AV-CC

Australian Vice-Chancellors' Committee

(INCORPORATED IN THE A.C.T.)

Ref: AVCC/AARNET/122/90
20 December 1990

AVCC Memorandum
To: J. Mullarvey
From: G. Huston

AARNet Backbone Upgrade

During the later half of 1990, considerable effort has been put into examining two alternative methods of implementing a bandwidth upgrade of the AARNet backbone. The two alternatives are

a) Megalink - a 2Mb service that has been available for some years, and

b) ISDN - a multiple 64K service that has only recently been introduced.

In memo AARNET/AVCC/89/90 (11th October) it was argued that a Megalink solution be adopted because of marginal cost savings and the unproven nature of the ISDN service and related third party equipment. Following a presentation by Telecom on 23rd October, where a much more detailed analysis and summary of the ISDN offering was made it was recommended to the AARNet Advisory Board that a solution based on ISDN be adopted.

Since that recommendation, AARNet Operations staff have been liaising with Telecom engineers to further refine the original proposal. During this period, significant new information has come to light regarding the functionality and performance of the ISDN Macrolink service and in particular the Nx64K multiplexor equipment. The most significant discovery is that the highest speed supported by the currently available Nx64K interface is 384K. This is both inconsistent with information with data provided by Telecom on several occasions and counter to AARNet's refined proposal to provide 512K between Melbourne and Sydney by March 1991. It is expected that this limitation will be removed by hardware enhancements due to be delivered for initial field testing in April 1991 (there is no commitment date for actual availability of this equipment).

Furthermore, it has been revealed that the total throughput of the current Nx64K multiplexor is limited to 2Mb per second. This means that when additional ISDN links are added to the backbone in July 1991 (as forecast) it will be necessary to replace the the existing unit with an enhanced model with a throughput of 8Mb. This new model is not expected to be available until June 1991 at the earliest.

Finally, recent reports indicate that some of the characteristics of the ISDN network are not appropriate to the requirements of the Nx64K multiplexors. These problems, related to multiple circuits being routed separately through Telecom's internal network, result in data loss and loss of Nx64K synchronization.

In Telecom's original proposal the interface equipment was to be sourced from two different suppliers because neither supplier could provide the both an interface to the ISDN network (provided by the Jtec Macrospan) and the Nx64K multiplexor functions (provided by the Summit Technologies S2000). Both vendors believe they will be able to deliver both functions in a single unit possibly by March-April 1991, but certainly not before that date.

The success of the AARNet project to date has been in large part attributable to the fact that it has utilized off-the-shelf, proven and proven technology. As a result of this new information the Telecom ISDN proposal is

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a) Not off-the-shelf
- a single unit cannot provided the functionality required (ISDN interface and Nx64K)
- unable to deliver speeds greater than 1.96Mb
- throughput is inadequate for planned growth

b) Not proven
- Telecom have not provided us with any reference sites that have implemented a similar solution
- the interface products are quite clearly still undergoing considerable development (the Summit S2000 brochure for example reflects a product that might exist in June 1991)

c) Not standard
- the Austel standard for Nx64K interoperability is expected to be available in February 1991.

As noted above, the original concerns with an ISDN solution were based on our belief that this technology was unproven and likely to suffer teething problems. Telecom's October proposal to provide an end-to-end service was sufficiently convincing that these fears were allayed. However, as the ISDN proposal was refined, and the details examined the information presented in this memo has only rekindled and exacerbated our concerns.

It is now the opinion of the AARNet Technical section that there is sufficient uncertainty and risk with the ISDN based proposal that the introduction of ISDN services into the AARNet data network be delayed until, at least the middle of 1991. The need to upgrade the capacity along the Eastern seaboard remains, and thus I wish to recommend that the AVCC proceed with an order for Telecom Megalink services from Melbourne to Canberra and Canberra to Sydney to address the requirements for additional capacity in this area.

As shown in memo AARNET/AVCC/89/90 (attached) Megalink is actually cheaper than ISDN for these trunk links, largely because of the high rental costs of the ISDN interface equipment.

Note however that the decision to recommend the Megalink services is a purely technical one based on the general comment that as of the start of 1991, ISDN is still a technology which has not been proven as a reliable and effective carrier service for the aplication intended by AARnet.

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11 October 1990

AVCC Memorandum
From: *G. Huston*
To: *T. J. Mullarvey*

High Capacity Trunk Links for AARNet

This memorandum documents the situation with respect to the provision of additional capacity for AARNet between the Regional Hub sites of Melbourne, Canberra and Sydney.

As you are aware, our continued efforts to prompt Telecom Australia to provide us with detailed information relating to our options in the provision of this bandwidth have been largely unsuccessful, and there appears to be little real commitment on the part of Telecom's Corporate Customer Division to address our stated requirements with any more than basic Telecom services.

The the options available to AARNet are to:

1. Purchase Megalink services from Telecom as per our original forecasts and prepared budgets

2. Purchase ISDN services from Telecom, and ancilliary equipment from other suppliers.

The cost summary is as follows:

		Year 1	Year 2
Megalink	Installation	$ 70,536	
	Rental	$228,756	$228,756
Modem	Purchase	$ 16,000	
		$315,292	**$228,756**
ISDN	Installation	$ 12,000	
	Rental	$264,648	$264,648
Mux	Purchase	$ 47,699	
		$324,347	**$264,648**

Additionally there are real concerns regarding the reliability of the ISDN proposal in terms of the capability of the configuration to provide the required services, as the proposed use of n x 64K channel aggregation is essentially an unproved form of usage of this service with little in terms of support structures in place as yet.

Accordingly, due to the cost advantage and proven technology for this application it is recommended that the AVCC purchase the required Megalink services to implement the connection requirements.

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In terms of implementation details, the Megalink contract will be for an initial period of two years from installation. Installation may take up to 16 weeks from recept of order. Thus if the AVCC orders two links in October, the links will be available for use at the tart of the 1991 academic year in February 1991.

It is proposed that in this case the two 48K DDS links between the three centres remain in place until at least July 1991 as backup facilities to the Megalink connection. We will need to spend a period evaluation the reliability and average servicer response time of Telecom before decommissioning these links.

As you are aware we would still like to trial ISDN services within AARNet, as this is considered a cost effective transport medium as the engineering matures over the next year or two. However it is considered a more reasonable proposal to trail such services in a more controlled environment where considerations of availability are not as crucial to the overall useability of AARNet by member institutions.