

THE PAST, THE PRESENT AND THE FUTURE OF QUESTNET/AARNET

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When I first suggested the subject of my presentation, I was very concerned about the future role of QUESTNet and more particularly the extension of the Internet in Queensland to reach out beyond universities to other areas - secondary schools, technical and continuing education, business and industry, government and community activities - and for Internet to serve the State's regional areas.

It was my intention to endeavour to survey these needs and suggest areas for advancement. Fortunately, an important member of QUESTNet other than the Queensland Universities is the State Government Department of Business Industry and Regional Development (DBIRD). It was suggested by our QUESTNet representative from DBIRD that a consultancy should be funded to carry out an independent and detailed study and I am happy to announce that Ms Marion Pender was selected to carry out this assignment. Thus, it would not be appropriate to preempt Marion's investigations and perhaps the substance of my proposed paper disappears.

I should, at once, return to Marion's consultancy and urge anyone who has a view on the future development of the IP network in Queensland through QUESTNet to contact her.

The QUESTNet

Having been associated with Data Communications in Australia and served on a number of international networking committees since 1963, it was suggested I should provide a historical perspective. But to recall some half dozen filing cabinets of minutes and working papers is something perhaps for my retirement or preferably for a research student - boating, fishing and sculpture being at a higher preference for me.

Nevertheless, in the context of QUESTNet/AARNet, I will try to cover - the Past, the Present and the Future.

In 1986, the Queensland Universities promoted the idea of SPEARNet (the South Pacific Education and Research Network). The first interim Management Committee formed under the auspices of the Australian and New Zealand Computer Centre Directors was held on 30 May 1986. It is interesting to note the objectives of SPEARNet:

- (a) To create a computer based communications network for the education and research community in the South Pacific Region which has access to similar networks in other countries;
- (b) To enhance the quality of teaching and research by providing an economic and convenient method for timely exchange of information and ideas. The types of facilities to be available to users would include -
 - . Virtual terminal access to remote systems and services

- . File transfer, access and manipulation
- . Electronic mail with features such as conferencing, bulletin boards and subscription news
- . Remote job entry and remote process execution.

It was recommended then (in 1986) that the Coloured Book protocols developed by the Joint Network Team in the United Kingdom be adopted as the main protocols but it was expected that a move would be made to appropriate implementations of ISO OSI protocols as soon as was practicable. The first SPEARNet workshop was held at the University of Queensland in February 1987. Representatives from 19 of the then 21 Australian Universities attended the workshop as well as presentatives from CSIRO, New Zealand Universities, Digital Equipment Corporation and IBM.

It was clear also that the project and the financial commitment required was bigger than resources and authority available to Computer Centre Directors. As a result of their representations, the Australian Vice-Chancellors' Committee (AVCC) established a Working Party on Networking Policy in January 1987.

There were numerous reports considered by the Joint Working Party later the AARNet Steering Committee (the name SPEARNet was not favoured). In May 1987 Emeritus Professor A S Carrington prepared a report to the AVCC on Networking of Computers and Telecommunications in Australian Universities and Other Tertiary Institutions. Dr Brian Carss was seconded

to the Steering Committee for six months to act as Executive Officer to the Steering Committee. The Carss Report was notable for the amount of traffic it generated on the network. It certainly stirred debate. One area of criticism was a recommendation for 2Mbps links rather than 48Kbps links. There were numerous reports and comments from just about everyone with some interest in the network.

In 1988 the AVCC and the Australian ACDP allocated \$160,100 for the initial planning, development and establishment of the network and the appointment of a technical manager who commenced work on 1.3.89. Geoff Huston's contribution and achievements since that date are well known to all of you.

In May 1989, the AARNet Steering Committee made a major submission to the AVCC and ACDP called simply Progress Report. The network was to be a national backbone connecting a number of regional networks. The protocol stacks to be supported were ISO OSI, TCP/IP and DECnet. The proposals were costed in detail. This submission was accepted by all members of the AVCC and the ACDP.

It was truly a remarkable achievement that without any promise of Government funding assistance, all representatives of Universities and the then Colleges of Advanced Education and CSIRO agreed on the network topology, the protocol stacks to be used and agreed to fund a national academic and research network.

In recalling this, I would like you to be aware of the outstanding contribution of Professor Ken McKinnon, the then Vice-Chancellor of the University of Wollongong, and Chair of the Steering Committee. He provided leadership, a willingness to be informed of the technical problems and enthusiasm in the advocacy of the proposal. I have no doubt that without his dedicated involvement and negotiating skills, AARNet would not have been established on a firm basis which allowed its rapid implementation.

Another factor contributing to the successful development of AARNet was the networking expertise that had been built up in the Universities and CSIRO during the 1980s. They were committed people, the true believers, who developed regional networks and who contributed to the debate, to the technical reports and cooperated with the AARNet technical group (which then consisted of Geoff Huston and Peter Elford) to bring AARNet into existence.

The AARNet Steering Committee was renamed the AARNet Advisory Board and later became the AARNet Board of Management.

AARNet commenced operations in mid 1990 and in four years has grown to 100,000 connected hosts.

The Queensland Tertiary Institutions Network (QTInet) was established around the early 1980s. I must say it also is typified by name changes. Its name changed to QARN in late

1989 and to QUESTNet in late 1990 or early 1991. QUESTNet was the name for the Queensland Education Science and Technology Network and was invented somewhere in the State Government Department of Business Industry and Regional Development (DBIRD). DBIRD have a representative on the QUESTnet Management Committee and have made significant financial contribution to the development of QUESTNet.

Much of the history of networking in Queensland is associated with that of the development of AARNet. Perhaps it is useful to note that in May 1988, the status of QTInet was that Griffith University (2Mbps) and the Queensland University of Technology (9.6Kbps) had direct links to the University of Queensland and the University of Southern Queensland had a link on order. The six Queensland Universities (some were then Colleges of Advanced Education) were connected to Telecom Australia's "Austpac" servicing.

All were Coloured Book sites (the UK JNT protocols) and all but two were ACSnet sites (a store and forward messaging system developed and managed by the University of Sydney). Before leaving the history of Queensland Networking, I should pay a particular tribute to my colleague, Graham Rees.

He is a first class networking engineer who has been a major driving force behind not only QTInet and QUESTNet but also he contributed to the development of the national system, initially through SPEARNet (indeed he invented the name) and later AARNet.

THE PRESENT

So much for the past, we should move to the present.

The most significant issues of the present relate to a period of uncertainty and instability over the past twelve months covering matters of policy in respect to the forward development of AARNet. In particular, I refer to -

- . The conditions of affiliate membership of AARNet
- . The proposal by the AVCC to introduce volume based charging
- . The proposed upgrades to the national backbone tail loops and the international link
- . The ASTEC study into Research Data Networks
- . The Research Data Network Cooperative Research Centre's proposed Experimental Broadband Network.

Conditions of Affiliate Membership of AARNet

Originally the concept of affiliated membership was to recognise the special relationship with Universities of some external groups particularly those involved in joint research projects with Universities.

The affiliated member was to be sponsored by a member institution. In practice, there developed a fairly wide interpretation of eligibility for affiliated membership although up until recently commercial use was not considered to be appropriate.

Earlier this year, AARNet decided to implement an open access policy allowing any entity to connect to the network. The

Conditions of Use and Acceptable Use Policy will therefore be replaced by a Terms and Conditions document. I am not aware if this document has yet been issued.

The AVCC Inc. continues to state that AARNet is a private network owned by the AVCC Inc. It is difficult to reconcile this with a public access policy but we must assume the legal and contractual requirements have been covered.

Some may view the open access policy as detracting from the primary purpose of the network to serve research, teaching and learning. Some may feel that such an important infrastructure should be available to support Australian business and industry. Some may have concern that it will be the first stage of a sell off of AARNet to commercial interests. The University and CSIRO traffic will dominate the network, but the number of public entities using the network will far outnumber the Universities and some fear that inevitably the management and organisation will change to favour the external users.

Volume Based Charging

In the April 1989 Meeting of the AARNet Steering Committee one member commented that the AVCC should be aware that it would be difficult to introduce charging to end users based on usage. The current AARNet proposal to introduce a volume based charging regime demonstrates these difficulties and introduces another major area of uncertainty. AARNet's

proposal to have the same charge for members and affiliated based on a low fixed fee and a volume charge for international traffic and national traffic was rejected by the AVCC. Apparently, the AVCC felt the original developers and owners of the network should receive some privilege (and indeed there has been and continues to be a great deal of non-costed work performed by Universities to improve AARNet and the services on it). The AVCC required further information on charging for three options of - received, sent and both-ways traffic. For budgetting purposes the AVCC would like some system which places a cap on expenditure. Well, we do not know the results of this review and instability will continue for some months.

It seems to me that from a University and CSIRO point of view, some fine tuning of the existing annual subscription system would be appropriate. The real problem of charging relates to usage beyond the private network partners to open access by the public at large where a precise and verifiable system would be required.

Proposed Upgrades

There has been some delay in making certain of the availability of the proposed Federal Government Funds to upgrade the national backbone to 10Mbps and loops linking major Universities to regional hubs to 34Mbps and higher. The filibustering by Telecom Australia as to whether ATM systems could be provided as a solution has not helped. Nevertheless, the funds are now apparently in place and an RFI has been issued.

The ASTEC Study into Research Data Networks

A draft discussion report was issued by ASTEC a few months ago. It did not appear to be well received but it could be said that it achieved its objective of encouraging debate and input to the ASTEC Committee. We can only await the final report which is aimed at providing the Federal Government with recommendations on the future development of data networks to support Australian Research.

The RDN/CRC

As the proposed Telecom Australia contribution of an Experimental Broadband Network (EBN) is no longer experimental, one must ponder the future of this CRC from the viewpoint of establishing its own network. There would appear to be other options available through AARNet to provide bandwidth to enable the cooperative Research Centre to work on advanced information systems associated with high bandwidth data communications networks.

THE FUTURE

It would be comforting to hope that a resolution of these present uncertainties will promote a sound basis for the future development of AARNet and Internet generally in Australia.

I do not believe this will occur until we tackle the program of

regional need. When the purpose of AARNet was defined in May 1989 it was to provide a national backbone to connect regional networks. The States of Australia are different in size, population distribution, type of industry, climate, style of government and so on. Our network must now reach out meaningfully to areas beyond our University cities and provide services to enrich our people and develop our resources wherever they are located.

There is a need for a central AARNet Management Board to establish network standards, to plan and operate the national backbone and the international link and to ensure there is a coherent approach to the provision of national services on the network. But there are no representatives on the AARNet Board who speak for the regions. Thus, there is no formal basis for the AARNet Board to recognise the needs and aspirations of these regions.

The problem of implementing volume charging would be simplified if AARNet charged each region for services. It could be said that this passes the problem on to the regions but the distribution of the charge may require different and more appropriate mechanisms in each State. AARNet Management have not judged it appropriate to include the regional based model as one of its charging options. *WILL NOW DO THIS*

Whilst there could be philosophical debate on the issue of an open access policy for AARNet, it is not clear how AARNet intends to manage such a policy. AARNet wishes to maintain a

low annual fixed fee for affiliates with the aim of encouraging a larger number of small business users. It is not clear how such users are to be provided with connectivity and services without the involvement of member institutions in each region.

You will recognise my bias but the only sensible model is one where all affiliates are affiliates of member institutions, where AARNet charges regions for backbone traffic, international traffic and the provision of common services and one where regional interests are represented on the AARNet Board.

A number of Universities in Australia are moving ahead to implement ATM switching capability within their own local area networks. It would seem therefore that the most appropriate action to advance the RDN/CRC would be for Telecom Australia in cooperation with AARNet to place similar capability in the AARNet regional hubs and to upgrade tail loops to such institutions as can demonstrate high bandwidth need. This would provide a real rather than experimental network for the RDN/CRC to develop advanced services appropriate to a broadband network. This strategy also may meet the needs of the ASTEC Committee on Research Data Networks as perceived from their first draft Report.

In my address "QUESTNet/AARNet and University Transformation" at the 1993 QUESTNet Winter Workshop in Rockhampton, I concluded that QUESTNet should deal with issues to advance

the use of the Internet in the interests of the State of Queensland. This suggested that the QUESTNet Management Committee should include representatives covering a wider area of activity than it does now. I am still of this view. But, if such an approach is the best option for planning, managing and operating the Queensland region of the Internet, it will develop out of Marion Pender's consulting report on the future of QUESTNet. Again, I urge you to contact Marion if you wish to make a comment on any aspect of QUESTNet.

I thank you and I hope that you will continue to enjoy the QUESTNet Winter Workshop and attend the 1995 Workshop which will be held on the Gold Coast.
