AV-CC

Australian Vice-Chancellors' Committee

(INCORPORATED IN THE A.C.T.)

Ref: AVCC/AARNET/14/90
11 February 1991

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

Re: AARNet - Melbourne Links

I refer to my previous memorandum of the 19th December on this matter.

I have now had the opportunity to discuss part of this material with Stephen Derrick, the Executive Director of the Strategic Research Foundation of Victoria (SRF). As I understand the current situation the SRF is a catalyst in the formation of a number of research institutes, to be located in Victoria.

The formation of the Institutes has lead to the revival of the proposals to install high capacity connection in the Melbourne area, similar to those evaluated in 1990 by AARNet, but on a smaller scope.

At this stage the SRF is proposing the installation of two 10Mbps links, one between the University of Melbourne and the Biomolecular Research Institute on Royal Parade, and a second between the University of Melbourne and the CSIRO / Leading Edge Joint Supercomputer Facility, located at Port Melbourne. Such links are evidently to be funded by the various participants in these projects.

The original proposal included high speed links extending from the University of Melbourne to LaTrobe University and Monash University. I understand that these links are no longer part of any SRF proposals.

Therefore the proposal outlined in my previous memo to connect Monash University / CSIRO Clayton to the AARNet Victorian Regional hub with a high speed connection would initially involve CSIRO, AARNet and Monash University as the three initial participants in detailed discussions regarding such a link. For this reason I would suggest that the memorandum be forwarded to the AARNet Advisory Board for comment at their next meeting.

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AVCC Memorandum
From: Geoff Huston AARNet
To: John Mullarvey, Deputy Secretary, AVCC
               Greg Batchelor, General Manager,
                    Management Information Systems,
                    CSIRO

Re: AARNet Links - Melbourne Metro Region

This memo is the first memo examining the current situation with respect to AARNet tail end links, examining the situation within the Victorian Regional Network. The intent of these examinations is to isolate critical points in the overall topology of AARNet where backbone and/or tail end links are within a situation of effective saturation, or likely to saturate within the next 12 months.

The AARNet link usage graph of the most recent week, (ending 16 December 1990) is attached to this report. The utilization report is based on the link topology indicated in Figure 1 (overleaf).

The conclusions drawn from this (and previous usage reports) is that the link between the Victorian Regional Hub and Clayton (Monash University) is now reaching levels of high line utilization within current usage patterns. This link is now the most heavily utilised tail end link within AARNet, and is the fourth most saturated link overall (following the USA, New South Wales and ACT) in terms of usage vs available capacity.

There are a number of additional factors entering the situation as of 1991 relevant to the Clayton link:

Greg Batchelor has informed me that the Strategic Research Foundation of Victoria now has indicated its willingness to fund a 10Mbps microwave connection between the CSIRO Joint Supercomputer Facility (JSF) (managed by Leading Edge) and the AARNet Regional Hub, and I understand that the preferred position of CSIRO and the SRF is that AARNet manage this link as per the details outlined in my previous memorandum on this subject earlier this year. Placing this high capacity link between the hub and the CSIRO JSF will in turn create additional traffic implications for AARNet, many of which are concentrated at the Clayton sites.

The Clayton area contains CSIRO facilities as well as Monash University. During 1990 a 10Mbps fibre connection has been established between these two sites, providing to both sites shared access to the AARNet 48K DDS tail. Additionally the CSIRO Clayton site is connected (via a variable capacity circuit switched from a 2Mbps Megalink bearer) to CSIRO Canberra (Ainslie) and from there to CSIRO Sydney (North Ryde). To complete the picture CSIRO Sydney (North Ryde) is connected via a 48K DDS circuit to the NSW Regional Hub.

CSIRO indicate that CSIRO traffic levels across the Clayton line will increase substantially in the coming levels, and it is highly likely that this will be compounded by significantly increased Monash University traffic levels with increased traffic directed toward the JSF site as well as the ANU computing facilities.
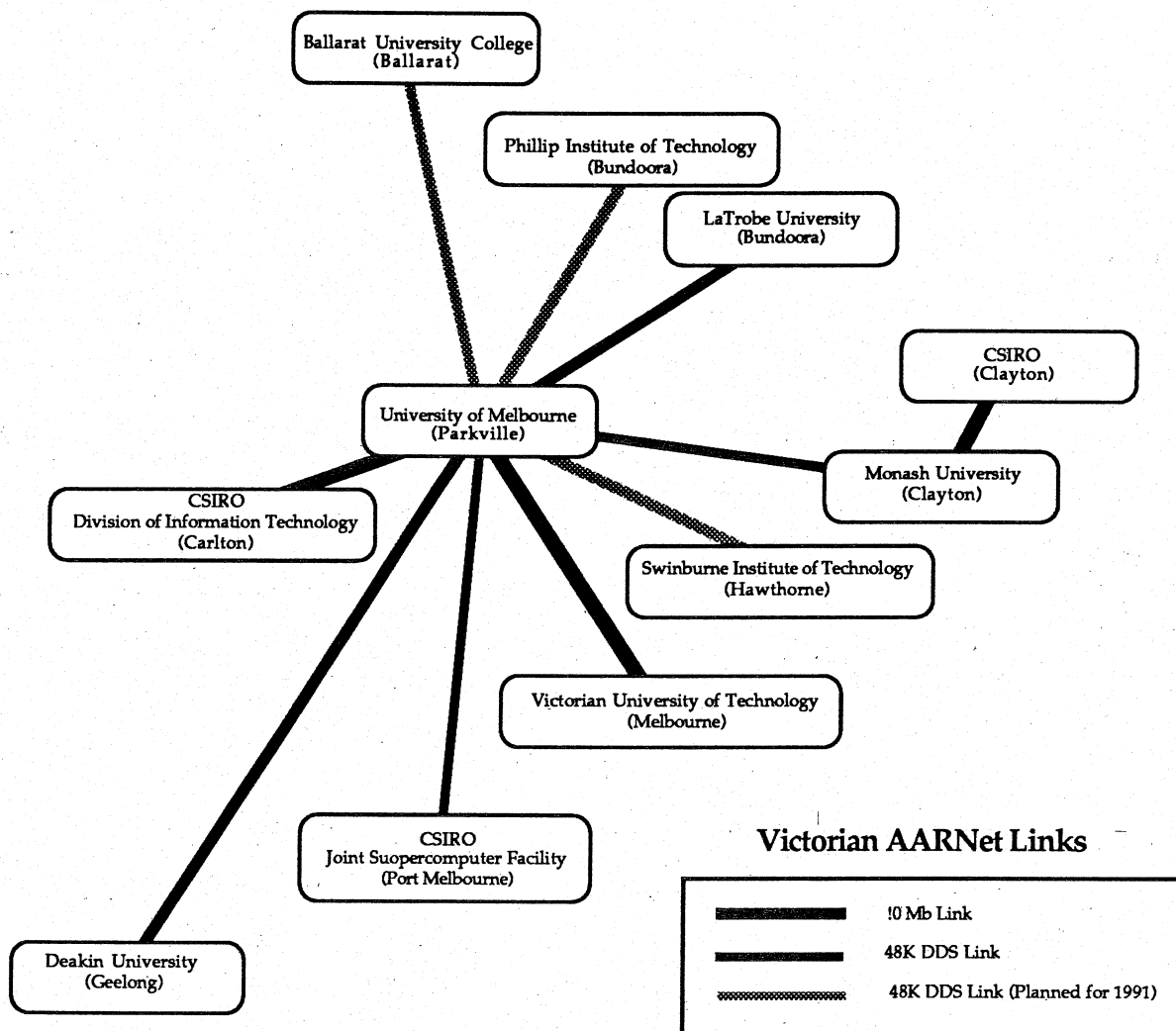
Figure 1 - Victorian AARNet Links - December 1990

There are a number of mechanisms by which additional capacity can be placed into the Clayton link. The most reasonable technology in terms of implementation is a Telecom Megalink service. Other potential solutions include microwave technology (there is a high capital cost component, and the long distance involved makes rain cell factors critical to reliability considerations of microwave, although previous studies did indicate that this approach was considered feasible), and Telecom ISDN technology (currently available equipment limits capacity to 384Kbps, and there are still a number of outstanding questions as to the suitability of this approach within AARNet).

Comms Service	Capacity	Capital Cost	Recurrent Cost	First Year Cost
48K DDS	48K	2,900	12,984	15,884
Megalink	2,048K	13,742	43,428	57,170
Microwave	2,048K	75,000	7,200	82,200

Table 1 - Relative costs of Communications Services

Table 1 gives the relative costs of the various available technologies and the resultant link capacity. From these figures it is suggested that the Megalink service would offer a suitable service at reasonable cost and acceptable reliability.

Greg Batchelor has indicated to me that CSIRO would be willing to fund some proportion of the costs of increased capacity of this link. At this stage, assuming a Megalink connection, the annual total cost increase on this link is some $30,444, and there is a single installation charge of $13,742 (which includes costs of relevant modems).

Under some form of cost sharing of a 2Mbps service service between Clayton and the Victorian Regional Hub, a Megalink service offers the appropriate network capacity on the most critical of the Victorian Regional links at a reasonable cost to the both AARNet and CSIRO. All other Victorian links do not appear to be in a position to present capacity problems during 1991 (as far as can be foreseen of course).

The resultant picture of Regional Connections would be as indicated in Figure 2.
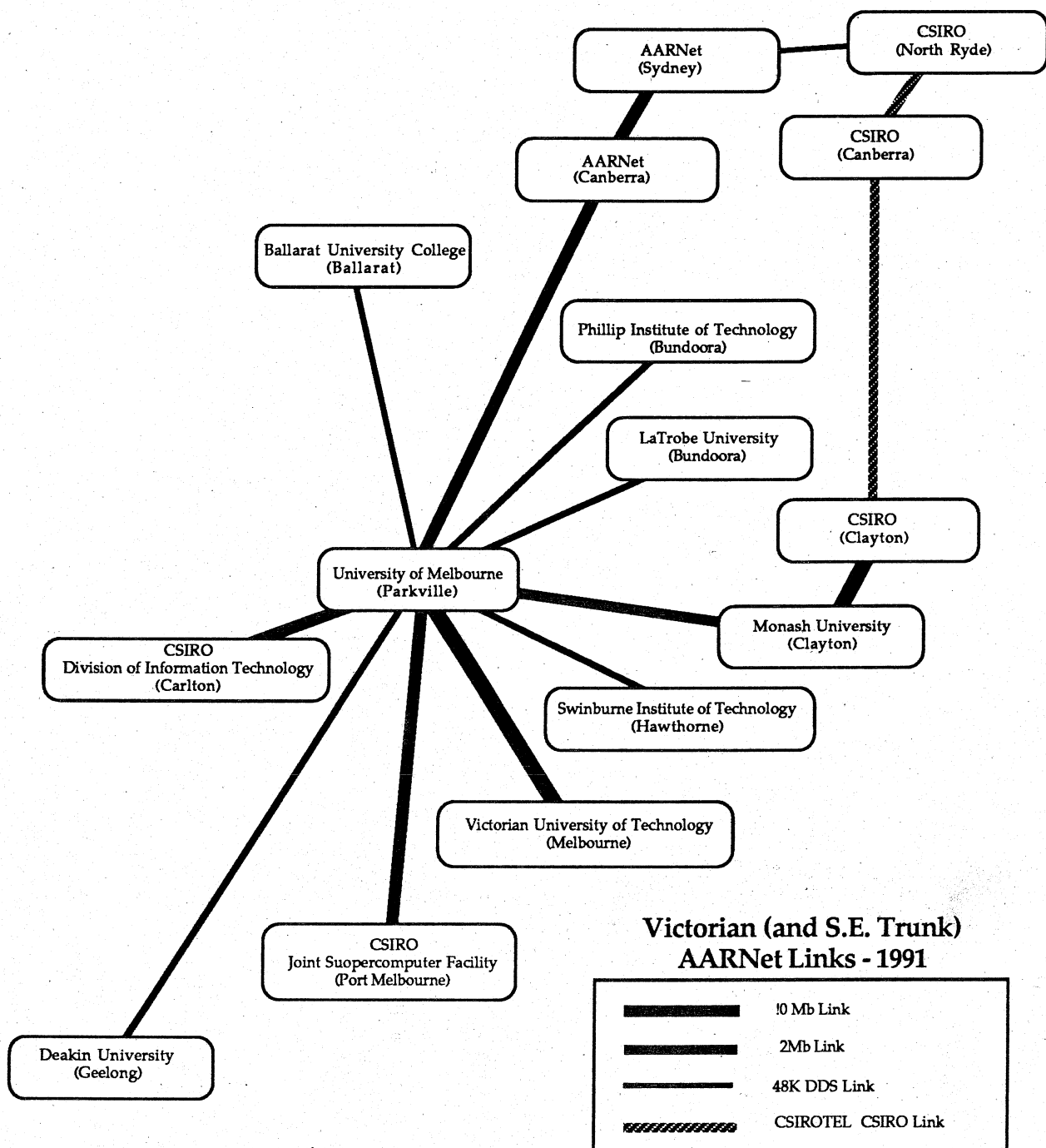
Figure 2 - Victorian (and S.E. Trunk) AARNet Links - 1991

Traffic over Monash Link over last 10 weeks - Bytes/Sec

Week Ending 9th December, 1990
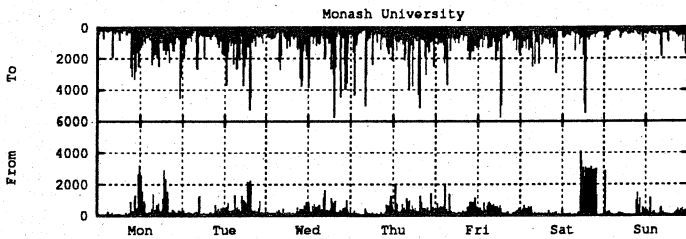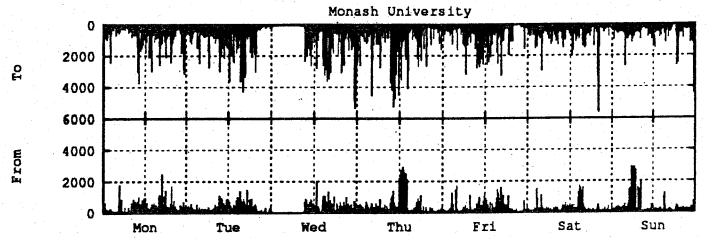
Monash University
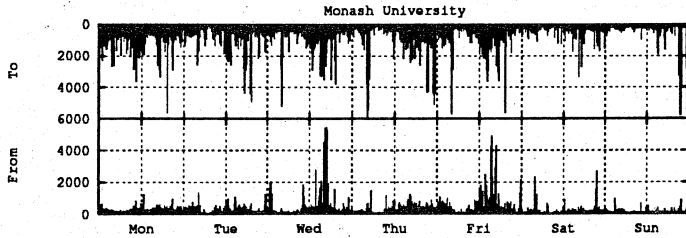
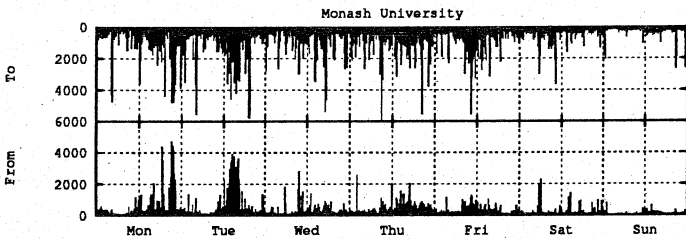### Week Ending 13th January, 1991

Monash University
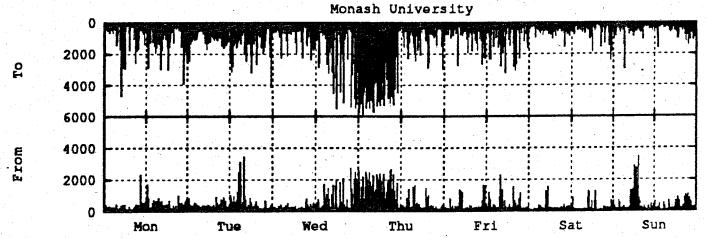
Week Ending 16th December, 1990

Monash University

Week Ending 20th January, 1991

Monash University

Week Ending 23rd December, 1990

Monash University

Week Ending 27th January, 1991

Monash University
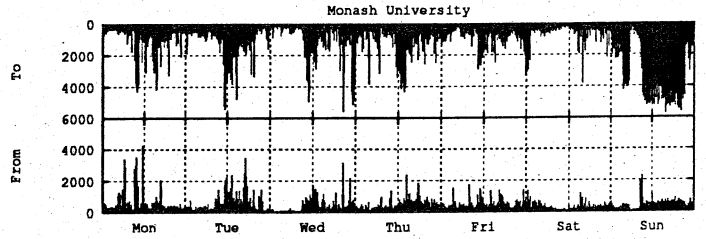
Week Ending 30th December, 1990

Monash University
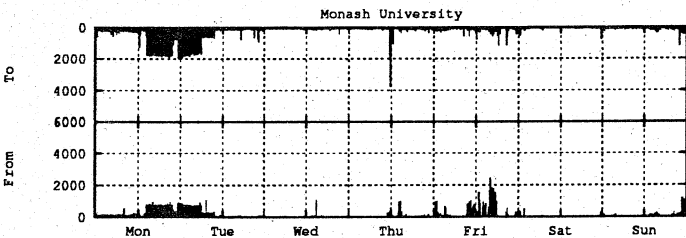
Week Ending 3rd February, 1991

Monash University
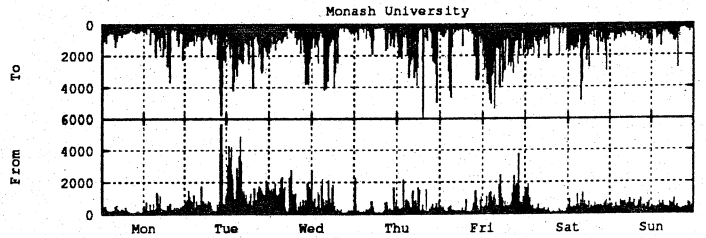
Week Ending 6th January, 1991

Monash University
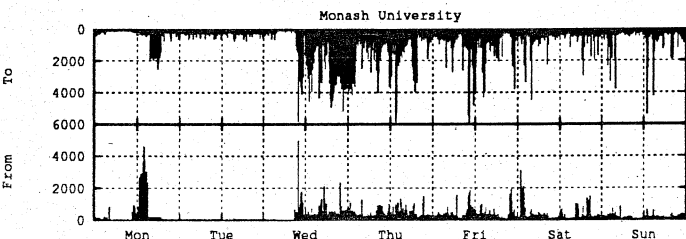
Week Ending 10th February, 1991

Monash University