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THE TERMINAL AND MAIL CONVERSION RELAYING FACILITIES IN THE CCIRN
COMMUNITIES OPERATING IN APRIL 1989

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ABSTRACT

This note lists the lines, mail relays and terminal relays known to the authors as being in place or planned between the North American Research Community and the European Research Community. It has been prepared for the Coordinating Committee for Intercontinental Research Networks (CCIRN) and the International Collaboration Board (ICB).

1 INTRODUCTION

It was decided, at the first CCIRN meeting in May 1988, to compile a list

of the gateways currently operational on the two sides of the Atlantic for the next meeting of the CCIRN in October 1988. we were tasked with compiling the information for mail and terminal gateways, others for file facilities. This is a fourth draft in this direction, which should be reviewed by all members of the CCIRN, and updated for their constituencies. While some editorial control has been applied, much of the contents of this version has been derived from CCIRN or ICB members.

In Section 2 we have listed the lines known to be in place or planned between the members of the North American Internet (and the networks to which it is connected) and the European Research Community. In Section 3, we have tried to list the networks which are considered relevant to CCIRN communities. It should be noted that by "network" we mean the total system - not just the lower communication subsystem. It has been updated also to indicate the communities served by each relay. We have excluded most of the commercial Message systems, mainly because they do not cater just to the research community. However, in a later version it might be important to compile also information on managed gateways between the research networks and the commercial ones. Examples are mail convertors being considered between JANET and the British Telecom Gold, or between the US Internet and commercial carriers such as MCI-Mail. One reason for not listing any such mail convertors at this stage, is that decision on their provision may be sensitive from both a commercial and regulatory viewpoint. There is one exception. NASAMAIL is mentioned, although it runs as a closed usergroup of the commercial Telemail service. This is because it is

in consistent use by a sizable portion of the research community. The subject of commercial mail services should be considered at a future CCIRN meeting.

Following the compilation of the relevant networks, we have listed some of the Mail Convertors which have been developed and are operational. This list may be incomplete; nevertheless it has had information from all members of the CCIRN, and will be updated as further information is amde available.

In Section 4 we have listed some of the installations tasked with providing mail convertor facilities.

This document has been updated based on information received at the CCIRN meeting of April 17,18 1989; when further information is provided, it will be updated again.

2 CURRENT AND PLANNED EUROPEAN-US LINES

LABEL	SPEED	FROM	(AGENCY)	TO	(AGENCY)	TYPE	
	(KBPS)					(DATE IN)	
						(SERVICE)	
A	64	JVNC Princeton, NJ	(NSF)	KTH Stockholm, Sweden	(NORDUNET)	Academic (Now)	IP
B	64	Seismo Washington, DC	(DARPA)	NTA Oslo, Norway	(NORSAR)	Defence (Now)	
C	64	BBN Cambridge, Mass	(DARPA)	RSRE Malvern, UK	(RSRE)	Defence (Now)	IP
D	64	Suranet Washington, DC	(UUNET)	EUNET Amsterdam, NL	(CWI)	EUNET (Now)	IP

E	56	JVNC	(NSF)	ULCC	(JNT)	Academic	
IP/X.25		Princeton, NJ		London, UK		(04.89)	
F	64	FNAL	(DoE)	Max Planck	(DFN)	Academic	
Many/X.25		Chicago, Il		Garching, GFR		(08.89)	
G	64	FNAL	(DoE)	CERN	(CERN)	HEP	
DECNET/X.25		Chicago, Il		Geneva, Switz		(now)	
H	64	Princeton U	(NSF)	Inria	(INRIA)	ACADEMIC	
IP/ENET		Princeton, NJ		Sophia, France		(now)	
I	64	DARPA	(DARPA)	CNUCE	(CNR)	DEF/ACAD	
IP/X.25		Arlington, VA		Pisa, Italy		(5.89)	
J	19.2	Goddard	(NASA)	ESOC	(ESA)	SPAN	
DECNET		Greenbelt, MD		Darmstadt, GFR		(now)	
K	19.2	Goddard	(NASA)	ESTEC	(ESA)	SPAN	
DECNET		Greenbelt, MD		Hague, NL		(4.90??)	
L	64	MIT	(DoE)	CERN	(CERN)	HEP,L3	
DECNET/X.25		Cambridge, Mass		Geneva, Switz		(4.89)	
CB/X.25							
M	9.6	FNAL	(DoE)	CNAF	(INFN)	HEP	
DECNET		Chicago, Il		Bologna, Italy		(now)	
N	56	Cornell	(NSF)	CNUSC	(EASINET)	Supercomp	
IP		Ithaca, NY		Montpellier, France		(now)	
O	56	CUNY	(BITNET)	CNUSC	(EARN)	EARN/BIT	SNA
		New York, NY		Montpellier, France		(now)	
P	64	FNAL	(DoE)	CNAF	(INFN)	HEP	
DECNET/X.25		Chicago, Il		Bologna, Italy		(May 89)	
IP/X.25							

Table 1 The Current North American - European Internet Links

LABEL	US CONTACT	US RESPONSIBLE	EUROPEAN CONTACT	EUROPEAN RESPONSIBLE
A	S. Heker	S. Wolff	A. Hillbo	M. Brunel
B	S. Blumenthal	M. Pullen	P. Spilling	P. Spilling
C	S. Blumenthal	M. Pullen	J. Laws	J. Laws
D	R. Adams	R. Adams	P. Beerlma	D. Karrenberg
E	S. Heker	S. Wolff	J. Seymour	R. Cooper
F	Gassman	D. Hitchcock	C. Ullman	C. Ullman
G	H. Ritchie (?)	D. Hitchcock	B. Carpenter	B. Carpenter
H	S. Heker	S. Wolff	C. Huitema	C. Huitema
I	S. Blumenthal	M. Pullen	B. Bonito	B. Bonito
J	V. Thomas	A. Villasenor	J. Franks	K. Blank
K	V. Thomas	A. Villasenor		T. Sanderson
L	H. Newman	D. Hitchcock	B. Carpenter	B. Carpenter
M	H. Ritchie	D. Hitchcock	E. Valente	E. Valente
N	S. Brimm	S. Wolff	J. Delhaye	J. Delhaye
O			J. Delhaye	J. Delhaye
P	H. Ritchie	D. Hitchcock	E. Valente	E. Valente

TABLE 2 Administrative Information

3 NETWORKS, PROTOCOLS AND RELAYS

3.1 NORTH AMERICAN NETWORKS

In North America, and mainly in the United States, there are a number of

relevant networks under the general umbrella of the FRICC, and a number of others run for specific communities; many of these spill over into other parts of the world. Those considered relevant to Mail Relaying are listed below. Even though many operate also in other parts of the world, they have the designation Ux.

U01. ARPANET/MILNET/NSFNET and Connected Internets - These run SMTP over leased lines. There are some sites outside the US.

U02. CSNET - This runs SMTP with additional PSDN and PSTN connections with specific PSTN protocols (PHONENET); they reach many countries outside North America over the PSTN and PSDN.

U03. SPAN/HEPNET1 - These run DECNET. There are some links outside the US.

U04. L3NET - These run the JANET Mail Protocols (Grey Book, GB) over X.25 over leased lines or U01 at lower levels. GB is similar to the Internet RFC 822 but running over British proprietary (Coloured Book) file and transport protocols.

U05. MFENET - These run MFE-Mail/IP over leased lines.

U06. USENET - These run UUCP and are world-wide over the PSTN, PPSDN and leased lines.

U07. BITNET1 - These run BITNET-Mail over leased lines and are worldwide; the Canadian (NETNORTH) and other versions such as EARN are fully connected in at present. The mail system used is called BSTMP and runs over proprietary IBM

protocols.

U08. BITNET2 - The mail portion of the network uses the same high level protocols as U07; however the networks themselves are fully integrated into U01 at the lower levels.

U09. CDNNET - This uses the EAN version of X.400 in Canada over leased lines, the PSTN and the PPSDN. There are versions in many countries.

U10. NASAMAIL - A NASA-operated private Telemail service providing electronic mail for NASA users.

U11. DRENET - This runs TCP/IP over the Canadian PPSDN (DATAPAC). It is part of the Internet under the aegis of the International Collaboration Board (ICB).

3.2 EUROPEAN NETWORKS

Some of the networks of Section 3.1 operate in Europe; where these use identical protocol suites they are not usually noted separately here.

E01. JANET - This runs Grey Book (GB) and operates mainly in the UK over leased lines and the PSDN. There are some sites in other countries.

E02. RARE-MHS- The biggest of these, DFN, operates in Germany over the PSDN and leased lines using X.400 only. Many other European networks are starting to use this suite for electronic mail, and hence are indistinguishable for mail purposes.

E03. RARE-EAN- This is currently identical to U09, using EAN; however this will be phased out as soon as the various

X.400 implementations are available with full conformance to the standard. It operates in many European countries.

E04. EARN - This is currently the same as U07, but is changing and is therefore listed separately.

E05. NORDUNET - A network serving the five Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). It is transporting IP, DECNET and EUNET traffic; OSI is planned also. For the mail service, it contains gateways between DECNET, SMTP, BSMTTP, EUNET and EAN mail protocols.

E06. EUROKOM/- This is not a network, but a conferencing system QZCOM running at two sites (Stockholm and Dublin). Because it has mail connections to many users, who access the sites via the PPSDN and PSTN, it is listed separately. There are in fact several versions of COM relays; I believe Stockholm runs the original KOM, and Dublin EUROCOM. I believe that both accept GB.

E07. EUNET - This is linked closely to U06. It operates in 19 European countries. There are moves to use SMTP and offer other IP-based services.

E08. HEPNET - This runs X.25, DECNET, SNA/RSCS and TCP/IP through much of Europe. It is also well connected to U04.

E09. GARR-IT - This is an Italian national communications infrastructure running different protocols (X.25, TCP/IP, DECNET, SNA, EARN) where the most important network functions interwork

X.400 through gateways. The mailing topology is based on the
mail and RFC 822 naming schemes, interconnected by X.400/RFC
most gateways. This heterogeneous network is used by the
academic important research bodies (INFN, CNR, ENEA), by the
community in the Universities, and by national
computing centres (CINECA, CILEA, CSATA).

E10. EASINET This is the network linking the partners of
the IBM Supercomputer Initiative; it is called the
European Academic Initiative. The network will run on a private
X.25 network, over leased lines; it will support X.400 and
SMTP for mail. Other services planned are File Transfer
(FTAM and FTP), and Remote Terminal access (TELNET and
3270 dialog).

3.3 MAIL CONVERTORS

There are a large number of special relays built at various sites.
Only a few of these are widely replicated. There is considerable
scope for extending the list below. The main criterion would be whether the
code was available, and could be supported.

R01. MMDf/Unix - This relays between SMTP, GB, UUCP, and Phonenet.

R02. Sendmail/Unix - This relays between SMTP, GB, UUCP, and
Sendmail.

R03. Jnet/VMS - This relays between SMTP and BSMTTP.

R04. Urep/Unix - This relays between BSMTTP and Sendmail.

R05. EUROKOM - This is a conference system, but because it
interworks

with other mail systems it is mentioned here.
It interworks with MMDF.

R06. EAN/Unix - This links EAN-X.400 to Sendmail or MMDF.

R07. Mailway/Unix - This links X.400 to Sendmail.

R08. NASAm ail Gateway - This relays between NASAMAIL and SMTP on the Internet.

R09. IBM TCP/IP - The IBM TCP/IP product for IBM/VM includes a BSMTTP-SMTP relay function internally.

R10. MINT - This relays between SMTP, BSMTTP, UUCP, VM Smail, EAN and Wylburmail

R11. BOHR - This relays between BSMTTP and UUCP

R12. GIVEME - (General Interface on VMS for Electronic Mail Exchange); this relays between VM Smail, BSMTTP, SMTP and X.400

R13. MAD - This relays between UUCP and EAN

R14. DFN-EARN/X.400 - This relays between BSMTTP(EARN) and X.400 running on IBM/VM. The Mail gateway is based on the IBM TCP/IP product, and the EARN X.400 Gateway code.

R15. DFN-EAN - This relays between VM Smail and X.400 on VAX/VMS

R16. MRX.400 - This relays between VM Smail and X.400 and runs on VAX/VMS as a commercial product

R17.
Note that EAN and Mailway gateways link to other mail systems, rather than to other protocols.

3.4 TERMINAL RELAYS

Terminal Relays are much simpler devices than mail convertors.

It is merely necessary to have a Host which is on two networks, and has terminal access to each; many then allow you to log-in from one network, and connect out again to another. Prior to the existence of MILNET, many of the Arpanet Hosts had this feature. It was requested that this feature be disabled on most such Hosts, to allow access control on a Host-Destination pair to have a meaning.

To provide good terminal facilities, it is necessary to do fairly extensive mapping of the terminal protocol features (like code, echo characteristics, buffer sizes, and character versus line mode).

While several US sites provide such relays - e.g. between MFENET and ARPANET, there are few such outside the US.

Four sites (NTA-RE in Kjeller-Norway, CNUCE in Pisa-Italy, RSRE in Malvern-UK and UCL in London-UK) have terminal access to the Internet via ARPANET. In NTA and CNUCE, terminal access to ARPANET comes only from inside the centre. Both RSRE and UCL provide proper terminal relay facilities from their constituent networks to ARPANET. In the case of RSRE, the access is limited to users who access terminal relay facilities inside RSRE from a UK Defence establishment using an approved form of access. In the case of UCL, users may access the relay only from their site.

Two sites have terminal access to the Internet via NSFNET: INRIA and UCL/ULCC. The INRIA relay is between the OSI stack in France and the Internet stack on the Internet. Access is mainly to computers running XXX on Transpac (the French PPSDN) in Europe, and a leased line to a

gateway to
NSFNET at Princeton U. The ULCC/UCL terminal relay is currently
using the
Public X.25 facilities via UCL to ARPANET, but this should change in
April
1989 to a line directly between ULCC and JVNC. Here the access is
from
JANET, the PSTN or the PPSDN. The relay does protocol conversion
between
the protocols used on the UK academic networks and the ARPANET
Telnet.
Only approved users have terminal relay facilities. There are
plans to
distribute IP services more broadly at least from CWI, and
NORDUNET has
similar plans. INFN uses different protocols for remote terminal
access;
the most commonly used is XXX in line-mode and in full-screen mode.
IBM
3270 protocol relays are used to access IBM mainframes. Terminal
relays
between the protocols in use and the Internet high level protocol
services
are under development. It is hoped that further information
will be
furnished on other terminal gateways.

4 INSTALLATIONS

4.1 NORTH AMERICA

- US01. Ames-Relay - This runs R08 at NASA-Ames Research Center for
NASA
users. It also relays between SMTP/VMSMail (SPAN)
and
SMTP; It also relays between DECnet mail, NASAMAIL
and
any DECnet machine at ARC.
- US02. Argonne-Relay - This runs at the Argonne National Laboratory
and
relays between BSMTTP (BITNET) and MFENET mail
for
DOE users.
- US03. BITNET-Relay1 - This runs R01 at several US sites, relaying
between

any BSMTP (BITNET) and SMTP (NSFNET) - usually for
bona fide Internet or BITNET user.

US04. BITNET-Relay2 - This runs R09 at several US sites, relaying
between BSMTP (BITNET) and SMTP (NSFNET) - usually for
any bona fide Internet or BITNET user - at many
sites which have both BITNET and Internet connectivity.

US05. CSNET-Relay - This runs R01 at BBN, relaying between
Phonenet (PSTN and PPSDN) and SMTP (ARPANET) for any
approved CSNET user.

US06. DECWRL - This runs at the DEC Western Research
Laboratory, and relays between Decnet (Internal DEC) and
SMTP (ARPANET) for communication with DEC employees.

US07. LLL-Relay - This runs at the Livermore Laboratory, and
relays between MFENET msail, SMTP (ARPANET) and DECNET
mail (HEPNET) for all bona fide DOE researchers.

US08. NASA-Relay - This runs R08 at LARC for NASA researchers.
This runs the same software as US01, but does not relay
to DECNET.

US09. UBC-Relay - This runs R06 at the University of
British Columbia, and relays between the EAN sites (PPSDN
and PSTN) and Phonenet (PSTN), for communication
with Canadian Researchers.

US10. UUCP-Relay - This runs R02 at several sites in the US, and
relays between SMTP (ARPANET) and UUCP (PSTN) for any
UUCP

site.

Note that any site that runs Sendmail or MMDF is probably also acting as a gateway between the networks mentioned in R01 and R02. Only a few of these are publicly advertised as such gateways, however. There are more relays planned by NASA (and other selected sites run by members of the FRICC) to carry out X.400 mail experiments in collaboration with RARE WG 6.1; L. Lanweber is heavily involved in this work.

4.2 EUROPE

ES01. Bohr Inst - This relays between BSMTTP (EARN) and UUCP (EUNET) for the HEP community.

ES02. CERN - This relays between Sendmail/Urep (PPSDN), UUCP (PSTN) and PPSDN), BSMTTP (EARN), EAN X.400 (PPSDN), VMSPMail (lease lines) and Wylburmail for the European HEP community. Many international leased lines terminate in CERN and have access to its relays.

ES03 Chalmers U - This runs R02 and R04 to relay between SMTP, EUNET (PPSDN and PSTN) and EARN.

ES04. CNAF-INFN - This runs R12, and relays between DECnet/VMS Mail, BSMTTP (EARN), X.400 and UUCP (EUNET) for the HEP community. Versions of R12 run at another 6 sites in Italy, and relay various subsets for Italian researchers.

ES05. CNUCE - This relays between SMTP (Arpanet) and BSMTTP (EARN) for Italy, and soon the whole EARN community over

leased

lines.

ES06. CWI - This R02 and R04, and relays between UUCP (EUNET and USENET), SMTP (NSFNET) and BSMTTP (EARN) for the whole European community - which uses EUNET for European distribution.

ES07. DEC-MRX - This runs R16, and relays between VMStmail and X.400 (PPSDN) in many countries.

ES08. DFN - Several relays running R15 between X.400 and local VMS mail networks for the German DFN Research Community (and at other European places for other communities).

ES09. Dublin U - This runs R05 at Dublin U, and relays between EUROKOM, BSMTTP (EARN), UUCP (EUNET, PSTN and PPSDN), and GB (PPSDN) particularly for the CEC-funded activities.

ES10. EASINET-Rel - This runs R14, and will be mounted at most of the EASINET and many of the EARN sites to relay between SMTP and X.400 for supercomputer users (EASINET) and academic users (EARN); probably this will be extended in practice to be available for most academic users. There will shortly be installations in Spain and Brazil.

ES11. GMD1 - This runs R14 at GMD, and relays between (BSMTTP) EARN, and RARE-MHS (PPSDN) for the German DFN Research Community. This relay is also being used by other upcoming X.400 communities until they have their own

Portugal, gateways; currently these are Brazil, Yugoslavia.

ES12. GMD2 - This runs R6 at GMD, and relays between UUCP (EUNET), CSNET and X.400 (PPSDN) for the German DFN Research Community. This relay is also being used by other upcoming XX.400 communities until they have their own gateways; currently these are Brazil, Portugal, Yugoslavia.

ES13. INRIA - This runs R07 at INRIA, and relays between RARE-MHS (PPSDN), UUCP (EUNET, PSTN and PPDSN), and soon SMTP (NSFNET) for the French Research Community.

ES14. Karlsruhe U - This runs R01 at Karlsruhe U. and relays between EUNET (PSTN) and Phonenet (CSNET, PPSDN) for the German research community.

ES15. MADRID POLY- This relays between UUCP (EUNET) and EAN.

ES16. NTA - This runs at Kjeller, and relays between RARE-EAN (PPSDN) and SMTP (ARPANET) for the Norwegian Research Community.

ES17. QZ - This runs R05 at QZ, Stockholm, and relays between KOM and a number of other mail systems including EUNET (PPSDN and PSTN), CSNET (PSTN), and RARE-EAN (PPSDN) for various Research Communities.

ES18. RAL - This relays between GB (JANET) and BSMTP (EARN) for the British Research Community.

ES19. RSRE - This runs R01, and relays between GB and SMTP

(ARPANET)

Research for a particular set of the UK Defence
Community.

ES20. RUNIX - This runs at Trondheim, and relays between BSMTTP
(EARN), Norwegian Internet Mail (UNINETT), RARE-MHS, and
EUNET (PPSDN and PSTN) for the Norwegian Research
Community.

ES21. SUNET - This runs R02 and R04 to relay between SMTP,
EUNET (PPSDN and PSTN) and EARN.

ES22. UCL-CS - This runs R01 at UCL, and relays between GB (JANET
and PPSDN), RARE-MHS (PSTN and PPSDN), and SMTP
(ARPANET).
It is mainly for the UK research community, but most
of the installation for SMTP is now at ES24.

ES23. UKC - This runs R01 at UKC, and relays between GB (JANET,
PPSDN and PSTN) and EUNET (PSTN) for the British
Research Community.

ES24. ULCC - This runs R01 at ULCC, and relays between GB (JANET
and PPSDN), RARE-EAN (to be upgraded shortly to full
X.400), and SMTP (ARPANET, soon NSFNET and PPSDN) for
the British Research Community. The activities of ES18
are closely integrated with those of ES21, and
the facilities can be considered as one for
external purposes.

ES25. Wien - This runs R14 and relays between BSMTTP(EARN) and
X.400 (PPSDN) for the Austrian Research Community.

Again many other sites have some ad-hoc relaying activities. These are the main ones tasked to provide such services.