

update

**DALNET Finance Committee
Meeting Minutes
University of Detroit Mercy
McNichols Campus
September 18, 2000**

Present: M. Auer, J. Bosler, B. Harris; B. Holley, P. Jose, K. Tubolino,
Guest: L. Bugg.

1. Call to order:

The meeting was called to order at 1:30 p.m. Documents were handed out. Committee members read the following documents: "DALNET Finance Committee Minutes for September 7, 2000," "DALNET Project Managers' Meeting Minutes for September, 11, 2000 Draft", "DALNET Project Managers Meeting September 11, 2000 Notes of J. Bosler", "DALNET Horizon Capacity Planning Report revised September 18, 2000", and "DALNET Servers: Charts". The Minutes to the two previous meetings had been distributed at the last Finance Committee Meeting, but had not been approved. There were no corrections to the Finance Committee Minutes of June 23, 2000, August 16, 2000. There were corrections to the Minutes of September 7, 2000. The Minutes for these meetings were approved with corrections as appropriate. Committee members considered distribution of the Minutes outside the Committee. Committee members advised that upon request the Minutes could be circulated more widely.

2. -3. DALNET Project Manager's Contract Extension / DALNET Partnership Agreement / *epixtech* Payment Plan

Based on the meeting of the Finance Committee on September 7, 2000 letters were to be written to *epixtech* regarding formal communication of the DALNET Project Manager's Contract Extension as well as a response to the proposed *epixtech* Payment Plan. Due to the quick turn around time between meetings, nothing had been accomplished in regard to either matter. B. Harris will initiate and consult with B. Holley.

4. DALNET Horizon Capacity Planning Report

L. Bugg presented the "DALNET Horizon Capacity Planning Report (revised September 18, 2000)" as well as "DALNET Servers: Charts 1-3." Extensive discussion ensued about the technological, financial and political components of making a recommendation to the Board. The "Budget Proposal for the DALNET Information Hub" had already been received at a previous meeting. The IHDC Financial Proposal makes a request for approximately \$250,000 in additional funds. In order to proceed with budget decision making, a recommendation will have to be made as to whether to continue with the vision as outlined in the Partnership Agreement or to refocus and realign finances to include the IHDC proposal. Several recommendations were considered:

1. A recommendation that the Help Desk be phased out as soon as possible, but no later than January 31, 2001.
2. A recommendation that the WAN Administrator position be eliminated. The DALNET Systems Office at WSU would be reassigned WAN duties for network support.
3. A recommendation that an additional DALNET Systems Librarian should be hired by the DALNET Director to assist with Horizon System, Web and Hub applications.
4. A recommendation that the role of the Webmaster be realigned as a function of the DALNET Systems Office and that a full-time staff member should be hired by the DALNET Director to provide Horizon System, Web and Information Hub support to all members.
5. A recommendation that DALNET upgrade its Horizon servers based on a designated option specified in the DALNET Horizon Capacity Planning Report.

The rationale for these recommendations can be found in the Meeting Minutes of the Finance Committee, the Project Managers, and the Steering Committee. In addition, rationale can be found in the "DALNET Services – Member Satisfaction Survey" and the "DALNET Horizon Capacity Planning Report". To be specific, there are a number of clear reasons:

1. The Help Desk was created to assist with the Horizon migration, which has been accomplished. The Help Desk is not utilized as much as anticipated, creating a cost effectiveness issue. DALNET members uniformly wish to go directly to System Librarians for answers to DALNET / Horizon questions.
2. The WAN Administrator position has never been filled and is no longer felt to be necessary. Many of the DALNET libraries did not go with a frame relay connection as anticipated. Due to the irregular implementation and the coverage already created to handle frame relay issues, a full-time WAN Administrator is not needed.
3. The Webmaster position is not currently aligned so that all DALNET members can effectively utilize it. New duties are being considered for a DALNET Webmaster because of the Information Hub. In the meantime, reorganization is sought so as to ensure current and future Web enhancements to Horizon are implemented uniformly. New job duties and functionalities will be designated and should be organized by the new DALNET Director.
4. The members have uniformly stated a need for additional personnel who are technically trained and library oriented as Systems Librarians. New staff members should report directly to the DALNET Director who will be responsible for their performance.
5. In deciding on a new server application the DALNET Finance Committee will have to prioritize needs which will include Horizon day to day operation, upcoming enhancements, the addition of new members, the development of the Information Hub, and other new anticipated as well as unforeseen projects.

The Finance Committee considered five options as presented in the "Capacity Planning Report". Committee members considered two servers at two sites and a single large server at one site. Options 2, 3, 4 are still being reviewed by the Finance Committee. Option 5 is a more complex option, which might be considered if DPL finds merit in the proposal.

It was agreed that additional research is required before coming to a conclusion on the recommendation to be made. Maurice Wheeler will be consulted before proceeding.

5. IHDC Financial Proposal

K. Tubolino represented the Budget Proposal for the DALNET Information Hub. Because no decision could be made about the server issue, a decision on the IHDC proposal will wait until the next Finance Committee Meeting.

Additional comments were made regarding the IHDC Proposal. Project Managers would like the current system to stabilize before taking on additional projects. However other institutions and agencies are moving ahead with information projects. Examples are:

- The Council of Library and Information Resources has begun a Hub project.
- The University of Michigan has been funded to do a Hub project (consider looking at their figures).

It was suggested that DALNET consider open source partnering with organizations that engage in networking.

Questions were asked. How fast do we want to move with the Hub? How many human resources does DALNET wish to use in support of the IHDC proposal?

Committee members were interested in establishing the following priorities: Horizon Operational Services
Day-to-Day Operation
Information Hub

A number of financial points were reviewed. DALNET has two accounts. They are: 1. An Operating Account, i.e. the annual budget which is non-interest generating, and 2. A Capital Reserve Account, i.e. an equipment reserve fund, which is an interest generating account. The money for enhancements goes to the reserve account. Committee members considered whether to create an additional restricted account to fund activities, projects or personnel expenses.

6. DALNET Contract between WSU and DPL

The contract for DALNET services between DPL and WSU ends September 30, 2000. The question was raised as to whether DALNET needs a contract extension? Previous negotiation between the two entities has not addressed this issue. Ideally, there would be an agreement to proceed in good faith on a month-to-month basis. Since there is no proposal and since the contract automatically ceases as of September 30, 2000, DALNET would like to continue on a prorated, month-to-month basis.

In lieu of Board action, the Executive Board, which was present at the Finance Committee Meeting, recommends that WSU continue the WSU/DPL contract on a prorated, month-to-month basis until January 31, 2000. It is expected that as part of the budget approval process the DALNET Board will determine the direction that the organization takes in contracting for DPL services. In lieu of a contract, WSU in the name of DALNET will continue to pay for current services and positions in place until the Board takes action. WSU will talk to its legal department regarding the contract.

7. DALNET Budget 2000-2001; 2001-2002

Since the Committee had reached no clear solution on a recommendation regarding future budgets, DALNET Budget issues could not be taken up at this meeting. This item will be on the agenda for the next meeting.

8. New Member proposals: Update

New member proposals were discussed. No new information was forthcoming. The following institutions will continue to be monitored: Marygrove College, William Tyndale College, Lewis Business College, Archdioceses of Detroit High Schools, Detroit Public Schools High Schools, Oakland County Schools, Mt. Clemens General Hospital.

9. Ameritech Grant

The Ameritech Grant money is being held by WSU for DALNET and the budget is in place to spend the remaining funds. Holley will monitor.

10. Adjournment

The next meeting of the Finance Committee was scheduled for Tuesday, October 10, 2000, 11:30 a.m. at Macomb Community College South Campus Library, Room J 306-3.

DALNET Horizon Capacity Planning Report

DALNET planned to upgrade its Horizon servers in Spring 2000 to enable the DPL and WSU server sites to better back each other up, to accommodate the new shared files that were to be delivered with our Horizon enhancements, and to add capacity for future growth. To this end, the DALNET Board set aside an equipment upgrade fund for FY2000.

This report from the DALNET staff is the information we have to date to help us plan for needed growth of our Horizon servers. The report takes into consideration these factors:

1. Current Horizon servers and their utilization (Appendix 1)
2. Predicted growth of DALNET's Horizon system, including (Appendix 2)
 - a. Annual growth of member's databases;
 - b. Addition of new members;
 - c. Annual growth for new releases of operating system, Sybase, and Horizon software;
 - d. Addition of shared files with the delivery of our Horizon enhancements.
3. Backup and recovery needs
(Appendix 3 describes DALNET's current backup plan)
4. System performance needs
(Appendix 4 is a description of Sun's high availability/clustering capability for improved backup, recovery and system performance. Iowa State University is using this capability successfully in their Horizon implementation.)

A number of options for increasing the capacity of DALNET's Horizon servers have been identified. The DALNET staff worked with Tim Hyde, *epixtech*, and Anna Golubeva and Jefferi Holland, of SUN Systems, to determine the viability and estimated costs of the options. We then reviewed the advantages, disadvantages and other issues of each option with Sun and *epixtech* in order to get their technical evaluation for the DALNET Finance Committee and Board.

DALNET Staff who participated in this investigation include:

Scott Muir, Project Leader
Jeff Trzeciak, WSU/DALNET
Kerry Sanders, DPL/DALNET
Louise Bugg, WSU/DALNET
Tim Cromer, DPL/DALNET
Tim Turner, DPL/DALNET
George Marck, WSU/DALNET
Martin Austin, WSU/DALNET

Report written by Louise Bugg

September 6, 2000 (rev. September 18, 2000)

Options for DALNET's Horizon Servers

This report describes five DALNET Horizon Server options:

- Option 1:** Two production servers at two sites without clustering
- Option 2:** Two production servers at two sites with clustering
- Option 3:** Two production servers at a single site with clustering
- Option 4:** A single production server
- Option 5:** Centralized and decentralized production servers with clustering
- Option 6:** Outsourcing DALNET's server services

Each option includes production/test/development Horizon server needs, WebPAC/iPAC production and test/development server needs, DALNET Website production and test/development server needs, and DALNET's firewall at the WSU site.

The descriptions of each option include these technical factors, as appropriate:

- Downtime to upgrade/user impact
- Staffing requirements
- System backup to provide best availability
- System performance
- Risk in case of disaster
- Horizon design issues for shared databases
- *epixtech* experience
- Software requirements
- Server site preparation
- Telecommunications requirements

Chart I lists the current servers and their upgrade or replacement in each option.

Chart II is a spreadsheet with the estimated costs for each option.

Chart III is a spreadsheet with staffing costs estimated for each option.

Finally, there is a recommendation as to the two best options from a technical viewpoint.

OPTION ONE—Two Servers at Two Sites without high availability/clustering

Upgrade the current Sun E5500 servers at WSU and DPL to be able to handle all DALNET databases as well as have room for growth.

Upgrade the Sun E450 test server to handle all DALNET databases with room for growth. In this option, it would serve as a test server and as an emergency backup for DALNET's Horizon databases for WebPAC/iPAC only.

Other DALNET server needs in this option are:

- The WebPAC/iPAC test server needs disk
- Need a Sun E230 as a Website production server
- Need a Sun Sparc as a Website test/development server
- Need a Sun E250 for a Horizon development server for operating system upgrades and alpha testing with epixtech
- Need a Sun E250 for backup/test Firewall server at WSU site
- Need a Pix firewall backup at DPL site

Advantages:

1. There would continue to be two server sites, in case of major disaster at either site.
2. The staff are already trained in this model.

Disadvantages:

1. There are differing backup tape systems at each site.
2. Without Sun's high availability/clustering option, one server cannot immediately take over for the other in case of a failure.
3. This option requires more staff support than a single site, more communication among staff, and more duplication of staff to maintain multiple server sites, multiple firewalls, and telecommunications.
4. Software costs are higher for multiple Horizon servers.
5. Horizon design issues are more complex for shared files in a multi-site server environment.
6. Upgrading the servers would require Horizon downtime for DALNET libraries.
7. Backup and recovery would be by copying the files from one server to the other using tape backups, which could take several days to do so that it would only be used in cases of lengthy downtime.
8. There would be maintenance of multiple servers.

Other Considerations:

1. The DPL site will need a generator to have continuing power as at the WSU site.

OPTION TWO—Two Servers at Two Sites with high availability/clustering

Upgrade the current Sun E5500 servers at WSU and DPL to be able to handle all DALNET databases as well as have room for growth. Obtain Sun's high availability/clustering capability to be able to switch between these two sites.

Connect the two sites with fiber that is "leased" from Ameritech.

Upgrade the Sun E450 test server to handle all DALNET databases with room for growth. In this option, it would serve as a test and development server because the two production servers would be backing each other up continuously.

Other DALNET server needs in this option are:

- The WebPAC/iPAC test server needs disk
- Need a Sun 230 as a Website production server
- Need a Sun Sparc as a Website test/development server
- Need a Sun E250 for backup/test firewall server at WSU site
- Need a Pix firewall backup at DPL site

Advantages:

1. Can take advantage of Sun's high availability/clustering capability to improve system availability, release migration and performance.
2. There would be two servers at two sites, in case of major disaster at either site.

Disadvantages:

1. There are differing backup tape systems at each site.
2. This option requires a fiber link between the two server sites, which will add to the cost and complexity.
3. This option requires more staff support than a single site, more communication among staff, and more duplication of staff to maintain multiple server sites, multiple firewalls, and telecommunications.
4. Software costs are higher for multiple Horizon servers.
5. Horizon design issues are more complex for shared files in a multi-site server environment.
6. Upgrading the servers would require Horizon downtime for DALNET libraries.
7. There would be maintenance of multiple servers.

Other Considerations:

1. Sun would need to inspect each server site in the cluster and determine needed site preparation.
2. The WSU Computer Center has already had such an inspection for its Sun Center for Excellence and the resulting site preparation will likely comply with the cluster requirements.
3. The DPL site would need to do the site preparation required by Sun.
4. The WSU Computer Center has a generator for backup electricity in case of emergency.
5. DPL would need to get a generator.

* 6. Only one in Michigan.

OPTION THREE—Two Servers at One Site with high availability/clustering

House both Sun E5500 servers at a single site and upgrade them to handle all DALNET databases as well as have room for growth. Obtain Sun's high availability/clustering capability to be able to switch between these two servers using shared disk.

Upgrade the Sun E450 test server to handle all DALNET databases with room for growth. In this option, it would serve as a test and development server because the two production servers would be backing each other up continuously.

Other DALNET server needs in this option are:

- The WebPAC/iPAC test server needs disk
- Need a Sun 230 as a Website production server
- Need a Sun Sparc as a Website test/development server
- Need a Sun E250 for backup/test Firewall server if at WSU site
- Need a Pix firewall backup if at DPL site

Advantages:

1. Can take advantage of Sun's high availability/clustering capability to improve system availability, release migration and performance.
2. This option should provide economies of scale with staff to support a single firewall, less complex telecommunications, and a single server site.
3. The two servers could use the same backup system.

Disadvantages:

1. Software costs are higher for multiple Horizon servers.
2. A cold backup site would be needed in case the single site facility had a disaster.
3. Sun's high availability/clustering capability would require significant training of two DALNET staff.
4. There would be maintenance of multiple servers.
5. Horizon design issues are still more complex for shared files on multiple servers, even at a single site.
6. Upgrading and moving the servers would require Horizon downtime for DALNET libraries.
7. Would need to move one head end frame relay circuit to the site selected.

Other Considerations:

1. WSU's Computing Center has facilities to handle both servers with monitoring of the machine room and with a generator for emergency power.
2. Sun needs to inspect cluster server sites and determine needed site preparation. The WSU Computer Center has already had such an inspection for its Sun Center for Excellence and the resulting site preparation will likely comply with the cluster requirements.
3. The DPL site would need to do the site preparation required by Sun.
4. The DPL site would need a generator.

OPTION FOUR—One Server

Replace both Sun E5500 servers with a single Sun server with capacity to handle all DALNET databases as well as have room for growth. This server could handle all Horizon, WebPAC/iPAC, and Website production, test, and development needs as well as image server needs.

No other servers would be needed except those for the firewall at the WSU site or the DPL site. A Sun E250 needs to be purchased as a backup/test firewall server for the WSU site and a Pix firewall backup for the DPL site.

Advantages:

1. Software costs are lower for a single Horizon server.
2. Would need less staff resources to operate and maintain a single server at a single site, with a single firewall, and less complex telecommunications.
3. Could use high availability or clustering between domains on the server.
4. Sun accepts trade-ins, which may help with the cost.
5. Would have a single backup strategy.
6. Less Horizon downtime for DALNET libraries to migrate to the new server than to upgrade existing servers because DALNET could keep the existing servers operational until all libraries had migrated to the new server.
7. No Horizon design issues about shared files across multiple servers and multiple server sites.
8. Could use this single server for all Horizon functions, including production, test and development Horizon software; production, test and development WebPAC/iPAC software; image server; and DALNET's production, test and development Web server.

Disadvantages:

1. Single point of failure with server, so would need backup server strategy for those areas that are not redundant within the server.
2. A backup site would be needed in case the single site facility had a disaster.
3. If DPL were the single site, there would be costs for site preparation including a generator.
4. The new hardware and software would require substantial training for DALNET computing staff to learn.
5. This would be forging new ground with *epixtech* for such a large installation on a single, large server.

Other Considerations:

1. Sun needs to inspect E10K server sites and determine needed site preparation.
2. The WSU Computer Center has already had such an inspection for its Sun Center for Excellence and the resulting site preparation will likely comply with the cluster requirements. Additional electrical outlets may be needed.
2. The DPL site would need to do the site preparation required by Sun.
3. The DPL site would need a generator.

OPTION FIVE—Centralized and Distributed Servers with high availability/clustering

Authorize one or more DALNET libraries to have their own Horizon server at their local site. Upgrade the centralized Sun E5500 servers to be sized for all DALNET shared files and all DALNET Horizon databases including those stored on Sun servers at member site(s). The centralized servers would use the Sun high availability/clustering capability to share disk and switch between servers.

Upgrade the Sun E450 test server to handle all DALNET databases with room for growth. In this option, it would serve as a test and development server only because the two production servers would be backing each other up continuously.

Other DALNET server needs in this option are:

- The WebPAC/iPAC test server needs disk
- Need a Sun 230 as a Website production server
- Need a Sun Sparc as a Website test/development server
- Need a Sun E250 for backup/test Firewall server if at WSU site
- Need a Sun E450 (or smaller) for a decentralized site
- Need a Pix firewall backup if at DPL site

Advantages:

1. Horizon is designed to run as a single database on a single server, so operation could be more efficient on a distributed server.
2. If a distributed server is down, only that database is impacted.
3. Software upgrades should be easier on smaller servers.
4. This allows new options for members to run their own servers.

Disadvantages:

1. Staff support for maintaining multiple servers, multiple server sites, multiple firewalls, more complex telecommunications will require more duplication of effort, more communication and may have both remote and physical access requirements.
2. Horizon design issues are even more complex for shared files on multiple servers in multiple sites.
3. It would be more difficult to keep the shared databases and the software versions in synch across DALNET libraries.
4. Software costs are higher for multiple Horizon servers.
5. Each server site would need site prep for battery or generator electrical backup.
6. There would likely be differing tape backup systems across the server sites.
7. Upgrading and moving the servers would require Horizon downtime for DALNET libraries.
8. Would need to move one head end frame relay circuit to centralized site.

Other Considerations:

Same as for the single site with a cluster.

NOTE: A variation would be to replace the E5500's with a single computer at the centralized site, as in Option Three.

OPTION SIX—Outsource

Completely outsource the Horizon site to a non-DALNET company (an applications service provider) with sizing, performance, backup and availability issues contractually determined.

Advantages:

1. DALNET staff would no longer have to handle the operational issues, backup and capacity planning, site management, telecommunications, etc. except in the development, management and evaluation of the service provider's contract.

Disadvantages:

1. Highly likely there is no vendor with experience running a Horizon site as large and complex as DALNET's, even *epixtech* or another *epixtech* customer.
2. Couldn't take advantage of WSU's educational discounts with Sun Systems and other software vendors.
3. Would have to lay off DALNET staff.
4. ASP vendor market is still in early stages of development and quite "volatile."
5. Would need to dispose of current DALNET servers.
6. Would have less DALNET "control" of the system on a day-to-day basis and would have to negotiate for special support needs that had not been foreseen to include in the contract.
7. DALNET would need to do an RFP to get costs, which would be a major project.

Recommendations

The two best options from a technical perspective, according to our Sun and *epixtech* consultants, are:

1. Single server; and
2. Two servers at a single site with high availability/clustering.

Both options have, in effect, a “hot” backup in their design, with the ability to share disk between “servers” in case of server failure. In the single server option, the computer is divided into “domains” that perform like separate servers.

Both options are at a single server site, which:

- Requires less staff support than for multiple server sites;
- Has less complex telecommunications;
- Has a single firewall; and
- Has a single tape backup strategy.

Both options have the risk of a single server site, so that a cold backup site would be needed.

The single server option would enable a phased upgrade for DALNET libraries, but would require that DALNET keep the old servers in place until libraries and functions were migrated and fully operational.

Appendix 1

DALNET Horizon Server Utilization at WSU

Server	%CPU used	Disk Space used	Real Memory Available	Free Memory
E5500 (Prod)	15.43%	78%	4096M	62M
E450 (WebPAC)	2.83%	53%	2048M	1188M
E450 (Test)	2.20%	73%	2048M	31M

Note: no data available for E5500 at DPL

Data as of 9-5-2000; based on one week's activity during a low use period this summer.

L.Bugg/G.Marck
Sept. 6, 2000

Appendix 2

DALNET Horizon Server Database Sizes for Planning Purposes#

Databases*	Union Catalog+	Shared Patron	OS, etc.	Total
186	110	50	11	357
205	121	55	12	393
226	134	62	13	435

All figures in GB gigabytes

Row 1 is current or estimated figure

Row 2 represents 10% growth for year one

Row 3 represents 10% growth for year two

New members the size of Tyndale (30,000 volumes) require about 1.5 GB of space

*Includes Marygrove and William Tyndale

+Includes the Union Catalog and authority resource files

#Database sizes include mirroring

S. Muir

September 1, 2000

Database Backup and Disaster Recovery Scenarios

Overview:

Throughout the day transactional backups are run against the databases. Nightly backups are run on the database server to the "backup" array within the server. At WSU, ADSM backs up that array to tape and manages the tapes including off-site storage. At DPL, DLT backup is used and copies are stored off-site.

Within the server at WSU there are three arrays - one backup and two data. Each array has fourteen drives that are both mirrored and striped. The server at DPL currently has two arrays with backup and data mirrored and then a test partition that is not mirrored.

Recovering from problems:

Problem: A single database has a problem (i.e., doing an upgrade and an error occurs, have to restore)

Solution: Recover from the backup array directly, no tapes are necessary. This is the simplest of the scenarios. This occurred at WSU with a successful recovery of the data.

Problem: A disk within an array goes bad.

Solution: Veritas (the disk management software on the server) takes over. Disks are mirrored within the server. If a disk goes bad, another takes over. We receive notification that there has been a disk failure and we report it to SUN to come and repair.

Problem: The backup array (fourteen disks) goes bad.

Solution: It will have no immediate affect on the operation of the system. We will call SUN and they will replace it. We would stop transactional and regular backups and reformat the drives once installed.

Problem: A single database array (fourteen disks) goes bad.

Solution: Each array has a front and a back. The front of array one mirrors the back of array two. The back of array 1 mirrors the front of array 2. To restore we'd replace the affected array and resynchronize.

Problem: (WSU only) Both database arrays (fourteen disks) go bad. This will result in considerable downtime.

Solution: We'd restore from the backup array.

Problem: All arrays go bad. This will result in considerable downtime.

Solution: WSU would restore from the ADSM tape backup to the backup array and then restore the databases from the backup array. DPL would restore from DLT.

Problem: WSU needs to restore to DPL

Solution: Restore from ADSM to the backup array on the WSU Horizon server or to the Horizon Test server, if the E5500 is down, and then either tar the backup to DLT tapes using the existing single DLT tape drive, or ftp via frame relay - which hasn't been tested.

Problem: DPL needs to restore to WSU

Solution: DLT tapes would be loaded into the WSU server tape drive and the data would be restored.

Clustering

Clustering is a SUN Microsystems, Inc. method of delivering high-availability. A cluster is a group of servers, each running Solaris, that are interconnected to work as a single, highly available system. Clustering minimizes any server or database downtime because one server can immediately take over (failover) for the other through a system of automatic fault detection and recovery.

SUN claims that clusters can deliver near 100% uptime. Employing this strategy recognizes the mission critical nature of DALNET's systems to its member libraries and their users. Iowa State University is currently using clustering as their choice for high-availability of their Horizon system and is satisfied with their results.

Clustering Services:

- Would enable the two production servers to back each other up continuously so that access to Horizon can continue even if one server fails.
- Facilitates disk sharing so each server can access the other's disks.
- Connects servers together so there's no one point of failure as with a single server.
- Facilitates maintenance since one server can be taken off-line for repair or testing, with minimal impact on services.
- Improves sever management since both servers can be managed as a single entity.

Clustering is accomplished by interconnecting two identical servers via a low-end workstation, console, and network cabling, thereby allowing them to work together. DALNET's existing E5500s could be upgraded to be identical and serve as the base for clustering, to keep costs of implementing clustering low.

DALNET's Sun representatives recommend that it is best economically and logistically for the cluster to be at one site. There are sites with clustered servers in separate buildings, but there are no "remote clusters" in Michigan. Remote clustering requires:

- ATM backbone with fiber optic preferable
- Disk upgrade from A5000s to A5200s
- Longwave GBICs (to connect to the ATM fiber)
- 4 Quad Ethernet Cards (2 per server)
- console system

Sun provides an intensive 1-week training program for clustering in Southeast Michigan.

S. Muir/L. Bugg
Sept. 5, 2000

CHART 1: DALNET SERVERS

Server	Current	Option 1 2 servers/2 sites w/o cluster	Option 2 2 servers/2sites w/cluster	Option 3 2 servers/1 site w/cluster	Option 4 1 server	Option 5 central/decentralized w/cluster
Horizon production	E5500 at WSU	upgrade E5500	upgrade E5500	upgrade E5500	buy E10K	upgrade E5500
Horizon production	E5500 at DPL	upgrade E5500	upgrade E5500	upgrade E5500	trade in both E5500s	upgrade E5500
Horizon test	E450	upgrade E450	upgrade E450	upgrade E450	trade in E450	upgrade E450
Horizon devpment	none	buy E250	incl. in E450 test	incl in E450 test	incl. in E10K	incl in E450 test
WebPAC/IPAC Prod	E450	upgrade E450	upgrade E450	upgrade E450	trade in E450	upgrade E450
WPAC/iPAC tst/dev	E450	upgrade E450	upgrade E450	upgrade E450	use for firewall bkup at WSU	upgrade E450
Website production	on WebPAC E450	buy E230	buy E230	buy E230	incl.in E10K	buy E230
Website test/dev	none	buy Sparc	buy Sparc	buy Sparc	incl. in E10K	buy Sparc
Firewall prod/WSU	E250	E250 (no upgrade)	E250 (no upgrade)	E250 (no upgrade)	E250 (no upgrade)	E250 (no upgrade)
Firewall bkup/WSU	none	buy E250	buy E250	buy E250 (if WSU)	use E450 (if WSU)	buy E250 (if WSU)
Firewall prod/DPL	Pix	Pix (no upgrade)	Pix (no upgrade)	Pix (no upgrade)	Pix (no upgrade)	Pix (no upgrade)
Firewall bkup/DPL	none	buy Pix	buy Pix	buy Pix (if DPL)	buy Pix (if DPL)	buy Pix (if DPL)

CHART 2: DALNET SERVER COSTS (Estimated)

Server Costs--One Time	Option 1 2 servers/2 sites w/o cluster	Option 2 2 servers/2sites w/cluster	Option 3 2 servers/1 site w/cluster	Option 4 1 server	Option 5 central/decentralized w/cluster
Horizon production					
E5500-WSU	51,040	51,040	51,040	trade-in	51,040
E5500-DPL	120,580	120,580	120,580	trade-in	120,580
Cluster plus install	NA	+ 83,125 9,360	83,125 9,360	NA	83,125 9,360
E10K	NA	NA	NA	NA 1,132,982	NA
E450-decentral. Sybase license	NA NA	NA NA	NA NA	NA NA	43,304 90,000
Horizon test					
E450	40,000	40,000	40,000	trade-in	40,000
Horizon development					
E250 Sybase	25,000 90,000	NA	NA	NA	NA
WebPAC/iPAC prod					
E450	included	included	included	trade-in	included
WPAC/iPAC tst/dev					
E450	included	included	included	keep for firewall	included
Website production					
E230	20,000	20,000	20,000	NA	20,000
Website test/dev					
Sparc	3,500	3,500	3,500	NA	3,500
Firewall bkup-WSU					
E250	25,000	25,000	25,000	use E450	25,000
Firewall bkup-DPL					
Pix	20,000	20,000	NA	NA	20,000
SUBTOTAL	395,120	+ 372,605	352,605	1,132,982	505,909

CHART 2: DALNET SERVER COSTS (Estimated)

	Option 1 2 servers/2 sites w/o cluster	Option 2 2 servers/2sites w/cluster	Option 3 2 servers/1 site w/cluster	Option 4 1 server	Option 5 central/decentralized w/cluster
Site preparation-DPL	TBD	TBD	TBD	TBD	TBD
Staff training (2)	20,000	20,000	20,000	20,000	20,000
Telecommunications	NA	50,000	2,200	2,200	2,200
Circuit move	NA	NA	NA	NA	2,200
Server move	NA	NA	1,200	NA	1,200
Backup site	NA	NA	TBD	TBD	TBD
Site preparation-WSU	NA	NA	NA	6,000	TBD
TOTAL	415,120	442,605	376,005	1,161,182	531,509
NOTES: RSS/URSA servers not included. For cluster and E10K, SUN will inspect sites and determine site prep needed.					
Trade-in value of E5500's and E450's aprox. 8% of E10K undiscounted price.					

CHART 3: DALNET Staffing Costs for Server Options

DALNET Technical Support Positions	Option 1 2 servers/2 sites w/o clustering	Option 2 2 servers/2sites w/clustering	Option 3 2 servers/1 site w/clustering	Option 4 1 server	Option 5 central/decentralized w/clustering
Lead Systems Administrator	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE
UNIX/Network Administrator	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE
Sybase Database Administrator	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE	1.0 FTE
Systems Administrator at second site	.5 FTE	.5 FTE	-----	-----	*
TOTAL	3.5 FTE	3.5 FTE	3.0 FTE	3.0 FTE	>3.0 FTE

* varies by decentralized site

L. Bugg
9/18/00

Budget Proposal for the DALNET Information Hub

Staffing

Current DALNET staffing is focused on Horizon. The systems librarians and systems analysts time is completely consumed by the requirements of new releases, training, trouble-shooting, and maintenance. While the IHDC can offer guidance and strategic directions, day to day management of HUB hardware, software, and projects by committee is not practical. DALNET staff focused on technical support and on user services of HUB databases is required. These two staff members will also take the leadership role identifying, analyzing, evaluating, and recommending technology systems to support HUB projects.

Systems Librarian	\$70,000*
Systems Analyst/programmer	\$70,000*

*Includes benefits

The Systems Librarian will focus time on client-side applications, database design, standards, training, working with member libraries in the planning and design of their projects, training, troubleshooting and consultation. This position could be designed as a third DALNET systems librarian with primary responsibility for the HUB and secondary responsibility for Horizon support. The three systems librarians could then share Horizon and HUB responsibilities to provide backup to each other.

The Systems Analyst programmer would focus time on the management of HUB servers, programming, applications from vendors, data conversion programs, database management, maintenance, and web interfaces. This position will also cross-train and be able to support Horizon applications as a back up.

Digital Laboratory

There are a number of potential projects that have been identified as a result of the "Breakfast Meetings" which are candidates for digital imaging. For example, Karl Joost from the Michigan Transit Museum in Mt. Clemens would like to digitize a collection of 30-40,000 photographs of train engines and trains and include their history. While many of these organizations have the original material, they lack the facilities and equipment on which to create and store these images and index them for retrieval through Im@gine. DALNET also lacks these resources currently. The initial server proposed for DPL, UDM and WSU was never purchased. DALNET can serve a vital role by providing 1) a server for storing digital images and their indexes and 2) a digitization lab. Some projects could be done in the digitization lab. One or more workstations could be portable and could actually be set up at the project site when items cannot be transported to the lab.

Server Site

Image Server	\$60,000
Development Server	\$20,000
A/V compression software	\$ 5,000

The Server equipment and software should be installed at one of the two DALNET head-end sites.

Laboratories

Cost per workstation	\$9,500
Microscope Digital Camera	\$ 2,500 (shared)

DALNET can set up digitization labs at one or more sites. The number of workstations at a given site can be based on space and funds available.

Workstation configuration includes microcomputer, large screen monitor, scanner, document feeder, digital camera, scanning and editing software. It also includes furniture and facilities preparation: electrical and network wiring.

Scott P. Muir
Information HUB Development Committee
August 24, 2000

Integrated Search Engine Software

For planning purposes only.

This software is the integral piece to provide the unified searching across the entire Imagine system for both Horizon and Non-Horizon databases.

Vendor # 1:

Partner with *epixtech* to develop a product. No cost estimate available at this time.

Vendor #2:

Product is in beta (Cornell currently, Getty soon). Due for general release Fall 2000. Prices quoted are for unlimited number of databases, staff users, and public users

- Option 1: \$100,000 per year for three years, plus maintenance (approximately 15%). Maintenance begins after third year. The above amount is for budgetary planning purposes only, but the amount is not expected to be higher. Includes five days of on-site consulting in each of the first three years – for a total of fifteen days.
- Option 2: \$250,000, plus maintenance (approximately 15%) Maintenance begins after 90 days. The above amount is for budgetary planning purposes only, but the amount is not expected to be higher. Includes five days of consulting in the first year. Note this cost is actually higher in the first three years due to maintenance costs; also note that we only get five days consulting instead of fifteen.

Vendor #3:

Product is in beta. Expected to be released Fall 2000

- Product including applicable Oracle runtime licenses of \$250,000. Annual maintenance of \$37,500. Optional contents management: vendor will be provide updates to templates and information provider's environments) of \$12,000/year. Installation and training is \$3,600.00.

Scott P. Muir, chair
Information Hub Development Committee
August 22, 2000