (NSF) grant to contribute to development of NSF's National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL). With **Ellen Hoffman** (Merit's MTN Project Manager) as Principal Investigator **Marcia Mardis** (Merit Internet Media Specialist) as Co-Principal Investigator, and **Kate**

Pittsley (MTN Librarian) as Advisor. CSTE is excited about this opportunity to assist in the creation and coordination of high quality progressive science teaching materials.

Specifically, CSTE received funding in the NSDL's Core Information Services track, a project named "TeacherLIB—Digital Community and Collections for Science and Mathematics Teacher Education." While the scope of the NSDL audience has been defined at "PreK to Gray," the TeacherLIB initiative will allow EMU and CSTE to play a role in NSDL's implementation and collections development with respect to pre-service teachers and the K-12 community.

— Marcia Mardis, Merit



USF Status

from page 14

However, these Year 2 funding commitments will not be made until the Year 3 "within window" 471's are processed and funding commitments are made.

- November 20, 2000 is the official deadline for filing Year 2 form 486 and form 472 (BEAR), but it is likely that this deadline will be extended for at least some applicants who are waiting on the results of appeals or who are waiting to hear the results of their Year 2 "out of window" applications.

Year 3

- Year 3 runs from July 1, 2000 through June 30, 2001.
- Year 3 Funding Commitments are being sent out by the the Schools and Libraries Division (SLD) each week. This is expected to continue until well into September 2000 and it seems likely that the SLD will still be making awards in October. The SLD had planned to have all Year 3 Funding Commitment Decision Letters for "within window" form 471s sent out to schools and libraries before the start of Year 3, but they did not meet their goal.
- So far the SLD has made just under \$1.6 billion in funding commitments. There is \$2.25 billion available in Year 3, although some of that total must be used to cover the administrative costs of running the USF program and some funds will be held back to cover awards and adjustments that will be made as a result of appeals. So there is between \$500 and \$700 million left to award in Year 3.
- Because the total funds requested (over \$4.7 billion) in Year 3 "within window" applications exceeds the funds available (\$2.25 billion) by such a large amount there will be no "out of window" form 471 applications for Year 3.
- Schools and libraries that have

received their Year 3 Funding Commitments can submit form 486, and, if necessary, form 472 (BEAR) now.

- A number of schools and libraries that were denied some or all funding for Year 3 have filed appeals with the SLD or FCC. Appeals must reach the SLD or FCC within 30 days of the date when the Funding Commitment Decision Letter or the results of an earlier appeal was sent. **Many appeals are being rejected without review on their merits because they miss this deadline.** Appeals may be filed with EITHER the SLD or the FCC. You cannot file an appeal with both agencies at the same time. Usually an appeal is filed with the SLD first and, if you disagree with the SLD's decision on an appeal, a second appeal is filed with the FCC.

Year 4

- Year 4 will run from July 1, 2001 through June 30, 2002.
- There is no window for Year 4 form 470 applications. Year 4 form 470s can be submitted now or anytime up to 28 days before the close of the Year 4 form 471 window.
- The Year 4 form 471 equal application window period will run from early November through mid January.

Technology Plans

Schools and libraries must certify that they have an approved technology plan when they submit their form 486s. Technology Plans need to be approved at least every three years. For more information on Technology Plan approval in Michigan see:

Schools: <http://www.merit.edu/usf/action/k12.html>

Libraries: <http://www.merit.edu/usf/action/newlib.html>

Getting Assistance

Michigan schools and libraries can turn to a group of staff at ISDs and Library Cooperatives for assis-

tance with the USF program. Check the Web for a list:

Schools: http://www.min.state.mi.us/funding/USF_Trainers_Schools.shtml

Libraries: http://www.min.state.mi.us/funding/USF_Trainers_Libraries.shtml

Additional information is available on the Web. See:

Merit's USF site: <http://www.merit.edu/usf/>

The MIN USF site: <http://www.min.state.mi.us/funding/>

The SLD's site: <http://www.sl.universalservice.org>

You can also contact the Schools and Libraries Division of the Universal Services Administrative Company for information:

question@universalservice.org
888-276-8736 (FAX)

FAX on demand service:
800-959-0733

You can submit questions to the Michigan Information Network Work Group.

Send e-mail to minwg-share@merit.edu to post your question or comment to the entire list and receive a reply posted back to the entire list usually within two or three business days, sometimes even sooner.

Or:

Send e-mail to minwg-private@merit.edu to send your question or comment to a group of approximately 20 volunteers that will work to answer you. In general answers will be posted to the entire minwg-share e-mail list. On request your name can be withheld from replies posted to the entire list or you may request a private reply. For a list of the minwg-private volunteers, see <http://www.merit.edu/usf/minreps.html>

Or:

You can get assistance from the Office of the Michigan Information Network in the Michigan Department of Management and Budget.

DMB-MIN@state.mi.us

Phone: 517-241-0572

Fax: 517-335-7004



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Mark Your Calendars!

Plan now to attend these Merit-sponsored events:

- ▶ Merit Joint Technical Staff (MJTS) meeting – December 7, 2000, at Michigan State University in East Lansing.
- ▶ Merit Annual Meeting - June 6-7, 2001. The third Merit Annual Meeting will focus on security issues for Member and Affiliate sites.
- ▶ MichNet Seminar - February/March 2001. The spring seminar will outline Internet2 developments and how your organization can participate.