

## PACCOM '91 Meeting Notes

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The 1991 PACCOM meeting was held on 4 - 7 August 1991 in Hawaii.

### Agenda

The agenda for the meeting was as follows:

Sunday 4th August	1400-1500	Registration.
	1500-1800	US network status.
Monday 5th August	0915-1030	Network status: New Zealand
	1045-1230	Network status: Australia
	1330-1515	Network status: Japan.
	1530-1600	Network status: Hong Kong.
	1600-1730	Network status: Korea
	2015-2200	Meeting on Korean & Japanese connection issues
Tuesday 6th August	0900-1000	Update - NSFNET
	1000-1030	ANS Issues
	1045-1230	ESnet and the NREN
	1330-1500	Cisco technical presentation.
	1515-1615	Wellfleet technical presentation.
	1615-1730	Proteon technical presentation.
Wednesday 7th August	0900-1015	Operational Coordination Issues
	1045-1230	User Services Issues
	1400-1700	Discussion on issues relevant to APCCIRN

### Attendees

The meeting was attended by the following people:

Name	Country	Affiliation	email address
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## **PRESENTATIONS**

### **US presentations**

#### **NASA**

NASA is involved in the Internet (through the NASA Science Network (NSN)) as a service network to NASA's general program communications requirements, and is now also undertaking NREN projects. The NSN is currently an IP and DECnet Phase IV multiprotocol network.

NASA are a strong financial supporter of PACCOM, with an active funding role to support NASA program requirements identified in New Zealand, Australia and Japan. It is likely that by November this year this funding, currently being passed directly from NASA to the University of Hawaii will be passed initially from NASA to the NSF with an attached Statement of Work. It is anticipated that these funds, with additional funding from the NSF will then be passed to the University of Hawaii as a NSF procurement. It is noted that NASA are interested in placing more structure within PACCOM to see it emerge as a clearly identifiable entity with a more formal structure.

As well as a funding involvement within PACCOM, NASA also are involved in links to the Chile observatories, Canada and the 2 joint agency Europe links to the United Kingdom (ULCC "fat pipe") and Germany (ESA "fat pipe").

Domestically the NSI is based on a T1 backbone using Proteon routers with OSPF as the IGP. NASA plan to upgrade this infrastructure to use T3 SMDS services by June 1992. Their intent is to use a T3 infrastructure as a switching fabric with high capacity tail loops connecting to each serviced site. In this way the logical link structure will be provided within the switching fabric as supplied by the telco, and end sites will require a single interface to the carrier's POP.

## Department of Energy

DoE support a multiprotocol backbone with IP, Decnet Phase IV, small scale X.25 and OSI, the Energy Sciences Network (ESnet).

The backbone uses 32 dedicated T1 lines. Additionally ESnet support the multi-agency link to Germany to connect to DASY via the DFN WIN network. ESnet carries 809 network with 85 directly connected sites. some 78% of their traffic is IP, 22% DECnet. Similarly to the NSN ESNet is proposing upgrades to T3 infrastructure as a program commencing by June 92. As a part of this program, and as the DoE component of the NREN ESnet will be commencing Frame Relay tests by the last quarter of this year. With their supportive role within the global HEPnet ESnet have requirements to KEK in Japan and NIFS.

## The National Science Foundation

The third major component of the US backbone network structure is the NSFnet Backbone. This program is now entering the final 12 months of the initial 5 year solicitation, and the program of deployment of T3 infrastructure is now well underway. Some 20% of the NSFnet traffic is now being carried within the T3 fabric, and some 500 networks are now connected to the T3 network or a dual-homed on the T3 and T1 networks. By year end it is anticipated that the T1 links will be decommissioned and all traffic will be switched within the T3 facilities.

## June 1991 International Traffic for the PACCOM members

	#nets	%pkts		%bytes		rank
		in	out	in	out	
USA	1647	90	88	92	83	1
Aus	84	0.98	1.23	0.59	1.8	3
Japan	64	0.24	0.26	0.15	0.37	13
Korea	7	0.11	0.15	0.04	0.25	19
New Zealand	13	0.07	0.08	0.03	0.14	20
Singapore	1	0.05	0.05	0.01	0.13	22

From an Australian perspective the NSF is an important player within the US. As the provider of general infrastructure in the support of scientific research the NSF is currently the prime facility providing transit facilities across the United States, allowing, for example, Pacific traffic entering the US at the West Coast to be switched onto trans-Atlantic links on the East Coast. The NSN plays a backup role to this NSF transit function.

## New Zealand

The meeting was addressed by Ian Forester, the Chief Government Scientist of New Zealand. He described the Foundation for Research Science and Technology, the body which will be placed in the role as the government's funding vehicle for research. This is part of a larger program of taking the DSIR and the research component of the MAF and establishing 10 CRIs as corporate entities which will be funded by both the Foundation as well as gathering together other funding sources for their research activities. Within this overall structure the government has recognised the vital role of communications facilities within the research domain, and has called for the establishment of the National Research Computer Network. This facility is intended to embrace the Universities, national library, research facilities and other similar facilities within a single infrastructure. While there are a number of major reasons for this strong supportive policy position being taken by the NZ government (interaction with the global economy of the future, provisioning the "roads and highways of the future", stimulation of knowledge-based activities, etc), there are a number of critical issues underlying this program which will require careful attention. The most crucial factor appears to be one of funding and leverage. It appears evident that while the NZ governmental position is one of encouragement and support there is no tangible evidence that this is to be translated into direct funding for the program. Instead the government is taking on the role as the host, directing the universities, NZ Telecom, DSIRnet, MAFnet, the National Library and other potential participants to meet together with a common purpose. With such a broad set of interests being represented it will be a challenging task for any group with so many diverse interests to accurately identify and effectively address the issues underlying the broad vision being painted by the Chief Scientist.

The network within New Zealand is comprised of 9.6K and 48K links. As AARnet experience indicates the service provided through the 9.6K links is severely constrained, and while this presents a major problem in broadening the user base there does not appear to be sufficient resources available to address this issue within the context of the University Kawaihiko program.

Each site within the network has purchased their multiprotocol router, and also has purchased a leased line to a neighbour site. Additionally each site purchases a volume-based position on the common link to the US.

## The Pacific Islands

The University of the South Pacific includes the countries Fiji, Cook Islands, Kiribati, Naru, Vanuatu Nauive, Solomon Islands Tokelau Tonga Tuvalu and W Samoa

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The USP is served by a mail only dial up connection to New Zealand, with USP paying the costs of the calls. There is no internal data network within the USP.

## Japan

The progression within Japan has been relatively conventional. The research networking environment commenced using the uucp protocol family in 1984. This was followed by deployment of TCP/IP in 1987 and experimental deployment of OSI protocols in 1990. In general research networking in Japan is research funded, including industry participation on the basis of membership fees. There is no direct government involvement in networking apart from the Ministry of Education's NACSIS program of support for the public universities. The major areas of work include ISDN, character sets, portable/mobile issues and operation technologies.

Within Japan JUNET, the uucp network, now serves some 450 sites after some seven years of operation. The sites include universities as well as other commercial and industry organisations, and, as with other uucp-based networks, the predominate services are mail and news layered above the basic messaging fabric of the network.

The WIDE Internet is an IP network with 53 members. The WIDE project is a research project, investigating distributed computing applications hosted across a wide area testbed network. The internal structure is a 5 site backbone, with NOCs at each of the backbone hub sites. The backbone is currently using 192K trunk lines.

The TISN Internet (Todai Science Network) is a service network for the scientific community. The network supports TCP/IP and DECnet, and operates on a membership fee funding structure. The network design is star-shaped, with the national hub hosted at the University of Tokyo.

The JAIN Internet is Japan's inter public university IP network connects some 16 sites. The network is constructed above X.25 transport links using the Ministry of Education's NACSIS X.25 infrastructure. TISN supports internal links to both WIDE and JAIN. The domain for TISN is *tisn.ad.jp*.

Additionally Japan supports a High Energy Physics DECnet, HEPNET-J, with some 23 sites within Japan.

BITNET-J is also present in Japan, currently using RSCS protocols over dedicated links to some 60 sites. BITNET-J supports international links to Korea and Taiwan, which are also RSCS links.

ICOT and ISR both support dedicated international Internet links into the United States. ICOT is also connected into WIDE, but international link sharing is not a viable option within the current regulatory environment within Japan (although it must be observed that the BITNET-J arrangements are evidence of overt sharing of both domestic and international facilities).

In terms of current activities the Ministry of Education is commencing a program called SINET. This is an IP network backboneed within the 7 "Emperor Universities", within the overall NACSIS program.

To assist in the coordination of this activity the Japan Council of Research Networks (JCRN) was formed in March 1991, together with an associated technical advisory group.

## Hong Kong

Hong Kong has 3 Universities, 2 polytechnics and 1 College. All common communications facilities are funded through the University Polytechnic Grant Committee (UPGC) as the relevant funding body. This body funds the HARNET network. At present the situation with respect to inter-institutional networking is poor. Link infrastructure is based on leased 9.6K links running DECnet. The Chinese University of Hong Kong is installing a 64K IP satellite link to FIX-W as a component of the PACCOM program. This facility provides a much needed upgrade to the 2.4K satellite RSCS links used for a BITNET link to Yale. It should be noted that while the BITNET links are UPGC funded, the IP link is a project of the CUHK.

More developments are expected here, both from within Hong Kong for a better MAN facility, and from the region as a component of restructuring the region into a technology centre for South China.

## Korea

Within Korea there are two major networking facilities. The first of these is the HANA network - a network run from the academic sector which incorporates the older Korean uucp network, SDN. HANA includes a national network of the universities, supporting national IP access. The second is the KREONET network, a research network servicing the research sector. A third grouping, KREN, appears to be the Seoul National University, but this does not appear to have a national network. All three groups are represented within the Academic Network Council of Korea (ANC).

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## ANS

With the growth of the Internet within the United States there have been a number of underlying problems which have been exacerbated by the almost explosive growth in the last few years. The major issue is the role of government funding and commercial enterprise within the Internet domain.

These problems include the issues relating to the mixed type of traffic being carried by the Mid-level (regional) networks. In general a typical profile of a regional network includes a level of participation by industrial and commercial concerns of some 50% of the total membership. This has been brought about by a desire for regional network financial self-sufficiency, which in turn tends to cause the regionals having to then address economies of scale through broadening the membership base.

The second area of concern and problem concerns the role of government funding within the Internet, and the associated conditions of usage of government funded facilities. Within the Internet such constraints on usage of government funded network facilities have been phrased as Acceptable Use policies. Such policies cause a reduced utility of the total network service through restrictive policy, and for a commercial or industrial network member the education and training of staff about the constraints in usage is then an issue.

The third major area is one of leverage of government funds. While NASA and DoE operate networks as a service structure, and as such procure links and equipment through normal procurement channels, the role of the NSF has been subtly different, and the NSF has actively supported programs of procurement in which various commercial partners also invest resources into the project on the expectation that they will derive longer term commercial benefit from so doing. In the case of the NSFnet backbone the commercial partners in the undertaking, MCI and IBM are now looking to provide commercial services based on the Internet through the ANS.

The NSF / ANS arrangements (with the participation of the FARNET and others (incl EDUCOM)) provide for ANS to provide service to MERIT on a not for profit basis, who in turn fulfils a contract to the NSF. ANS reserve the right to add additional clients to the infrastructure to support the expenditure on a for-profit basis, but profit is to be put back in to the research infrastructure.

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**NASA Meeting - Honolulu - 9/8/91**

Present: J Hart (NASA), M Topping & N James (NZ), G Huston & R Erskine (Aus)

The main item of attention by this meeting was that there is a concern relating to the visible lack of a longer term business structure to consolidate the actual operational activities undertaken within PACCOM. These concerns are visible (to varying degrees) both within the partner countries within PACCOM as well as from the US agencies who actively fund PACCOM, although it must be stated that the major concern is a one of the procedures of procurement by the US Federal agencies who contract PACCOM to perform various communications activities on their behalf.

PACCOM currently exists within two structures - as a set of bilateral agreements underlying the joint acquisition of communications facilities and secondly as a communications engineering forum for the Pacific region. Within the area of the bilateral commitments there is a desire to introduce a more formal structure such that both partners within each agreement are fully aware of the requirements placed on the common link.

Within the US agency perspective there is a procurements issue which is becoming a major problem in the eyes of NASA. Normally such a procurement of international half circuits would be performed directly by the NASA communications division (PSCN), and NASA are finding it increasingly difficult to direct funding to the University of Hawaii as a procurement of communications capabilities. The alternative being implemented by NASA is to pass the funding (some \$400K p.a.) to the NSF, together with a Statement of Work. It is anticipated that these funds, together with an additional \$100K p.a. from the NSF would be passed to the University of Hawaii with a similar Statement of Work and associated reporting commitments.

It was requested to have the NSF Statement of Work to be an open document which would be "matched" against similar statements of work from the various national network partners. The intent is to ensure a visibility of reporting structure

The meeting discussed the feasibility of the formation of some form of "executive committee" to formalize and cement the basis of PACCOM, such that it continues to meet the various US agency and international networking requirements on a year by year basis of commitment.