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1. INTRODUCTION

1.1. PURPOSE

This report identifies electronic mail solutions available to Calbiochem. Background information, critical evaluation, links to further information, and direct contacts with solution providers are included wherever possible. Section nine suggests a plan of action based on careful consideration of this research, an interview with Calbiochem MIS, and other consulting expertise.

1.2. HISTORY

Virtual Advantage referred Calbiochem to Kensho for electronic mail intelligence. Based on my understanding of Calbiochem’s needs shared during an April 4th meeting with Linda Michel and Robert K. Whitemore <bwhite@adnc.com> in Calbiochem MIS, I proposed to research and report on appropriate e-mail solutions. The outline of proposed research, report and format (hypertext as the preferred version) were approved in e-mail correspondence on April 29th. This report should be available online Monday, May 6th, with notification sent by e-mail to Calbiochem.

1.3. AVAILABILITY

This document is available for download from the Kensho site in multiple formats. The report will remain online and available through June 1, 1996, after which we reserve the right to archive it to conserve space on our server. Here are the URL’s to retrieve the report:

1.3.1. HYPERTEXT

http://www.kensho.com/pubs/email/

1.3.2. ADOBE PORTABLE DOCUMENT FORMAT (PDF)


1.3.3. POSTSCRIPT (GNU-ZIPPED)

http://www.kensho.com/pubs/email/calbiochem-email.ps.gz

1.3.4. ASCII TEXT

http://www.kensho.com/pubs/email/calbiochem-email.txt
2. PLANNING

Managing all this takes strict standards, comprehensive planning, and ironclad policies.

—Alice LaPlante, describing a 31,000 user e-mail system at NCR

Depending on how things get done in your corporate culture, this document may be ‘the plan.’ Great, flip to section nine and dig in. Section nine contains a sample plan that may get Calbiochem up and running with electronic mail. Details in sections one through eight will back you up.

No consultant can bring together a comprehensive knowledge of your customer’s needs, your user’s needs, your management’s needs, and your corporate vision as cohesively as you. Please consider any and all advice offered here within the context of the people and politics that make up your organization.

2.1. FOUR VIEWS OF THE CALBIOCHEM E-MAIL OPPORTUNITY:

MIS: what would give our users e-mail and cause the least pain to MIS?

Users: we want e-mail, we know how to use Microsoft-windows based tools, get us ‘on the net’ yesterday, please.

Customers: it sure would be nice if could get some help from Calbiochem without waiting until daylight and calling them long-distance.

Consultant: Gee. Nice network. Information Literate Users, biotech firm. Lots of biotech information on the Internet, lots of biotech customers on the Internet, sounds like a good match.

2.2. QUESTIONS

The process of answering the questions below will help assure that Calbiochem’s actions in the IT area are on-track.

1. What information do Calbiochem users/customers regularly exchange (or wish to exchange), and how do they presently exchange it?
2. Will e-mail help or hinder this exchange?
3. How will e-mail help Calbiochem fulfill its MIS/IT mission?
4. What is the mission of the MIS department, anyway?
5. How did the desire for Internet e-mail arise within the organization—executive decision, popular demand, MIS value-added service?
6. Have commercial solutions related to e-mail such as groupware been effectively ruled out?
7. What are the concerns of the user community with regard to being on the Internet?
8. What organizational vibe/politics may arise when each and every user is suddenly empowered to drop a message directly to the private mailbox of the company president, to every user in the organization at the press of a button, or (bye-bye calbiochem.com) every user in every one of 18,000 internet discussion groups?
9. Will e-mail service be the foundation of a broader solution, such as an intranet (over-hyped, but very realistic) or groupware setup for Calbiochem?
10. Have any user surveys, focus groups, systems analysis, or other collaborative information gathering been employed to make sure we’re doing what our users need and want?

1 LaPlante, Alice. “Global e-mail is catalyst for downsizing at NCR” InfoWorld v15, n29 (Jul 19, 1993):60.
Perhaps the biggest decision to make in planning the electronic mail project is the level of network connectivity to purchase. If Calbiochem seeks to use the Internet for e-mail, only e-mail, and nothing but e-mail, then a low-bandwidth, on-demand connection to the Internet would perform adequately. If Calbiochem will be delivering any other benefits of the Internet to its users, (such as telnet access to library databases, real-time international audio or video conferencing, or world-wide-web access), then a large-bandwidth, permanent connection would make more sense.
3. CONNECTIVITY OPTIONS

No matter who is administering Calbiochem’s Internet domain and mail-transport computers, Calbiochem will need to establish one or more connections from its own office locations to an Internet service provider (ISP). Several choices are reviewed here, and their role in the big picture will be presented later in the document. Please note the give-each-user-a-modem-and-let-them-fight-it-out-for-the-PBX approach is ignored in favor of more centralized, neighborly approaches.

...40.5 percent of those companies with current Internet access have direct connections to the Internet; 7.8 percent reach the Internet through an on-line service, and 32.7 percent use an access provider such as NetCom On-line Communication Services Inc.

—Rachel Parker, reviewing a recent survey of Internet connectivity

3.1. CONNECTIVITY ON-DEMAND

This is an economical solution which provides e-mail to the enterprise based on the store-and-forward concept. Users write and send messages, which are queued on a local server. At regular intervals, the server connects to the Internet, forwards outgoing messages, and pulls down incoming e-mail before breaking the connection. The connectivity cost for a business account would begin at roughly $50/month plus connect time and any domain-name services provided by the ISP.

3.1.1. UUCP/MODEM

Calbiochem is already using UUCP (UNIX to UNIX copy protocol) for some site-to-site communication, which makes it a realistic alternative for enterprise e-mail connectivity. Many ISPs still offer UUCP on their menu of services.

Likewise, a single high-speed modem can use other common protocols such as PPP to connect to an ISP and perform mail queue tasks.

3.1.2. ISDN

Just a note that ISDN can be used in much the same way. The configuration on your end and the ISP’s end is roughly the same for a PPP analog modem or high speed ISDN line. There are ISPs in San Diego who offer flat-rate ISDN-on-demand starting at $50/month, which does not include ISDN hardware or the Pacific Bell line charge ($30/mo), same as a modem-account will not provide a phone line and hardware either.

3.2. PERMANENT CONNECTIONS

To give Calbiochem a ‘real’ Internet presence and allow even the simplest e-mail applications their full functionality, a permanent connection to the ISP is the way to go. I’ve arbitrarily defined two levels of connectivity based on bandwidth. Bandwidth will correspond roughly with price for the smaller connection sizes (as all solutions will require a similar startup investment of ISP setup, telecom setup, local setup, and hardware rental or purchase—router, CSU/DSU or ISDN/modem, etc.).

Simple advice for selecting a level of bandwidth? Choose 56-128 Kbps if electronic mail is the only Internet service desired at this location now or in the near future. Select a bigger pipe if Calbiochem will be serving or obtaining Internet information via other protocols such as file-transfer, usenet news, world wide web, voice chat or video-

conferencing. Depending on how you use (or want to use) information within the enterprise, it may be appropriate to connect your headquarters to the Internet at high-speed, and link the affiliates via smaller pipes.

Simple advice for selecting an ISP? Go with a large local provider if you will not be coordinating access for the European sites. If you will be arranging connectivity for your European divisions, see if one or more of the major telecom companies such as Sprint, AT&T, or MCI can serve all of your sites.

3.2.1. LOW SPEED PERMANENT CONNECTION

Three types of low-cost, permanent connection might work for Calbiochem, providing enough bandwidth (64-256Kbps) for 200 users sending and receiving e-mail all day. If appropriate the same permanent connectivity can be leveraged overnight to perform batch-style tasks such as replication of corporate database(s) or extraction of information for use in data-warehouse or W3 applications.

DEDICATED MODEM

A dedicated, 24/7 POTS phone line linking an ISP and Calbiochem via 28.8Kbps modem. This is preferable to transient connectivity, and might be a smart choice as an online backup connection to a second service provider if e-mail for Calbiochem is defined as ‘mission critical.’

ISDN

Centrex (flat-rate) ISDN services should be available from one or more San Diego area ISP’s to the Calbiochem headquarters. ISDN can be purchased in 64Kbps increments and is conceptually similar to setting up modem access—ordering phone lines, modem/router hardware, and an Internet service to ‘dial-in’ to 64-128Kbps. ISDN works well to bring a full range of Internet services into and out of an office of eight active users, and if Calbiochem will be limiting its Internet activity to e-mail only, ISDN may be the economical choice for a reliable, low-speed permanent connection. Rates for Centrex ISDN with unlimited Internet access range from $400-600/month ISP’s and Pacific Bell are both continuously changing ISDN tariffs and usage pricing. In that sense, it is a politically unstable technology.

LEASED LINE

Several flavors of permanent leased line in the 56-128Kbps range would be suitable for Calbiochem’s electronic mail services. An excellent article that discusses the technological and financial differences between the various leased-line technologies and their billing models is cited in the ‘more information’ section. Costs for leased lines very based on billing model. Some will charge by distance between ports (i.e. from Calbiochem to the ISP), some will charge by actual bandwidth used (i.e. your average use this month was 96Kbps), others by total bandwidth available (i.e. you’re paying for the opportunity to pump 128 Kbps through here) and the trickier folks will make an equation of these or other usage statistics from which to generate bills.

Fred Parker of CERFnet recommends against ‘fractional’ or ‘burstable’ connectivity, in which an ISP will offer a low base rate such as 56Kbps and then the freedom to draw more bandwidth-on-demand. He explained to me that unscrupulous ISP’s will oversell these ports in the hope that multiple clients don’t need an extra burst of speed all at once, since that won’t (be able to) happen. Reminded me of airlines overbooking flights.

An interview with the network administrator at a local engineering company that recently changed ISP’s from CERFnet to Netcom for their 56Kbps leased line revealed
that CERFnet has unbeatable customer service. However, these net-savvy engineers voted to switch over to Netcom’s slightly higher throughput, lower price, and proven track record of crummy service. Remember these guys are propeller-headed enough to measure their throughput over long periods of time and make purchasing decisions based on machine satisfaction—they didn’t require much in the way of tech support.

There are many national, international, and local ISP’s serving the 619 area code. If Calbiochem seeks to order similar network services at each of its European branches, the most sensible solution may be to go straight to one of the international telecom providers such as AT&T, Sprint, or MCI.

3.2.2. HIGH SPEED PERMANENT CONNECTION

While an online service might be enough for an individual connecting to the Internet, to provide a business presence on the Internet really requires a direct connection.

—Mel Beckman evaluating Internet–LAN connectivity options

If Calbiochem will be using any Internet services above and beyond simple electronic mail in the near future, a high-speed permanent connection (512-1.5Mbps) might be best to avoid ‘growing pains.’ Before paying for such a valuable service, Calbiochem should make sure users are interested and information-literate enough to take advantage of it, and that the organization has something to offer customers via the Internet above and beyond the customary marketing information on W server (which can be conveniently outsourced).

The technologies for this high level of permanent connectivity include frame relay, SMDS, and ATM. Shopping for this amount of bandwidth will bring salespeople to your door. National and international comparison shopping can be performed on the Internet via The List.

3.3. MORE INFORMATION

The May, 1996 issue of Byte magazine has two excellent articles on selecting leased-line network services ranging from ISDN to ATM. The explanation of connection and billing is very clear and applies directly to Calbiochem’s search for the best connectivity provider. The List of Internet Service Providers is a world wide web site featuring contact information and end-user evaluations of all the ISP’s in the world (more or less). Searchable by telephone area code.


3 Beckman, Mel. "Internet links for the LAN." Macworld v12, n7 (Jul 1995):138-139.
4. MAIL TRANSPORT OPTIONS

In this document, *mail transport* describes the handling of an electronic mail message from the moment it leaves a Calbiochem desktop until it is handed off to a final destination host, or how a message from the Internet is handled from the time it reaches Calbiochem’s Internet port until an end-user opens the message with their mail-reader software. Choice of mail transport will have the greatest impact on Calbiochem’s involvement in day-to-day e-mail administration. Selection of mail transport will also help determine the type of external network connectivity and end-user software required by the project. I’ve defined two variations of *outsourcing* and two schemes for handling things *in-house*.

4.1. OUTSOURCE SOLUTIONS

To save MIS the time and the cost of administrator-hours, Calbiochem can outsource its electronic mail project in several ways. Two ideas considered here include complete outsourcing to a major solution provider and collaboration with a local ISP.

4.1.1. TURNKEY

National solution providers offer groupware and mail-only network information services that may be of interest to Calbiochem. These ready-made solutions bundle everything from desktop software to connectivity to server space. The main distinction among turnkey systems is the distinction between e-mail-only services (like AT&T Mail and SprintMail) and groupware hosting (Lotus Notes services from WorldCom, CompuServe, and InfoNet).

Online research finds groupware hosting prices ranging from $600/month and up (WorldCom) to $2500/month and up (CompuServe). US West is also expected to roll out a similar service in the immediate future. Most of these services are available via simple modem dialup or via a leased-line connection. Consult each vendor for full information.

Following are some links and summaries of the prefab services:

**AT&T MAIL SERVICE**  
AT&T offers a popular electronic mail service that could fit the bill.  

**COMPUSERVE NETWORKING**  
CompuServe offers several private-network services that may be suitable for Calbiochem.  
Phone: 800/433-0389 or 614/798-3356  
e-mail: NETWORKINFO@cis.compuserve.com So that we may better serve you, please include your: Name, Title, Work Address, Phone Number, and Company Name.

**INFONET**  
InfoNet took over a Lotus Notes-hosting service from AT&T recently.
InfoNet® Services Corporation is a world leader in providing reliable, state-of-the-art international communication solutions to global enterprises. InfoNet specializes in value-added services and managed networks, which are supported locally in 56 countries.

**MCI**

InternetMCI is a ‘…fully integrated e-mail, fax, and paging solution,’ which Calbiochem could provide to its users in lieu of an on-site e-mail solution.

http://www.mci.com/newhow/V/how/catalog/software.internetmci.html

**SPRINT**

http://www.sprint.com/work/

Sprint offers many private network outsourcing options, most notably SprintMail:

http://www.sprintbiz.com/jproducts/jfaxamsg.html

**WORLDCOM**

http://www.worldcom.com/

WorldCom is a network dedicated to the Lotus Notes business user; services include international access, project management, specialized gateways, and integration of clients’ Lotus Notes networks with the Internet.

4.1.2. **LOCAL ISP**

If Calbiochem seeks to establish SMTP-standard e-mail for its users, an Internet service provider can assume most of the administrative tasks involved in setting up and maintaining corporate e-mail for Calbiochem. ThdSP could be delegated varying amounts of control, from a complete centralized system with e-mail only user accounts for Calbiochem affiliates to an arrangement whereby thdSP will merely act as aMX (mail exchange) host for Calbiochem. In thdSP-centralized model, all that Calbiochem MIS would need to do is purchase a pipeline to thdSP and install TCP/IP popmail client software for users. ThelISP would create and administer the e-mail accounts.

**MINI-RFP FOR CALBIOCHEM**

The following message was circulated to all of the Internet service providers in the San Diego area. Several local ISP's have responded. Responses are available at the following URL:

http://www.kensho.com/pubs/email/calbiochem-rfp/

Greetings San Diego Area ISP's & 'Net Consultants:

This is a mini-RFP I'm sending out on behalf of a local client who needs ballpark quotes on e-mail connectivity for their ~200-user company. If you choose to respond, I'll be formatting your prompt reply into a spreadsheet from which the client may contact you directly for further information. If you can help this company, please have a look at the details below and respond promptly via e-mail.

Thanks for your Help!
Sincerely,
Sean Dreilinger

----- E-Mail Solution Mini-RFP -----

Our client seeks an Internet e-mail solution to...

1. link users in their large san diego facility to the outside world
2. link ~200 users in their large san diego facility to one another
3. communicate with their branch offices in Switzerland, England, and Germany
4. spare their MIS department the administrative & security headaches associated with wiring their entire LAN up to the Internet

Their San Diego facility presently has a Novell 3.11 LAN with MS-Windows/DOS on user desktops. They use HP Unix for their finance/billing applications, and communicate with their European branches via UUCP.

If you can offer an e-mail solution for this client, please RSVP to "bids@kensho.com" promptly with a brief proposal and *ballpark* cost that covers your services plus any hardware, software, telecom bills, and additional services. The fields I'm compiling for them are below in case it helps you prepare your response.

VENDOR:
CONTACT:
SOLUTION SUMMARY:
BALLPARK COST:
DETAILS...
Internet Connectivity:
Mail Transport/Gateway:
Mail user Agent:
Security:
Policy:
Training:
Additional Internet Services:

===========================================================================
BTW: We obtained your name & e-mail address from http://www.thelist.com/619.html, and added it to our private automated e-mail list of San Diego Area Internet Service Providers. If you're not an ISP, prefer we contact a different e-mail address, or just don't want to receive mail regarding Internet Services for our larger projects, please send a message to "sd-ISP-request@kensho.com" and we (or the listservice) will attend to it immediately.

Sean Dreilinger, MLIS
PGP Public Key - http://www.kensho.com/sean/pubring.htm
sean@kensho.com - 619.514.3939 - http://www.kensho.com/~sean/
KENS HO - Bringing Knowledge to the Information Age - in a Flash

4.2. ONSITE SOLUTIONS

If Calbiochem prefers the speed, control, extensibility, and potential economy of maintaining e-mail services on-site, the following information on commercial and public domain tools will be helpful. Note that in order to host e-mail and other Internet services on site, a permanent connection to an ISP such as a 56kbps or faster leased line is required. We'll look at in-house mail transport solutions from two viewpoints - what you can do for 'free' (public domain software) and what you can buy.

4.2.1. PUBLIC-DOMAIN MAIL-TRANSPORT

If Calbiochem is willing to commit to e-mail messages and software that comply with some open systems standards, such as Simple Mail Transfer Protocol (SMTP) and Multi-purpose [Multi-media] Internet Mail Extensions (MIME), then an excellent onsite mail service can be assembled from the same public domain software used by large organizations and universities around the world.

UNIX

Calbiochem can put up a PC host running a free version of UNIX, sendmail, named, and popper daemons, and any desired character-based (or X-windows) MUA's on the same machine.

With enough bandwidth, memory, and CPU, the same machine can easily serve other forms of information for Calbiochem's users and customers, including a file-transfer...
site, world wide web site, e-mail discussion lists, usenet news, real-time textual chat, simple video-conferencing, etc.

All of the software mentioned here is free and works beautifully. Most UNIX-based tools are widely supported by the Internet user community, where you can contact software authors directly and bugs are patched within hours, not months or years. The trade off is in the time required to understand and administer these public-domain tools, which tend to be feature-rich and technically complex.

One option we discussed at Calbiochem was the potential value of a student intern, literate in information systems and system administration, who would assist Calbiochem with the installation and maintenance of its Internet services.

**WINDOWS NT SERVER**

Similar to the free-UNIX solution, there are a number of public domain (and commercial) Internet information service tools available for Windows NT Workstation/Server. In contrast to the free tools for UNIX, those for Windows NT tend to be very simple - in both features and administration.

Calbiochem expressed an interest in providing users with Microsoft Mail on the desktop, in which case hosting the ms-mail post office on a NT server with an SMTP/Internet gateway might be a great success. Free and commercial gateways to work with Microsoft Mail are here, and details of a backlash against the use of Microsoft Mail on the Internet will follow.

The best known source of free utilities for putting Windows NT on the Internet is the European Microsoft Windows NT Academic Centre (EMWAC). Digital Equipment Corporation, Beverly Hills Software and most recently Microsoft all host useful resources for getting Windows NT onto the 'net.

If Calbiochem is interested in providing users with remote access to the LAN or the Internet, Windows NT Server includes an excellent remote access service that supports up to 256 simultaneous users (you provide the modems, phone lines, and serial ports).

**Computer Variations**, a local Internet service provider, operates its entire Internet-oriented business via Windows NT servers, and may be able to offer valuable consulting or other services to Calbiochem.

**emwac internet mail services for nt**

European Microsoft Windows NT Academic Centre (EMWAC) has been set up to support and act as a focus for Windows NT within academia. EMWAC offers many free Internet services that run under NT. One of them is an SMTP mail daemon that performs the more basic tasks that sendmail would perform on a UNIX host. The EMWAC SMTP tool can be run in combination with another free tool called Intergate/SMTP to gateway into Microsoft Mail and/or Novell mail services redirected by an NT server.

http://emwac.ed.ac.uk/html/internet_toolchest/ims/

intergate/smtp (freeware)

Intergate is a free SMTP gateway that claims to link Microsoft Mail with the Internet in combination with the EMWAC’s Internet Mail services for NT. You can read the Intergate documentation and download the software online from their minimalist homepage:

http://www.gruntsoftware.com/intergate.htm
NOVELL

An excellent and free solution for full-featured LAN and Internet e-mail is available for Novell installations such as Calbiochem in the form of Pegasus Mail and its related gateway software packages charon and mercury. The two free gateway programs are identified here, with more on Pegasus mail itself in the MUA section.

Johan Svensson offers a helpful description of charon and mercury at this URL:
http://www.ec.ltu.se/hdn/manualer/wpmail/inf_ab-wpm/charmerc.html

Here is some information derived from that source:

mercury

The Mercury Mail Transport System, by the author of Pegasus Mail, is a comprehensive Internet mail solution implemented as a set of NLMs for NetWare 3.11 and later. It is fast, small, efficient and has a considerable range of features, including a fully-fledged list and mail server, aliasing, autoreply and more.

charon

Developed by Brad Clements, and a product of Clarkson University, Charon is a dedicated server which can service mail on up to 8 NetWare servers simultaneously. Pegasus Mail and Charon were written with each other in mind, and work very well together. They interact via NetWare Print Queues, which makes for easy management (using the NetWare PCONSOLE utility).

gotchases

Setting things up using Novell would also require DNS and a ‘smart’ Internet mailer, such as sendmail and named running on any UNIX machine at Calbiochem, or perhaps an ISP can provide these services at their end. Alternatively, some commercial software is available to perform intelligent mail routing and DNS for Novell. Unoverica’s mail server daemon lists for $1200 per server, not including tech support, the DNS is $500 per server.

electronic file distribution

Pegasus Mail and related software/documentation for Windows, Macintosh, and DOS is freely available via David Harris’ W3 site at:
http://www.cuslm.ca/pegasus/

The ‘official’ W3 page is undergoing a ‘makeover’ at the present time, and may not be open to public access. The latest software is also available from several mirror FTP sites, including:
ftp://risc.ua.edu/pub/network/pegasus/

more information

A 500-page book about Pegasus Mail:
http://www.browsebooks.com/Kocmoud/index.html

The Novell FAQ contains information on internetworking Pegasus Mail from the viewpoint of experienced CNE’s
http://netlab1.usu.edu/novell.faq/nov-faq.htm

4.2.2. COMMERCIAL MAIL-TRANSPORT

Commercial e-mail services offer many sexy features above and beyond what you get with a vanilla SMTP and MIME package—by creating a closed environment that is
standardized on a single proprietary solution. For example, messages can contain embedded OLE objects, graphics, fonts, and routing slips. But the minute you need to send a message off of the LAN and out onto the Internet, you’ll enter the realm of expensive and complex gateways tools to translate the proprietary mail to and from the proprietary format to standards SMTP and MIME compatible messages. If you purchase one company’s proprietary mail transport, you’ll probably be locked into buying their user-agent, and vice versa.

**COMMERCIAL SMTP: POST. OFFICE FOR NT/SOLARIS**

Post.Office is a commercial SMTP mail daemon that runs under Windows NT or Sun’s Solaris flavor of UNIX. Post.Office can be administered via W pages or dialog boxes, which is quite a bit easier than editing the dreaded sendmail.cf file that UNIX sendmail requires. The Post.Office product sells for $450 per electronic download or $500 in a box with disks and manuals. You can read the product literature and online documentation at this URL:

http://www.software.com/

**CC:MAIL**

Based solely on the review quoted below, Calbiochem might be wise to pass on CC:Mail’s Internet gateway product for the moment.

> Enabling users of such private e-mail packages as cc:Mail and Microsoft Mail to communicate with the outside world requires a gateway… The Lotus product is crude almost beyond words. It looks as though it were designed and coded over a long weekend, and it actually undermines the security of the corporate e-mail environment.

—Kevin Tolly, evaluating E-Mail Gateways for Data Communications

More positive, product-friendly information is available directly from Lotus at this URL:

http://www.lotus.com/ccmail/

**MICROSOFT MAIL**

Various commercial tools are available to help Microsoft Mail clients send and receive mail from the Internet.

exchange server

Microsoft Exchange, the mail and groupware server recommended for Windows 95, requires an add-in patch called ‘Internet Mail Connector’ in order to successfully exchange messages with standards SMTP mail services on the Internet. The Exchange server for 25 users currently lists for $2139, and the required Internet Mail Connector costs an additional $377 per server. Additional client licenses are $54 per seat.

There is a W³ resource that discusses the Exchange Server Beta product. The client version of Exchange that comes with the Windows 95 operating system attaches a formatting and font data file to each message. This attachment can be quite large, and is creating an anti-Exchange backlash on the Internet among SMTP users who don’t want to spend their connectivity dollars to download extra files that are useful only to other MS-Mail users. If Calbiochem users will be exchanging mail with customers via the Internet, it may be wise to use a mail user agent based on open standards.

worldtalk.net_connex.ms-mail gateway

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4 Tolly, Kevin. “E-mail gateways: What’s missing from the link” Data Communications 24, n9 (Jul 1995):35-36.
NetConnex will gateway Microsoft Mail for PC Networks versions 3.2-3.5 running on Windows NT Server with standard SMTP mail services. The suggested retail price is $1495 for the first postoffice and $795 for additional postoffices. More information is available under the product information link at:

http://www.worldtalk.com/

**PMDF SOFTWARE GATEWAY**

The most promising commercial mail-gateway solution that this research turned up was a comparatively inexpensive, all-in-one gateway product named PMDF, from Innosoft International. In particular, it’s proven to effectively handle tricky binary attachments exchanged in any combination between Microsoft Mail, Lotus CC:Mail, and standard SMTP mail agents.

PMDF comes close to the ideal of a perfect e-mail backbone. Compared to some other e-mail interoperability software, PMDF is a bargain. It can link most popular PC LAN-based e-mail systems, mainframe e-mail systems, X.400 mail, fax services and Simple Mail Transfer Protocol Internet gateways to a single, smooth-running backbone. Perhaps the most outstanding aspect of PMDF is how it does everything it promises.

—From a March, 1996 review in *InfoWorld*

There is a Usenet newsgroup (and mail list) that discusses PMDF: bit.listserv.pmdf-l
gotch as

PMDF must be run on a commercial OS—Sun Solaris/UNIX or a Digital Equipment Corporation operating system—OpenVMS or OSF/UNIX. If Calbiochem is shopping for an AlphaServer anyway… Innosoft welcomes prospective customers to try the software free for 30 days, they can be contacted at +1 (800) 552-5444, sales@innosoft.com.

### 4.2.3. HARDWARE

If Calbiochem desires assistance selecting a pre-configured Internet Server, such as a Sun Netra or similar machine from Silicon Graphics, several are evaluated in the following article:


### 4.3. RECOMMENDATIONS

Choose an on-site mail-transport solution if Calbiochem will be adding other Internet services above and beyond user-to-user electronic mail (world wide web, voice and video, file transfer, telnet to library catalogs, etc.) Stick with proven, public-domain software and put the money saved towards training or configuration by an expert consultant.

Choose a turnkey vendor to keep the e-mail out of your hair and reduce exposure of your LAN to the untamed masses.

Based on lax response to the mini-RFP, this project may not get the attention and service that it deserves with local ISP’s acting as your e-mail administrators.
5. **MAIL USER AGENT SELECTION**

So how is your e-mail solution going to look from your user’s point of view? That depends on the client e-mail software (mail-user-agent or MUA, for jargon) you install for them. If Calbiochem users are versed in GUI tools, they’ll probably appreciate a graphical, multiple document interface to their e-mail messages. If Calbiochem users spend more time on terminal or terminal-emulation screens (entering data on the HP-UX order system?), they might prefer a UNIX or Novell/DOS account that is hardwired to do nothing but run character-based e-mail using a high-power UNIX MUA (such as pine or elm). In the commercial solutions side, choosing one vendor MUA will probably require you to purchase their mail-transport software for both your LAN and the Internet.

5.1. **OPEN-STANDARD E-MAIL**

Open standards mail-user-agents adhere carefully to a collection of standards defined in Internet research & development documents called request-for-comments, or RFC’s. This conformance to standards is the key difference between the open systems and proprietary solutions. The two ’open standards’ that are most relevant to Internet e-mail are SMTP and MIME, and links to additional information on these two standards will follow. All of the user agents described in this section are capable of downloading messages using Post Office Protocol (POP).

5.1.1. **FREEWARE**

There are two excellent public domain e-mail tools that will please Calbiochem LAN users: Eudora and Pegasus Mail.

**PEGASUS MAIL**

Pegasus Mail (pmail) is a free e-mail package by David Harris designed to run on Novell networks. There are versions for MS DOS, MS Windows, and the Mac. Public-domain mail gateways such as charon and mercury are available. These allow the Novell administrator to manage e-mail as NetWare printer queues. Pegasus includes mail filtering, and freely available plugins for public-key encryption. The first release of pmail was met by positive reviews, and the current release (v2.3) for 16-bit windows competes feature-for-feature against commercial offerings, and has no competitors in the cost/benefit evaluation.

more information

You can peruse a usenet newsgroup gateway of the pmail e-mail discussion list: 

bit.listserv.pmail

Pegasus Mail and related software/documentation for Windows, Macintosh, and DOS is freely available via David Harris’ W³ site at:

http://www.cuslm.ca/pegasus/

The ’official’ W³ page is undergoing a ‘makeover’ at the present time, and may not be open to public access. The latest software is also available from several mirror FTP sites, including:

ftp://risc.ua.edu/pub/network/pegasus/

A 500-page book about Pegasus Mail can be sampled and ordered from:

http://www.browsebooks.com/Kocmoud/index.html

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The Novell FAQ contains information on internetworking Pegasus Mail from the viewpoint of experienced CNE’s

http://netlab1.usu.edu/novell.faq/nov-faq.htm

EUDORA

Exists as both a free mail program and a commercial app that runs on Windows (16 and 32-bit) and Macintosh platforms. The free version is actively maintained from the same source code, but is compiled minus a few info-glut management tools such as message filtering.

Qualcomm maintains homes for the free and commercial versions of Eudora at this URL:

http://www.qualcomm.com/quest/eudora/

NETSCAPE

If Calbiochem wants to train users on only one software tool to meet all of their Internet needs, the e-mail software built into Netscape Navigator may do the trick. This same front-end handles W3, USENET, FTP, audio-chat, and VRML.

5.1.2. FULL-FEATURED

There are a few commercially available e-mail tools designed to support open e-mail standards. Two that might interest Calbiochem are the commercial version of Eudora—Eudora Pro, and Z-mail.

EUDORA PRO

Eudora Pro is a more capable and flexible Internet mail package. For users who need access only to a single Internet or “intranet” mail system that supports standard interfaces, Eudora Pro is as good as these packages get. It receives an overall grade of A-.

—Wayne Rash, Jr, evaluating MUA’s in February, 1996 for Communications Week

Eudora Pro adds a few notable features to the freeware version. Users can define rules to filter and act on incoming mail, and the program supports the MAPI protocol common to most Microsoft Apps. Current street prices for Eudora Pro are $55 per individual shrink-wrap and $2,650 for 100 users and one set of documentation.

Qualcomm maintains homes for the free and commercial Eudora applications at this URL:

http://www.qualcomm.com/eudora/

There are several usenet newsgroups that discuss Eudora:

comp.mail.eudora.mac

comp.mail.eudora.ms-windows

Z-MAIL

Z-mail is a cross-platform mail product currently owned by NCD. Like Eudora Pro, Z-mail can also take advantage of MAPI, MIME, and POP servers. Another feature touted in the Z-Mail product literature is its ability to tap into enterprise directories such as x.500 and NIS (yellow pages). Client user licenses for Windows, Macintosh, and UNIX platforms are $95 per seat, with floating license pricing available upon request.

Z-mail information is available in NCD’s W3 server:

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3 Rash, Wayne Jr. “Two Net e-mail packages put to the test.” Communications Week n597 (Feb 19, 1996): IA4-IA5.
5.2. PROPRIETARY E-MAIL

This is likely to be most pleasing to Calbiochem LAN users and cause the most trouble for MIS and the Internet recipients of e-mail originating at Calbiochem. Users will enjoy the pleasant gimmicks available in high-end commercial mail packages such as colored fonts, formatted messages, cute icons, and global point-and-click address books. MIS may not enjoy explaining color-quoted e-mail to remote SMTP mail recipients, maintaining those global address books, or configuring (and paying for) commercial mail gateways to coax the internal proprietary mail system into a peaceful harmony with the Internet-standard SMTP mail transports.

5.2.1. LOTUS CC:MAIL

A popular solution, available to users of DOS, windows, OS/2, and several flavors of UNIX. Like most proprietary e-mail packages, CC:Mail will require special gateway software such as SMTP-Link or PMDF to send and receive e-mail via the Internet.

MORE INFORMATION

You can learn more about CC:Mail by opening the following links on your world-wide-web browser:

ccmail homepage
http://www.lotus.com/ccmail/

ccmail faq's
http://www.lotus.com/csswww/faqccm.htm

discussion list
To subscribe, send a message with subscribe CCMAIL-L < your name > in the body to:
mailto:listserv@vm1.ucc.okstate.edu

to post a message to everyone:
CCMAIL-L@vm1.ucc.okstate.edu

smtp-link spec sheet
HTTP://www.lotus.com/ccmail/213e.htm

5.2.2. MICROSOFT MAIL

Microsoft Mail and the Microsoft Exchange Mail Client are Microsoft’s contenders in the LAN e-mail category. If your users are literate in OLE and your servers have lots of space, people can drop OLE attachments into messages, guide messages through routing lists of recipients, and mail documents from the ‘File’ menu of mapi compatible applications. MIS can then undertake the expensive (time and/or money) challenge of gatewaying MS Mail to the Internet.

MORE INFORMATION

ms-mail faq
http://www.mysite.com/hall/mykb.htm

ms-mail-list
An Internet-standard listserv discussing Microsoft mail can be reached at:

mailto: MSMAIL-L@YALEVM.CIS.YALE.EDU

5.2.3. TURNKEY BUNDLES

If Calbiochem outsources the entire e-mail project to a big international provider such as SprintMail, InternetMCI, or AT&T, the vendor will provide their own proprietary client software.

5.3. MORE INFORMATION: RFC’S

The following Internet Requests for Comments (RFC) documents apply directly to open standards for sending and receiving e-mail on the Internet. These papers, for better or worse, are what engineers and companies use to design Internet-compliant software tools such as mailers, mail gateways, mail servers, etc.

RFC 822 - http://ds.internic.net/rfc/rfc822.txt
ISO x.400 - smtp - http://ds.internic.net/rfc/rfc1327.txt
6. SECURITY

More than half of those surveyed reported security-related financial losses in the past year—with 20 companies reporting losses in excess of $1 million. And of those using the Internet for exchanging information externally, 20 percent reported successful or attempted break-ins in the past year.

—from a survey of 1,300 CIO’s in January, 1996

If Calbiochem elects to attach its LAN to the Internet, it will have to take measures to assure secure connectivity. Regardless of how Calbiochem provides e-mail for its users, secure message content will also be a consideration.

6.1. SECURE CONNECTIVITY

6.1.1. PREVENTION

To protect the security of its LAN above all else, Calbiochem should consider one of the transient/on-demand forms of Internet connectivity. This inherently assures security because the brief, unpredictable periods of connection make it difficult for cyber-scum to get in, look around, and do damage.

6.1.2. FIREWALLS/SMARTHUBS/ROUTERS

To secure a permanent Internet connection, firewalls can be used to enforce security policies anywhere along a continuum from promiscuous to paranoid. Internet security experts recommend a policy on the almost-paranoid side, combined with end-to-end data encryption and single-use passwords for all cross-network communications work.

### Table 1: SECURITY CONTINUUM

<table>
<thead>
<tr>
<th>PARANOID</th>
<th>PRUDENT</th>
<th>PERMISSIVE</th>
<th>PROMISCUOUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t connect to</td>
<td>Any activity not</td>
<td>Any activity</td>
<td>Anything goes</td>
</tr>
<tr>
<td>the Internet at</td>
<td>explicitly</td>
<td>explicitly</td>
<td></td>
</tr>
<tr>
<td>all</td>
<td>allowed by the</td>
<td>blocked is</td>
<td></td>
</tr>
<tr>
<td>firewall is</td>
<td>explicitly</td>
<td>allowed</td>
<td></td>
</tr>
<tr>
<td>blocked</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New ‘smart’ network hardware can perform firewall style filtering and even perform more basic levels of security—the new so-called smarthubs can prevent a machine on one port from seeing or snooping on any other machine or traffic on the LAN.

6.1.3. USER COOPERATION

A network will only be as secure as its weakest link. We’ve all experienced or heard of situations where file servers are carefully guarded against viruses, but one user violated policy, loaded infected software on their workstation, and ended up infecting other users on the net. The same headache transfers easily to network security. If any trusted user on the Calbiochem network has an alternate network connection, such as PPP or SLIP Internet dialup account, they provide a means for cyber-scum to bypass any protection created by MIS.

6.2. SECURE MESSAGING

Secure messages may be desired when the content will involve proprietary research, business, or financial information traveling across untrusted wires. Messages can be

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digitally ‘signed’ by a user for authentication purposes, or the entire contents of a given message can be scrambled.

Excellent public-domain encryption technology exists specifically for protecting e-mail, and can be implemented on a per-user level or site-to-site level.

In the per-user model, each individual requiring privacy-enhanced e-mail is trained in the use of add-on encryption software such as PGP or PEM. Each individual user can then sign, encrypt, and decode messages as desired. There is plenty of room for user error in this labor-intensive process. This secure messaging setup will work with any e-mail solution chosen by Calbiochem.

In the per-site model, identical mail transport agents at each site are hacked to encrypt outgoing mail and decrypt incoming mail. This solution assumes that once mail reaches the mail transport, it is stored on a trusted host/network. Any further transfer of cleartext across untrusted connections (on an insecure LAN or via dialup to an ISP, for example) defeats the purpose. This secure messaging setup will work when the mail transport boxes are administered on-site by Calbiochem.

6.3. MORE INFORMATION

Merenbloom, Paul. “Security is more important than ever before: How to lock down your LAN/WAN.” InfoWorld, v17, n25 (Jun 19, 1995): 94.


Rotherwick Firewall Resource - BETA
http://www.zeuros.co.uk/firewall/
7. POLICY

Faced with international controversies over pornography and hate speech on the Internet, employers are setting policies to limit Internet usage to business purposes. They also are penalizing employees who send out abusive electronic mail, “flame” people on Usenet or visit inappropriate sites on the World Wide Web. And they are cautioning employees to remember that out on the 'net, they represent their companies, not just themselves.  

—Mitch Wagner in a Feb, 1996 Article on Internet policy in the workplace

For various reasons, more and more organizations are mandating electronic mail, Internet, and acceptable use policies. Depending on Calbiochem’s corporate culture, such a policy or more informal set of guidelines may be desirable. Regardless of the 'official' decision, Calbiochem should carefully consider the following e-mail and Internet-related predicaments, and be prepared to act when and if they arise:

• Sexual harassment via e-mail
• Rights of Calbiochem users, managers, or system administrators to read the messages of others (consider the analogy of someone breaking into your desk, discovering your personal diary, and covertly reading new entries each day)
• An employee who uses company time & resources for a great deal of personal e-mail (consider the analogy of an employee who makes numerous personal phone calls and writes long personal letters from their desk, helps themselves to all the company’s postage stamps and prepaid FedEx mailers they want)
• An employee who is spending much more time surfing the World Wide Web and downloading games than they are devoting to their job.

Here are a few real life examples from Wagner’s article:

Some 98 employees at Pacific Northwest National Laboratory in Richland, Wash., were disciplined last month when audits of system usage revealed that they used lab computers on their own time to access pornographic sites on the Web.

Kmart Corp. in Troy, Mich., fired webmaster Rod Fournier in November when he created a hot link from a single period at the end of a sentence on the Kmart home page to his personal home page [CW, Nov. 20]. That page, in turn, contained a link to a site that spoofed the controversy over Internet pornography.

At Sandia National Labs in Albuquerque, N.M., 64 employees, contractors and college interns were disciplined in August and September for reading pornography on company time and their own time. The heaviest offenders were suspended without pay for up to a month, while others received shorter unpaid suspensions and letters of reprimand.

According to HR Columnist Barry Weiss, blame for inadequate acceptable-use policy may fall upon the shoulders of an organization’s MIS department:

Oftentimes, these employers rely on management information systems (MIS) managers to reevaluate operating procedures as new technologies debut. But if the MIS staff fails to consult with HR managers about the potential pitfalls created by these technologies, concerns about employee privacy, sexual harassment and other legal liability issues may surface unexpectedly.

—Barry Weiss for HR Focus, September, 1995

Weiss has determined four key areas that effective Internet use policies must address:

As rapidly as the Internet is growing, it is introducing new management, security, and legal issues that many companies have yet to address in their employment practices. To prevent problems, companies should develop sound Internet policies and related procedures to govern employees’ travels in cyberspace. Four areas in
particular must be in step with evolving technology:
• employee privacy
• sexual harassment
• trade secrets and confidentiality
• human resources policies.

—Barry Weiss, from Management Review January, 1996

The most comprehensive example of an email specific policy I could locate in preparing this report is a draft by the University of California to cover e-mail use on its nine California campuses. Calbiochem could adapt this for legal coverage, and then produce a set of easy-to-read guidelines to share during employee e-mail training. In particular, “VI. SPECIFIC PROVISIONS” covers:

- Appropriate Use
- Disclosure and Privacy
- Security and Confidentiality
- Archiving and Retention

These sub-sections could be used as a model to produce some a legible and worthwhile set of guidelines for employee e-mail use.

The U.C. E-Mail Policy draft is available at:
http://www.ucop.edu/ucophome/policies/email/

7.1. MORE INFORMATION

There is one usenet newsgroup devoted to discussion of computer-related policy, and e-mail policy has been the topic of several threads of discussion during the preparation of this document:

comp.admin.policy

Academic Computing Policy Statements Archive of the Electronic Frontier Foundation:
http://www.eff.org/pub/CAF/policies/

Ellis, James; Fraser, Barbara; Pesante, Linda. “Keeping Internet intruders away.” UNIX Review v12, n9 (Sep 1994):35-44.


8. TRAINING

You’re bringing a cyberspace launching pad to every desktop -- what a wonderful productivity tool for information-hungry end users, or so you think.

Without well-thought-out training and usage policies, you could be delivering nothing more than a time-waster, which could get your organization into hot water.

Without proper training, the technology-challenged users in your organization will suffer some level of motion sickness as they whirl around the Internet.

—Cheryl Currid, blaming everything on effective training

8.1. INFORMATION LITERACY

Among a population of information literate users, networked information tools such as electronic mail can cut costs, increase efficiency, and speed up dissemination of information internally and externally. So what is ‘information literate’ and how many Calbiochem users are information literate?

Beyond computer literacy (understanding the hardware, software, and basic computing concepts), beyond network-literacy (understanding the general relationship between machines on a computer network) comes information literacy.

Information Literacy is the comprehension of the high-level information that fuels a workplace—knowledge of what individuals and teams require to operate—and how present-day technology applies to the search for that information and further refinement of raw data into knowledge that advances the business.

8.2. LEVELS OF TRAINING

Conventional Internet training focuses on software configuration and use, and if you’re lucky, on the concept of computer networks and networking—an understanding of which is essential for sane use of networked information retrieval tools.

Exceptional Internet training will delve into the psychological and organizational issues related to each Internet technology being taught. You wouldn’t want to attend a telephone sales seminar today and spend the full time discussing the buttons on your office phone and how to correctly look up phone numbers to program into memory. You’d expect to discuss the psychology of telephone conversations, how to handle different discussion topics tactfully, what you can infer from the speaker’s tone of voice, what you can do to establish rapport over the phone, etc. Effective Internet training will build up to this ‘higher level’ of information and spend a good deal of time on it.

Once your users are literate in the basic use of their Internet software, they’re now ready for the ‘real’ education of how to apply these tools in the effective representation of your organization on the Internet and for effective use on your internal LAN.

An additional up-and-coming issue in Internet training is how to help users deal with information overload Using the example of e-mail, a user assigned to read and respond to the support@ address for a small company, monitor and post to a single work-related list, and exchange mail with co-workers can easily be looking at more than 100 inbound messages per day, 30,000+ per year.

8.3. TRAINING PROVIDERS

If an e-mail training program will be developed and delivered in-house at Calbiochem, a number of Internet resources can be used in planning and creating the project, including resources in Netiquette and a source of publicly accessible mailing lists.

If an outside provider will come to Calbiochem to deliver e-mail training, Calbiochem should ask to review training materials or even sit in on another client’s training session before hiring them.

A third option for Internet/E-mail training would be to send users off-site for general training sessions offered by local ISPs and conventions. Recent San Diego conferences with introductory Internet training sessions included the American Society for Information Science and the San Diego Computer Festival sponsored by ComputerEdge magazine. New Horizons is a large computer training organization headquartered in San Diego with its own ISP, MillenniaNet.

8.4. MORE INFORMATION

Very little formal research is available on the impact of e-mail within an organization, but what little there is suggests that this powerful tool should be taught and used with great care, due to the sheer speed at which electronic word-of-mouth spreads versus the customary channels.

9. RECOMMENDED ACTION: A 10-STEP PLAN

There are many paths that will lead Calbiochem to a successful e-mail service for its users and customers. The plan offered here attempts to make use of Calbiochem’s existing LAN resources, provide time for testing and user training, allow future expansion, and give Calbiochem MIS a new, interesting-yet-not-overwhelming system administration challenge.

9.1. CLARIFY CALBIOCHEM’S INTERNET AND E-MAIL VISION

- Do a needs assessment and/or systems analysis to determine if and how Internet tools could improve work at Calbiochem
- Get participation and/or buy-in from user community if politics are an issue. This might take the form of a user survey, call for feedback at a weekly meeting, etc.

9.2. E-MAIL SERVER SETUP: PEGASUS, MERCURY, AND CHARON

Set up & test e-mail for the Calbiochem internal NetWare LAN, using Pegasus Mail, charon, and mercury. Pegasus, etc. are recommended because:

- Calbiochem has experienced CNE’s, and Pegasus is a Novell-centric e-mail system
- Calbiochem’s users are already on Novell, this spares them the confusion of learning a second username and password to access e-mail from any other host or provider
- This will work nicely as an internal e-mail solution, whether or not any Internet connection is functioning
- This solution spares Calbiochem MIS the hassle of administering a parallel user database on any other system for the purpose of e-mail only
- Price: the servers and client package are freely available for Windows, DOS, and Macintosh. Actually, you should do the right thing and purchase an unlimited license to duplicate the Pegasus Mail user manual for about $325
- There is a PGP add-in to Pegasus Mail which can be used to send industrial-strength encrypted messages when secure content is desired/mandated
- This solution allows Internet e-mail to be sent and received at the user desktop without a local TCP/IP stack. If Calbiochem aims to restrict use of other Internet software such as web-browsers, this should be a good deterrent.

9.3. ESTABLISH INTERNAL/EXTERNAL E-MAIL RESOURCES

- Choose an addressing scheme for resource addresses and aliases. The user addresses should correspond to Novell usernames.
- Define and setup internal e-mail aliases such as all, mis, helpdesk, management, and news
- Define and set up e-mail external aliases such as postmaster@calbiochem.com, info@calbiochem.com, support@calbiochem.com, sales@calbiochem.com, and newsletter@calbiochem.com

9.4. CREATE POLICY OR GUIDELINES

- Form a team of techno-savvy Calbiochem folks to review existing policies and draft one for the company.
- An informal set of Internet Use Guidelines might weather the rapidly changing technologies better than one letter-by-letter policy devoted specifically to e-mail.
- Review Policy draft with Calbiochem community and legal authority
9.5. TRAINING, PART ONE—SOFTWARE BASICS

- Introduce users to E-mail software basics
- Invite them to begin using Pegasus Mail internally
- Point out internal e-mail alias addresses, i.e. “If you’d like technical support via e-mail, send a message to ‘helpdesk’ and Bob or Linda will respond promptly”

9.6. CONNECTIVITY—PERMANENT, LEASED-LINE OR ISDN

- Note that planning and shopping for connectivity can be concurrent with everything above. However, I strongly discourage ‘turning on the pipe’ until a policy is in-place, the MIS folks are comfortable with the e-mail administration, and the users have a vague notion of netiquette.
- Select a level of permanent connectivity (56Kbps–1.5Mbps) based on Calbiochem’s overall Internet plan and level of initial e-mail use within the organization
- Gateway the tested LAN e-mail to the Internet with the aid of a local ISP and/or an Internet intern.
- Employ your ISP as your security consultant—many Internet service providers recommend and discount a commercial security solution, such as a firewall or router-based service. Yes, you should have security, you shouldn’t be the one to lose sleep over it. Since your primary vulnerability will be through your ISP-provided port, and the ISP controls the other end of it… they should be able to do a pretty good job.

9.7. TRAINING, PART TWO—E-MAIL STRATEGY

- Teach users the etiquette and psychology of electronic mail
- Introduce Internet e-mail addressing and resources such as biotechnology e-mail discussion lists
- Discuss Calbiochem’s formalized Internet usage policy or guidelines
- Teaching this as a second session allows users to arrive familiar with the software and focus on the ‘higher level’ topics.

9.8. REMOTE ACCESS—POP

- Install a POP server to allow remote Internet users to check their e-mail from other Calbiochem offices, from home, and while traveling
- If appropriate: arrange dialup Internet access for Calbiochem teleworkers, traveling representatives, etc. This can be facilitated via a National ISP or directly to Calbiochem, bandwidth permitting.
- Create remote-user software packages containing customized Calbiochem documentation, Pegasus Mail and other Internet access software

9.9. INTERNET PRESENCE

- Announce & promote Calbiochem’s e-mail presence and URL in relevant Internet groups
- Add e-mail addresses and the corporate URL to business cards, print advertising, etc.

9.10. EVALUATE AND REFINISH THE SYSTEM

- What local and remote user feedback are you receiving?
- Would any advanced electronic mail services be helpful? (details in following section)
- Create an introductory information sheet and policy guidelines to give to new employees and visitors who receive LAN access privileges.
10. ADDITIONAL INFORMATION SERVICES (FUTURE PHASE-INS?)

There are a plenty of Internet services and information sources from which Calbiochem users could benefit. Similarly, Calbiochem could offer clever information services via the Internet to benefit customers and affiliates who are wired. This section will highlight a few of those services.

10.1. MAIL-SPECIFIC

Not to dwell on e-mail… but once you have a user population fluent in the use of electronic mail software, some advanced services can be used very effectively by all.

10.1.1. DISCUSSION LISTS

This is the electronic mail parallel to a magazine subscription, except everyone’s letter to the editor gets published in real-time. Discussions lists are also known as mailing lists, and by names derived from the software that runs them—smartlists, listservs, majordomo lists, etc. Typically, list users will agree to exchange e-mail on a given topic of interest—such as a particular manufacturer’s product, a style of system administration, hobby, musical group, field of research, etc.

Calbiochem MIS might benefit from subscriptions to some of the hundreds of technology-specific lists devoted to various facets of MIS and IT—including UNIX administration, Novell administration, database administration, etc. Calbiochem researchers might like subscribe to some of the hundreds of biotech lists. Employee workgroups can add work-related discussion groups as projects and needs require.

Calbiochem customers might appreciate the opportunity to subscribe to mail lists hosted by Calbiochem, to discuss the use of Calbiochem’s products, distribute the company’s press releases, etc. Once you are running a mail server, you can create as many of these lists as you like, for public or private use. Most of the user-level administration is handled by the users themselves via special e-mail messages they submit. Offering subscription e-mail lists is a good way to raise an organization’s network presence.

10.1.2. AUTOMATED RESPONSE SERVICES

Much like telephone-faxback services, automated response e-mail services can send back plain text (or binary, full-format) tech support or product information documents to users. If Calbiochem presently offers a faxback service or Web-based document delivery service, this can be readily adapted to automated response e-mail—one more information-delivery choice for your customers.

10.1.3. SURVEYS BY E-MAIL

When conducting product research, product registration, or gathering other information in a scientific fashion, surveys can be distributed, collected, and tabulated by electronic mail. Electronic mail surveys have an ‘incredible’ response rate, apparently much higher than direct-mail or telephone survey response-rates. The electronic format eliminates paper and postage costs, and increases speed and accuracy. Special software is available to aid in the creation, distribution, and tabulation of surveys via electronic mail.

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14 Minus the phone bills, slow speed of faxes, and cost of toner and paper to your customers.
16 Wingfield, Nick. “E-mail tools will cause Internet surveys to spread” InfoWorld 17, n47 (Nov 20, 1995):49.
10.2. STANDARD INTERNET SERVICES

Most net-savvy organizations host several information services above and beyond the requisite \( W^3 \) site. E-mail services have been described throughout this document. E-mail is definitely the most popular and lowest-common-denominator tool for Internet communication. Depending on Calbiochem’s commitment to serving its customers electronically, one or more of the following information services might provide another tier of benefits to staff, researchers, and customers:

10.2.1. FTP

File transfer protocol. FTP is used to send and receive binary and text files around the world. FTP servers are available in the public domain, as are character-mode and GUI clients. Although \( W^3 \) browsers can perform some client side FTP tasks using \texttt{ftp://} prefixed URL’s, they can not match or replace the services of a full corporate FTP site. FTP supports both publicly accessible (anonymous) and password-protected user access. Anonymous FTP can be used to distribute software, product literature and documentation, and can be used by remote users to submit bug reports, detailed queries and large data that may not travel well via e-mail. Password-protected FTP can be used to provide individual users remote access to their files, and to provide a repository for distributed workgroups to share collaboratively produced documents and other project-related information. FTP might be especially useful for sharing information between Calbiochem’s international divisions.

10.2.2. TELNET

telnet and rlogin are two of the earlier protocols for machine-to-machine connections on the Internet. Calbiochem researchers can use outbound telnet to access thousands of online information sources containing all types of free and for-fee data. Dialog, LEXIS/NEXIS, Datastar, BRS, Dow Jones, government information, and over 600 free library catalogs can be accessed via telnet, not to mention user accounts that may be available to collaborative research projects around the world.

10.2.3. WORLD WIDE WEB

You’ve probably heard of this one\( ^3 \). While Calbiochem is developing resources to serve information to the Internet via an offshore \( W^3 \) host, perhaps local users are interested in researching their work (or the competition) via this browsing tool. Calbiochem MIS might logically select a \( W^3 \) browser as the software front-end of choice to teach users \( W^3 \), e-mail, ftp, and usenet news, since several browsers can integrate these and other functions under one roof.

10.2.4. WAIS

If Calbiochem would like to make its product literature, technical support information, or documentation available to the world, WAIS is a classy way to do it. By setting up one of these wide area indexing servers, you allow individuals and libraries around the world to search the full text of your published information via a high-level client-server protocol called Z39.50. Z39.50 and WAIS support full text and field searches, and advanced IR features such as relevance feedback. Many WAIS clients and servers are in the public domain.

10.2.5. IRC

Internet relay chat is a tool used to allow multiple-user discussions on a selected topic. IRC is used as an internal communications tool in university settings by net-savvy
departments. On the Internet at large, there are many IRC channels dedicated to the support of a particular product. Corporations are experimenting with offering IRC-based customer support and internal IRC-based conferencing between sites. Calbiochem might like to monitor the public IRC channels relevant to its business and perhaps offer one if there is a need. IRC might be a nice extension to the traditional UNIX talk when communicating with the international Calbiochem sites—the difference between a full-duplex conference call and a one-on-one telephone call.

10.2.6. USENET NEWS

The UseNet is an international network of over 18,000 interactive, topical discussion forums, each dedicated to a different subject. Calbiochem researchers might be interested in reading and participating in the large bionet hierarchy. Calbiochem might also choose to create internal newsgroups for disseminating information and facilitating discussion. Client-server news software uses one central copy of each message, so it is nicer to your network than e-mail messages, which are individually transferred and stored as a separate copy for each user. Users often prefer to participate in UseNet-style discussions over e-mail lists because the news-reading software is able to track threads of discussion—organizing messages by their subject and a hierarchy of who is responding to which point. Clients and servers for UseNet news are freely available.

10.2.7. VOICE CHAT AND VIDEOCONFERENCE

These are not standard customer service tools on the Internet (yet), but could help provide inexpensive voice, video, and white-board communication between Calbiochem in California and its international affiliates. Free GUI software is available to provide real-time and almost-real-time video, secure-voice, and white-board communication on the Internet. Voice and video applications will require small hardware investments in sound cards, microphones, and video cameras, which you may already own.

10.3. INTRANET

As you’ve probably read in all-too-many trade publications, your MIS department is supposed to be very turned-on and tuned-in to the ‘revolutionary’ idea of an internal internetwork called an intranet. As if you’re not fed-up and crying ‘enough already,’ you’ll soon start to see advertisements for ‘turnkey’ intranets and all sorts of other vaporware.

Actually, the ideas underlying intranets are excellent, and many organizations have improved communications, and saved time, money and paper in the process. Every college campus in the modern world has had some sort of TCP/IP based campus-wide information system (CWIS) online for years. Quite a large test population for this ‘new’ idea. When big business noticed that university staff and students could deliver and review administrative forms, homework assignments, documentation, papers, and collaborative projects, even apply to attend college electronically, they got interested.

The low-to-no cost of the Internet tools to create these services got businesses very excited. When Netscape, Inc., announced that most of its revenue comes from the sale of software for internal use, things went ballistic. The buzzword intranet was hatched and every software product under the electric sun is being repackaged and re-marketed as an intranet solution.

Depending on how Calbiochem uses (and would like to use) information internally, there might be a real opportunity to set up an intranet, or other computer-supported collaborative work (CSCW) tools, perhaps groupware such as Lotus Notes.
Kensho is presently assembling an online information center for intranet planners, you might like to check this URL around June 1, 1996:

http://www.kensho.com/hip/
# 11. APPENDIX: WORK ORDER

Hello Bob:

Thanks for the opportunity to meet with yourself & Linda Michel this morning. As we discussed, I'll create a document that identifies options (both in-house & outsource) to help Calbiochem meet its immediate need for electronic mail on every desktop. Areas you identified for me to research & report on include:

- connectivity options
- mail transport options
- mail user agent selection
- security
- policy
- training
- additional Internet services (future phase-ins)

Please let me know if this looks good to you, or if other major topics would serve Calbiochem better.

If you decide to follow through with the idea of bringing in an Internet-Savvy college intern, I've attached a job description and corresponding technical interview questions that you might like to use in the process. The attached document is in Adobe portable document format (PDF). Free "Acrobat" software to view, print, cut, copy, & paste from PDF docs can be grabbed from the World Wide Web at [http://www.adobe.com/](http://www.adobe.com/)

Have a Good Afternoon!

--Sean :-)

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<th>Connectivity Options</th>
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