```
From:     IN%"ONEILL@applelink.apple.COM" 15-OCT-1992 13:15:58.21
To:       CCDIRECTORS-OZ@AARNET.EDU.AU
CC:
Subj:     AARNet Futures Working Paper
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Hi,

Here is an Working Paper which I have been asked to forward to you all.

Regards,
John

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Item      6012385                      14-Oct-92          12:47

From:     CLARCOMM@DURRAS.ANU.EDU.AU@INTERNET#

To:       ONEILL                       Aust-John O'Neill, Snr SE Education

INTERNET# Document Id: <9210140447.AA18026@fac.anu.edu.au>
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Sub:    Narrow Bandwidth Working Paper

From: clarcomm@durras.anu.edu.au (Roger Clarke)
Subject: Narrow Bandwidth Working Paper
To: oneill@applelink.apple.com
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G'day John

Thanks for your time on Monday. Here follows an ASCII version of the paper
which I would be delighted if you could distribute to delegates
immediately, and to any other mailing lists which contain relevant people.

I'll send straight afterwards an empty message with an attached MSWord 4.0
version of the same thing.

Regards ... Roger

Working Paper
14 October 1992

NARROW BANDWIDTH APPLICATIONS
Working Group of the RDN-CRC

ACT NOW IF YOU WANT RESEARCH FUNDING
DIRECTED TO NARROW BANDWIDTH APPLICATIONS
FOR AUSTRALIAN RESEARCHERS

Summary

The Minister for Science has earmarked funds for the enhancement of the
Australian Academic Research Network (AARNet). It now appears that a
significant proportion of those funds is to be committed to research into high
bandwidth applications. This will benefit the (admittedly very worthy) 'high
science' research area, but do little or nothing for the majority of the
research community.

This working document is for distribution to interested parties, including
delegates to the Apple University Consortium / Major Education Accounts seminar

in Sydney this week. Its purpose is to invite parties to bring constructive
pressure to bear on the Department of Science, the emerging research
consortium, and such suppliers as Apple, such that investment in narrow
bandwidth matters will be incorporated into the research proposals.

Contacts

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Background

In the last Budget, the Minister for Science announced the provision of funding to enhance AARNet. It has subsequently become apparent that some of these funds are to be invested not in AARNet itself, but in research into AARNet-related matters. The mechanism whereby the research is to be undertaken is a Cooperative Research Centre (CRC) focussing on Research Data Networks (RDN). This means that industry partners have to be found to provide cash and/or kind contributions into the programme.

The front-running consortium includes Telecom Research Laboratories, IBM, CSIRO DIT and ACCI. It gives every appearance to being strongly oriented toward high-bandwidth links, synchronised multi-media, graphical tools to support visualisation, and research into using such high-tech tools to better support high-science.

No-one would argue that such aims are not important. Some people are, however, concerned that the consortium is focussed on the needs of 'high science' at the expense of the vast majority of researchers in Australia, and that research into narrow bandwidth uses is complementary to that into high bandwidth matters, and should be incorporated into the CRC's programme. This working document contains a discussion of these issues.

Factors Requiring Consideration

Researchers are a highly diverse group of people, and need access to highly diverse services, via highly diverse workstations located in many different locations, and over highly diverse links. In particular:

o many researchers spend, and for many years yet will continue to spend, at least some of their time out of reach of high-bandwidth connections, e.g. at home, in the country and on the move;

o many people whose workplace is not in conventional research institutions nonetheless are researchers or contribute to research, and need access to research-related network services;

o many researchers are still not networked, and have very limited funding to enable them to gain access; hence the RDN must have low-cost (and correspondingly low-capability) access alternatives as well as the high-capability ones which 'high-science' needs and has the resources to acquire;

o a great deal of research-related communication does not require particularly high bandwidth; for example, multi-media e-mail and synchronous (video-less) conversational facilities;

o research-related services must be easily learnable and usable, irrespective of the bandwidth of the spur on which the user is currently working. This implies a need for service integration, consistency and transparence an order of magnitude better than that currently available;

o all services should be accessible from all workstations (albeit in degraded form in some circumstances), irrespective of the bandwidth of the spur on which the user is currently working and the workstation brand and capabilities;

o research-related services must offer a professional level of reliability and security, irrespective of the bandwidth of the spur on which the user is currently working;

o the network must play at least some role in enabling access by non-researchers to research-derived and -related data, and in one model could be the means not only of researcher access, but also of business, and even public access.

A considerable amount of benefit to the research community should be able to be drawn from the experience of alternative and populist movements such as Gnu, the Electronic Frontier Foundation (EFF), the ISODE consortium, Pegasus (which claims 20 research institutions among its users), Cleveland Freenet and various other prototypes in California and elsewhere.

Possible Research Sub-Programmes

It could be easily assumed that narrow bandwidth services are already being satisfactorily delivered, or soon will be, and that they are no longer in need of research . Such an assumption would be wrong, however.

There is a wide variety of services, including asynchronous communications between and among researchers (such as text-only email, attached-document email, compound-document email, news, conferences, document annotation, etc.); synchronous communications between and among researchers (such as text-only chat, multi-window chat, multi-media chat, viedo-conferencing, etc.); data access (including statistical tables, library catalogues, full-text retrieval, multi-media retrieval, etc.); electronic publishing (such as capture of data into machine-readable form, notification of new publications, etc.); support services (such as network management, directories, document and message location, process server location, etc.); and distance education to provide all researchers with the capability to use these services.

There are many uncertainties as to how these many services should be conceived, designed, integrated and delivered. Even in those cases where the technical research has been completed, there is a need for a set of integrated research sub-programmes to define the integrative architecture and determine the priorities for implementation. Among the many potential research questions are the following:

 o researcher needs
    What do researchers do? Who they are employed by? Where do they work? Wha are their data sources? What awareness do they have of current and emerging services? What kinds of communications needs do they perceive themselves to have? What payback to they perceive from their use? A target for this research sub-programme would be the specification of a researcher workbench, comprising a generic architecture and specific discipline variants. Because it addresses such a large market, the results of this research should be readily commercialisable and exportable;

 o the outreach function of the research network
    In order to achieve articulation, corporations and individuals must be attracted into contact with the research community, becoming aware not only of research results and research specialities, but also of work-in-progress. How can appropriate sub-sets of research-related services be extended beyond the narrowly-defined research community, including narrow bandwidth connections in private industry, in government agencies, in homes, at remote locations, and on the move. This sub-programme should have spin-off benefits for small business, education and consumerism;

 o discovery mechanisms
    Identifying individuals, institutions and programmes, and establishing communication with them continues to be seriously problematical. Do existing directory standards meet the needs of researchers? What changes are needed? Why are services based on these standards not being delivered?

 o user-friendly services
     How can services be offered on multiple workstation platforms providing?Ho can consistent and intuitive interfaces be offered on the wide range of different workstation types and network linkages which will be used by researchers in the future?

 o the research and adoption processes
    What institutional barriers exist which slow down research into, development of and adoption of services relavent to researchers? Why don't researchers find the use of these services as natural as television, microwave ovens, VCRs,

faxes?   How can the barriers to adoption be overcome?

Aims of the Working Group

To serve the needs of the broad community of researchers, it is important that the RDN-CRC complement its support for and research on high-bandwidth matters with activities related to achieving high levels of accessibility to and usability of research-related services. This implies support for and research into low-bandwidth capabilities as well, to enable low-cost access from a wide variety of locations by a wide variety of researchers.

The Working Group urges all interested parties to bring constructive pressure to bear on the Office of the Chief Scientist, the consortium members, and IT companies with an interest in the area, in order to ensure that the CRC includes a segment aimed at Public Connectivity for Research.

Caveat

This is a working document which has not yet been ratified by the Working Group as a whole. Because of the extreme urgency of the matter, it is being published in its present form.

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14 October 1992