Australian Academic and Research Network

AARNet Membership
Terms and Conditions

Draft History
A: Chris Rusbridge,12 June
B: Geoff Huston, 19 June
C: GH, 3 July
D: GH, 10 July
E: GH, 25 November
F: GH, 11 December

1. Introduction

It has been recognised that AARNet will provide networking services to the member institutions of the Australian Vice-Chancellors Committee (AVCC), the Australian Committee of Directors and Principals Limited (ACDP). In consideration of the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) special relationship with AARNet, through its funding a proportion of the national and international components of AARNet, it enjoys the same status as members of the AVCC and ACDP. Given the initial commitment to establish AARNet, it is appropriate that such institutions be termed *members* of AARNet.

Additionally it is recognised that AARNet will also provide services to other institutions and organisations in the interests of the overall goal of AARNet of the provision of a data communications infrastructure for the benefit of the national higher education and research community. It is proposed that organisations and institutions which join AARNet under these circumstances be termed *affiliate members* of AARNet.

The proposed terms and conditions described in this document are to apply to connections to AARNet itself; that is, connections to a regional hub node or to a member institution using a network layer connection into AARNet in such a way that the other members of AARNet and connected international networks are directly accessible.

2. Policy Considerations

The goal of providing AARNet connections to Members and Affiliate Members is in endeavouring to assist the overall effectiveness of Australia's national research and academic activities by the fostering of collaboration between the nation's researchers and scholars using data communications technology. The overall intent of the network is in the provision of services to end users which allow productive and cost effective communications on regional, national and international scales.

The reasons for extending AARNet access from the initial base of member institutions of AVCC and ACDP together with CSIRO to the wider academic and research domain through affiliate membership lie in two significant considerations:

- the benefits available to the affiliate member in terms of access to information services on the network (such as network news, the publication of information databases as a network accessible resource and similar) and access to the members of both AARNet and overseas networks via electronic communication.

- the benefits to the remainder of the AARNet network community in being able to access the affiliate member via network services, furthering the major objective of the establishment of a research infrastructural facility spanning the Australian research community.

The regulatory basis of these connections to affiliate members of AARNet is that of the provision of value added data services, for which a class license has already been issued by the relevant regulatory body, Austel. The services provided by AARNet within this class license include application services such as electronic mail, and more fundamentally include the addition of multi-protocol network layer packet routing functionality on top of the point-to-point data transmission services.

2.1. Affiliate Membership Connection Policy

It is proposed that the application for affiliate membership be made to the AARNet Board, which would consider the applications at the next available meeting.

This application should include the following information:

- Description of the intended purpose of the connection in terms of the relevant academic or research activity related to the AARNet connection.
- Nomination of an AARNet member organisation who is associated with the activity described.
- Endorsement of the application by the sponsoring member institution so nominated by the relevant Chief Executive Officer of the organisation.
- A statement from the Chief Executive Officer of the organisation, indicating agreement to abide by the terms and conditions applying to associate membership.

The general guidelines concerning connections could include:

- That the connection is for the purposes of academic and research activity as described in the sponsored application. Usage of the network for commercial purposes is not in general permitted.
- The affiliate member cannot provide further extensions of AARNet connectivity to other bodies without the explicit approval of the AARNet Board. Such approval would be given in writing, and may entail further specific conditions as specified by the Board.
- The physical data connection to the affiliate member site is the responsibility of the connecting organisation to purchase and maintain.

Following approval of this application, the connecting organisation will be responsible for establishing the connection into AARNet. The physical connection will generally be made directly to the relevant regional hub, however consideration will be given to approval to connect via an AARNet member with the prior approval of the arrangement by both the AARNet Board and the two parties involved.

3. AARNet Physical Connection Policy

In committing to provide services to the end users of each AARNet member and affiliate member site, the issue of the network path to the connected site is relevant.

It is proposed that AARNet provide the necessary infrastructure to directly connect to the institutional local area network of each member, and the location of this connection will be as nominated by the member or affiliate member.

3.1 Interface to AARNet

It is necessary to define the point of attachment between each member's local networking facilities and AARNet, in order to clearly delineate the respective areas of responsibility between AARNet and each member.

It is recommended that the interface from each member site to AARNet be the physical transciever device on the member site's local area network. To ensure the effective operation of the equipment connected to this transciever (the multi-protocol router equipment, line interface, the connecting link) and the network itself, it is proposed that the management of the equipment be the responsibility of AARNet.

This recommendation allows the AARNet Wide Area Network to be managed as a single entity, with AARNet taking the responsibility for the operational status of both the data communications link, and the link termination equipment to be installed on each site. Effectively this will allow:

- AARNet to directly meet the commitment of service provision to users by having direct control of all equipment in the path leading onto the central spine of each member's local network;
- uniform software upgrades to be performed on the routing equipment on a national scale;
- control of the routing information passed across the network to ensure maximal availability of the network from the perspective of the end-user;
- uniform resolution of operation problems with a national focus, ensuring that all AARNet equipment is configured optimally at all times.

It is recognised that this interface definition may entail additional expenditure on the part of some member sites: in a situation where the member site wishes to connect a number of locations using identical technology and equipment, the above proposal implies the institution spending an additional $15,000 in capital equipment costs to provide the equivalent functionality within the institution. However it should also be noted that the equipment to be purchased for AARNet has been selected using criteria as appropriate for Wide Area network performance: this equipment may not be the appropriate choice for Local Area networking applications in every case, as the performance parameters within the local context are somewhat different.

As an alternative to this additional expenditure, where a member site wishes to place additional interface equipment within the AARNet multi-protocol router to connect to other sites it is appropriate that the site make application to the AARNet Board for authority to so do. In so doing it will be required that the operational arrangements, which would then involve Regional Facilities Management and AARNet Operations Management as well as the member site, be agreed by all concerned. It is noted that in such cases, where there is "joint" management of the tail-end components of the network, AARNet's commitment of service provision to the member's user community is then more indirect.

3.2 Multiple Connections into AARNet

It is not envisaged that AARNet provide multiple connections to a single member or affiliate member. To do so AARNet would be placing itself within the additional role of service provider for internal network services for the institution, and the conflicting requirements of the management of the local institutional-based network and the broader national network are not considered a workable arrangement in general. However it is recognised that in some cases the level of autonomy of components of an institution is sufficiently great, and the relevant digital connection tariffs so structured, that additional links into AARNet from a single member is considered reasonable. It is intended that such situations be referred to the AARNet Board on a case-by-case basis for resolution. It is suggested that in cases where additional connections into AARNet are approved

for a member site, the connecting site will fully fund both the costs of these additional links and the necessary equipment to be installed at both link ends, as well as the ongoing costs of maintenance.

3.3 Data Transmission link to AARNet

The preferred connectivity is one where each member site is directly connected by a single transmission link from the Regional hub to the central site of the connecting institution. In this way the responsibility for the provision of networking services is clearly an AARNet issue, involving AARNet communicating directly to the providers of both the equipment and the data transmission facilities in the event of network problems.

It is recognised that some sites may wish to place local circuit switching equipment within the total data path between the regional hub and the AARNet, or in some cases implement the link into AARNet by switching through an existing AARNet member in a chained topology.

This does present issues in terms of the direct relationship between AARNet and member sites, as the installation of additional equipment in the network connection to the site will entail more issues in problem resolution, and the overall evolution of the engineering of the network[1]. The general proposition is that all links to AARNet members be made by direct point-to-point connectivity from the member site to the Regional AARNet hub, but also included in this proposition is the provision for members to present a case to the AARNet Board in respect of implementing alternative arrangements.

4. AARNet Funding

4.1 Funding by AARNet Members

The funding model as proposed for AARNet for the first year of operation (1990) takes into account the necessary expenditure on capital equipment, data transmissions links, and the operational management overheads in running the network. The connectivity included in this budget includes direct links to each participating AARNet member.

The sources for funding for 1990 are:

- The Australian Research Council
- AVCC and ACDP member institutions who are participating in AARNet
- CSIRO

In the case of CSIRO, central CSIRO administration is expected to provide $0.2m for each of 1990 and 1991 as CSIRO's component of the national and international expenditure for AARNet. Within each region CSIRO will fund the relevant proportion of the facilities management costs associated with the operation of this regional component of the network, and will pay the full costs in making a network connection from each nominated CSIRO site into AARNet[2].

---

[1] For example, chained topologies present problems in determining the most cost effective method of direct bandwidth upgrades to indirectly connected member sites: without careful management attention to the growth of such connectivity models, the ability to manage the network as a single service provision entity is compromised and economies of scale of operation are reduced.

[2] In most states a model involving a "primary" CSIRO site with direct connectivity to the Regional hub is proposed, and additional CSIRO links will be directed to this primary CSIRO site.

In the case of AVCC and ACDP member institutions, the funding is based on the operating grant of each participating institution[3].

4.2 Funding by AARNet Affiliate Members

In determining the 1990 AARNet budget no provision has been made for any revenue raised by the charges levied in providing AARNet services to affiliate member institutions.

In providing data connectivity to affiliate members of AARNet, the issue of access charges is directly relevant. AARNet's objectives with such charges do not include the direct generation of profit from these activities[4], nor, on the other hand, should AARNet members be subsidising the use of the network by such non-member bodies.

The basis of the AARNet connection policy is therefore that connections by affiliate member bodies are to be encouraged, and also to ensure that non-members who do connect to AARNet pay the costs associated with their use of AARNet network services, and that such costs are used to offset the costs attributed to members of AARNet in the operation of the network[5] [6].

5. AARNet Affiliate Member Connection Charges

As with the AARNet members' funding formulae, the intent of this proposal is to nominate a relatively simple and uniform charging schedule for AARNet affiliate members.

Affiliate members pay a charging schedule which uses two components. The first of these addresses the costs involved in the provision of a point-to-point AARNet link from the Regional hub (or an AARNet member site under some circumstances) to the connecting site (the tail-end link). The second component addresses the charges incurred through usage of the network, both within AARNet itself, and the use of the international network links to access peer overseas networks of AARNet.

- It is proposed that the amount covering the tail-end link charges be negotiated by the host member site, and that this be a matter between the two parties concerned. Suggested guidelines for some link configurations are included in this document, but variations to these guidelines may be contemplated due to specific local considerations.

---

[3] While other funding mechanisms (such as usage based funding, or bandwidth-based funding) may prove to be viable in the longer term, the initial operation of AARNet is to be funded on the basis that an institution's operating grant is a suitable metric of anticipated actual network usage, and such a funding mechanism is equitable across all members of AVCC and ACDP.

[4] There is a distinction to be made here between the generation of a profit (in the commercial sense) and that of a revenue surplus. Certainly it is envisaged that there will be some form of revenue surplus gathered from such activities, to be used in providing funding for raising the quality and range of services provided on this network.

[5] The Steering Committee in considering this matter at earlier meetings had discussed an arrangement where those member bodies which provide network connections to non-member sites do so under financial arrangements as negotiated between the two parties involved in each case. Furthermore the major caveat that would be placed on such connections by AARNet is that the use of the network is for purposes of a non-commercial nature, and that such usage is related to the research, academic or professional activities of the network members.

[6] The arrangements as outlined in the above footnote make no provision for any payments into either the AARNet Regional Networks or the AARNet National Network. As a policy objective, the inclusion of a direct payment to the AARNet by the connecting body is considered desirable. Such payments can then be disbursed to both the Regional and National network budgets, ensuring that the costs incurred by those bodies providing services are covered by the payments made by the non-member user of the services.

- The amount covering the costs of usage of AARNet national and international services be fixed by AARNet in all cases. The proposed schedule of charges are included in this document.

5.1 Guidelines for Tail-End Connection Charges for Affiliate Members

In providing Tail-End connections for affiliate members it is recommended that the connecting site be responsible for the purchase and installation of the link termination equipment on their site, and that the host institution be responsible for the termination of the other end of the communications link. It is also recommended that the responsibility for the costs of operation and maintenance of the link itself be that of the non-member connecting body.

The guidelines for charging are therefore intended to cover the local costs in the termination of the communications link, which are the purchase and maintenance costs of required equipment and operational costs.

It is assumed here that the link will be either an Internet Protocol (IP) link (using either the SLIP protocol over a low speed line, or intergateway protocols over a mid/high speed line), a DECnet link (most likely over an async 9.6K line), or a multi-protocol link using equipment functionally compatible with that used by the host member site.

The suggested guidelines are:

Equipment and Data Transmission

The connecting site funds the capital cost of the local equipment, the data transmission link, and all associated maintenance charges for these services and equipment.

Termination Equipment

9.6K SLIP or DECnet link	Connection fee	$1,000
	Annual Maintenance	$2,300 p.a.
48K Multiprotocol link[7]	Connection fee	$5,000
	Annual Maintenance	$3,500 p.a.
10M link	Connection fee	$10,000
	Annual Maintenance	$7,000 p.a.

These charges are payable to the AARNet member site which terminates the tail end connection to the affiliate member site.

The connection fee covers the capital purchase of line termination equipment at the member site.

The annual maintenance fee covers the local expenditure in respect of facilities management of this additional equipment. Additionally this fee covers the overheads in terms of local maintenance activities associated with network connectivity to the connecting site, and also connectivity for the various network applications (mail, remote access, etc).

5.2 AARNet Connection Charges for Affiliate Members

In determining a schedule of charges for access to AARNet, the basis for the charge schedules is that of the effective bandwidth of the link between the connecting body and AARNet. The bandwidth is a simple metric

[7]This assumes that the host site has a configurable Bridge/Router capable of adding further interfaces.

of the potential usage of the network's services and the quality of the provision of that service. The charge is intended to cover the costs to AARNet in providing national and international network access to the connecting body.

The determination of these charges is based on cost estimates of $1 m p.a. for the operation of the national and international components of AARNet, funded by a pool of some 40 AARNet members and affiliate members, using 48Kbps bandwidth access links. This results in a charge of $25,000 p.a. for a 48Kbps connection. Charges for lower bandwidths are roughly proportional to this figure, and for higher bandwidths are discounted by the inability to use such bandwidths through the entire network.

The proposed schedule is therefore as follows:

AARNet annual usage charges:

Connection Bandwidth	AARNet fee
Dial-in SLIP / DECnet	$3,000
9.6K SLIP / DECnet	$6,000
19.2K	$12,000
48K (Multi Protocol)	$25,000
2Mbps	$50,000

These fees are payable directly to AARNet.