OARTech Minutes for August 14, 1996

Meeting comes to order at 10:00 by Galen Work from Wilmington.

Opening remarts from the chairman:

Changes in agenda. Marlene will move to afternoon. Discussion of Bitnet's demise will be moved to 10:40 AM. Patricia (Wright) has a number of items to bring to the table.

White paper: OSTEER meets at end of October, so we have one more meeting to discuss the paper. Copies of paper will be distributed at 12:00 for lunchtime reading.

Marlene of OARnet security introduced Todd, an intern from Ohio State, who will be working on security. Expect to see some email from Todd.

Galen asked for a motion to accept the June minutes. Moved and seconded. Approved unanimously by voice vote. Minutes will be appended with attendance list and distributed.

NOC update:

Gene: Gene has been with Oarnet since 9/3/95; this is a one-year summary. [map on screen] After a quick projector change... The original 9/1/95 network map. A bar graph shows that network traffic has approximately doubled in the last 12 month time span. A map showing the current backbone structure is presented. The former 9 mb/s has been replaced with 3 DS-3 45 mb/s links. There is a 155 mb/s SONET ring. A new Athens POP is present. 6 mb/s to Akron. 45 mb/s to Cleveland.... Overall bandwidth of the network has increased by a factor of about 100. Sprint is now totally gone.

Today. [a US map] Columbus, OH is the center. Links to DC, Athens, GA, Chicago IL. MCI is committed to putting $60 million into the network in the next year. Q: Do they [MCI] expect to complete an OC-12 link between the coasts any time soon? A: It is coming, but not in the close future. OARNet wants to move from the Atlanta link to Denver. They planned to have the move complete by the end of August

96. MCI is having some delays in building new bandwidth, but there is a spot reserved in the equipment in Denver. The move is expected by the end of September.

The map shows a link to vBNS in California. This is a new initiative by the NSF (they call it next generation internet). Only Ohio and Iowa have firm commitments from NSF. vBNS (Very high bandwidth network system) The NSF invited applications grants for meritorious use. OARNet proposed to install a OC-3 to connect OCARNET and other facilities. OCARNET is a collaboration of seven schools with CIS degree granting programs: The OSC, Kent, CSU, WSU, UD, Cincinnati, OSU, (maybe Toledo). This was funded by the OBR to create an ATM testbed. The proposal was approved; now they are in the process of selecting vendors and specifying equipment. Gene presented a map of OCARNET. This network will include a conformance lab at OSU. Please be aware the network is a tested and not intended for production. There is not an intention to uninterrupted service. The topology with include routed networks attached to a switched backbone. The northern node will be in North Royalton, connecting to vBNS by OC-3.

Q: Re: the current OARNet connections... who all is on the Toledo POP? A: UT, MCO. Q: is the DS-3 to Cleveland running? A: Yes, one customer: St. Martin in the Netherlands Antilles. There are 70 to 90 requests for SOMACS lines, therefore moves will be coordinated for a smooth transition in the Cleveland POP. SOMACS move will be first. A channelized T1 is being installed to support any remaining 56K links. SOMACS will be finished somewhere in the September - November time frame. Case has asked for an OC-3 is working on a plan for more OC-3s to connect to its consortium. They wanted OC-3c, which can (c= clear channel) only be supported on a SONET OC-12.
Kevin: calls have reduced somewhat in the summer, which has made it possible to upgrade various things. Major strides have been made in reducing the ticket count. There have been some planned tickets due to expansion and a few due to weather.

Remedy, an action request system, has been installed. Remedy allows requests and questions of many types to be tracked. SSDS, a consulting firm, was hired in June. Phase 1, a client database, is almost finished. Remedy is built on Sybase, so they had to purchase a full version of Sybse to support the latest release of Sybase.

Cisco works is being installed to track the performance and health of the network.

OSU is planning to post six positions for the OARNet support center.
The jobs will be put on the OSU web site. This is a move to
developing the 24/7 support center. The time frame is September to
begin staffing the positions. This will allow the support center to
be the single point of contact for all clients. Web site interfaced
and other tools to simplify client interactions are being considered.
Gail Corelli was just hired as LAN specialist. The Cambridge NOC
misunderstood OARNet's desire to mail major outage notices directly
to customers - all tickets were going out; this has been fixed.

Q: At one point there was discussion of monitoring Ohiolink client
machines. A: It is probably still going on, but status is not known.
Q: Is BBN service being phased out? A: Yes, at some point in the
future, not yet specified, OARNet will take over all monitoring.

BITNET (yet again!) update:

Patricia/Wright. What is being done to address the disappearance of
BITNET? Akron and Wright have determined that there are about 12
schools still connected to BITNET. Wooster, Antioch, UD and several
others expect to be gone by 12/96. CREN has agreed to maintain tables
until 12/97. Princeton will remain until the bitter end. There are
some software issues between VMS and IBM. CREN licenses the software;
the expense depends on school size. OSU has yet to make a final
decision on their stance on the issue. Cleveland anticipates staying
in until the end because the cost is low. Ohio State will not be able
to get rid of the hardware because they're using the hardware anyway.
OSU is likely to be in the net until the very end.
Most countries now have internet service. There is not a specific
document which lists countries that will be isolated. LISTSERV users
need to unsubscribe, then resubscribe with an internet address. There
is a formal "Leaving BITNET" file available from CREN that may aid in
notification LISTSERVs. Sites may have to set up FTP drop boxes or
similar mechanisms to make transition easier.

Q: One issue is sender-initiated file transfer? Most people are just
using FTP or mail attachments.

Dial-up access survery (Chip Freund) update:

Chip Freund: Dial-up access. Of 10 responses: 3 offer none, 6 offer
in-house, 1 out-sources to a national provider. The only one to
charge is the site out-souring. Very large or very small schools seem
to be able to make the necessary economies of scale to work in house.
For middle size schools, phone switch capacities seem to be a limiting
factor which favors out-souring. The John Carroll RFP included a
specification for guaranteed address space to accommodate Ohiolink's
authentication.

Feature Presentation:

Stephen Trier/Case: Web Gadgets and Experiences: They use the WN web
server, mainly for historical reasons. The platform is a 486 DX-2
running BSD-OS with 48 megs of RAM and 2 gigs of disk (200 megs
active). The second item is the ethics policy; they felt they'd like
the welcome to be first; the ethics still gets a lot of hits.

USENET directory. They automatically index the news groups at
midnight. The underlying news service is INN. They pull of the
groups' descriptions. The database is searchable. Clarinet news is
available by using a PERL script tied to a kerberos authentication
server. The generally is used as a database rather than implementing
functional kerberos.

Documentation: CWRU has moved much documentation on line. They feel
that less control of formatting is a good trade-off for having the
documents available anywhere. How to generate print-outs is an on
line form, which has password protected check boxes. Print-outs may
be picked up at about 6 locations across the campus.

Automated home page directory. Users are able to enter their
respective URLs into a form for inclusion into the database. There
is a PERL code back-end to verify the contents and to prevent
inclusion of arbitrary HTML in the form. Again, this is verified by
the campus password database. This is linked to the ph information.
This is processed by a number of custom scripts.

Network monitoring. Cabletron Spectrum. Rover network monitor from
MERIT. The have a web interface to the Rover-generated data. They're
using the refresh tag to auto-update the screen every three minutes.
They initially used the Rover telnet interface, which swamped at 12
connections. The web interface has taken substantial load off the

Rover system because it makes ephemeral connections only every three minutes.

The MOTD (message of the day) is done with file inclusion directive.

Software downloads. Keep most major packages on line. They use file include directives for maintaining up to date descriptions of the programs. The large number of little icons on the software pages causes a lot of pounding on the server. One lab caused 400 hits in a minute. They are planning on a better organization.

Regular banner. They have a tab-style banner at the top of each page. The WN server engine provides a nice search function. The search function has proved very popular for people coming from a search engine going to the phone book page.

MOMspider. Is a verification tool that finds broken links, redirected links, and typos in URLs. This package is available free from UC Irvine.

Cable TV directory. A big table with file inclusions with the campus TV directory.

Film store: set up with secured FTP. This allows itinerant student users to update files. A filter is set to prevent anything with executable bits to be set.

Graphics: a talented student is doing animations to illustrate things like plugging in fiber jumpers. They're using GIF animation to avoid complexities and overhead associated with JAVA.

Stephen and Irene spend about three hours each per week updating and maintaining the server. A lot of help comes from volunteers.

Lunch: a wonderful Chinese style lunch was provided courtesy of OARNet.

Featured Vendor Presentation:

Bay Networks: Bay is here to talk about their 100 megabit ATM switch products.

Overview: When deploying a switched network, the topology typically includes a big router in the middle of a number of smaller routed networks. There are a lot of good reasons for maintaining a routed network. The bay products are designed to look into the upper levels of the protocols with the intention of merging firewall products into the router. They are working with Checkpoint. Today, ATM with LAN emulation is the only current standards-based means for virtual LANs. Their LAN emulation API in the edge switches is claimed to be interoperable with other products.

Reasons:

Network Congestion.
Current solutions are not scalable. "Fork-lift" wholesale changes of technology are too expensive.

Centillion 100 features:

6 slot backplane
3.2 Gb ATM backplane
Each card has switching
Keeps most processing at "edges."

Centillion 100 architecture:
3.2 G bus
400 Megabit control bus
cards cache connectivity information, which is passed on the control bus.
each card has an embedded RISC processor.

Filtering for MACs, protocols, etc can be applied to LANs being emulated on a given card without loading up the rest of the box. The filters can be up to 12 bytes wide and up to 255 bytes into the packet. Filters may be nested or combined with boolean logic. Up to 64 filters can be applied per port. There will be a 10 to 15 percent performance hit on that card. Lab testing has shown that a 30 switch network can recover within 60 seconds.

ATM migration:

Scenario 1. Simply replace backbone. Use existing router, but front-end it with a LAN port on the switch.
This allows the routing and IP naming/subnetting structure to be maintained. Segment utilization at end-users is reduced. Server accessibility is enhanced.

Scenario 2. Use two or more switches. Add capacity in the backbone. Switches at either end of the backbone can function as a larger distributed switch.   Bandwidth can be added by paralleling the backbone pipes. Load balancing is supported for up to eight parallel circuits.

Scenario 3. Native ATM devices attach to the switch. Layer 3 decisions may be rolled into the switch.

Filtering.

```
LLC  0   F0                      EQ  2   0   FORW
LLC  7   0A                      EQ  3   0   FORW
LLC  15  70.72.69.6e.74.65.72        EQ  0   0   ALT  2.3, 2.4
LLC  2   05.0.00.00.03.08.00.01.a2.a3 EQ  0   0   FORW 2.1
LLC  0   aa.aa.03.00.00.00.08.00             DROP
```

Switching.

Switching can be all accomplished on a given card in the ASIC without using backplane bandwidth.

Configuration.

There is an MCP card that holds the software image. The system will boot in 6 to 7 seconds, with the MCP initializing the cards through the 400 megabit control but. The cards are hot-swappable. The MCPs are upgraded by TFTP or download through a console port.

Cell based backbone.

Fat pipe.
Multimedia services.
Remember end-to-end considerations. Switch architecture should be brought into consideration, as hops can introduce latencies that bring down throughput. Delays to strains on buffers. Asynchronous delays in a dual-homed network can cause problems such as choppy

video. Bay promotes edge work with conversion to ATM close to the end
user as a way of getting unpredictable delays out of the network.
Load balancing is on a session by session basis. ATM allows multiple
VLAN membership on a given device. A server with an ATM card could
be on 10.10.10.0 and 20.20.20.0, for instance.

Current support is with IISP for static routing. Alternate routes
have to be determined and entered by hand in advance. The next
generation is PNNI, with allows definition of ATM switch peer groups.
PNNI is roughly analogous to what OSPF is to conventional routers.
PNNI was only ratified within the last few months and is not likely
before the end of 1996.

Marlene: OARnet is going a security audit via a consultant. They are
going to be using SATAN, COPS, TIGER, etc. There are SATAN detectors
called Gabriel and Courtney. Courtney needs TCP dump, so that if
somebody actually does break in, there is all the information logged
for the hacker.

Ping bombs. They're still there. Ping can be configured to send a
lot of ICMP requests which can overload a router. Real audio can be
a problem. A misconfigured server caused a client station to be
bombarded with UDP packets. Note that even just one MBONE fills up a
T-1. Marlene deals with denial of service attacks by putting filters
on routers as close to offending source as possible. Denial attacks,
whether innocent or malicious are a security issue. Real audio uses
7156 and 7157. Beware of CGI scripts that attack web servers. Remove
the phf CGI example script; it is intended for demo only anyway. On
Windows NT, be sure to not to place perl.exe in the CGI-bin directory.
You may want to look at the safe-perl CGI wrapper to compartment
potentially risky scripts. See www.perl.com.

SOMACS update:

Ruth Crites/SOMACS. The bad news- they're running late. The good
news- they're not very late. There was a slight problem when
Ameritech installed the lines; they put them in the wrong physical
location in the OET POP. The lines have been moved and are being
turned on. Good news for those already ordered- the installation
price $857. For those about to order, the correct price of $1,429
will be charged for B8ZS (B8ZS is 1.54 Meg clear channel bipolar/8

bit w/zero suppression). The $857 charge is for AMI (alternate mark inversion), which steals some databits to support framing on the line the throughput on an AMI line is 12.5% below B8ZS. Four schools will be about one month late due to a facilities problem at OET. Others are closer to the mark. Please send email to Ruth if there are questions.

The Whitepaper:

The Whitepaper. June 96 is the current edition.

Changes brougt to table:

Page 1/1/1: words, "(vt100 terminal emulaiton)," added at end of line.

"This does not preclude this use of existing equipment capable of performing these functions." Added as last sentence of paragraph Page 1/paragraph 1.

John will submit proposed text which recognizes recurrent nature of technology expenditures.

Page 3: the works "the same cable..." "an integrated cable"

page 2/4 Emphasize PPP over SLIP

page 2/4 28.8 baud changed to 28.8 K bps. Order changed to emphasize 28.8K bps.

page 3/ "The direction is to provide an alternative security mechanism not dependent on location."

page 3/7 strike "and". insert ", telemetry and".

page 3/7 add (10 megeabit/sec max)

page 3/8 strike "separating networks"

page 3/11 bold "uninterruptible power supplies."

Ohiolink update:

Greg: Collapsed Ethernet backbone switch has been installed. Two new
juke boxes and support equipment have been installed for power pages.
All legacy equipment less than Alpha has been replaced. The plan is
to run from magnetic media in Michigan; that will be some time in
1997.

Meeting adjoined 16:07

Appendix 1: Attendance Roster

Name	Representing	New emil address
Bob Wilson	U of Toledo	
Galen Work	Wilmington	
Jay P. Blum	TMC	
Bob Walker	Edison Community College	
BobStelljes	AFIT	
Pat Kelley	AFIT	
Bill Mayhew	NEOUCOM	
Tim ?	College of Wooster	
Marty Stroud	Owens Community College	
Stephen Trier	Case Western Reserve U	trier@ins.cwru.edu
Frank Parenteau	Antioch University	
Kevin Earp	OARnet	
Bob Beer	Ohio Northern Univ.	
Jeff Rieman	Ohio Northern Univ.	j_rieman@onu.edu
Sheila Hollenbugh	Wright State	
Peter Murray	CWRU	
Marlene O'Neil	OARnet	
Todd Morrison	OARnet	
Mike Bartz	Univ of Dayton	
Barb Deschapales	Univ of Dayton	
Kingsley Neegal	U of Rio Grande	
Teresa Beamer	Denison University	
Chip Freund	John Carroll U.	
John Heimaster	Ohio State	
Sean Joyre	Heidelberg	
Kurt Hienemann	Heidelberg	

Patrick Limpach   CWRU
Elliot Jolesch   Oberlin College
Mary Copas   Ohio Board of Regents
Greg German   OhioLINK