AV-CC

Australian Vice-Chancellors' Committee
(INCORPORATED IN THE A.C.T.)

AARNet Staffing Structure

As indicated in the various reports of activities being undertaken within the overall AARNet program, the number of activities and range of duties being performed by the two AARNet staff members have been steadily increasing since the commencement of this project. This situation is now reaching the point where, despite the considerable dedication and considerable number of hours invested by the staff, it is increasingly likely that the timeliness and overall quality of effort will be detrimentally effected (due predominantly to the increasing volume of the workload). In many ways this is a critical problem.

It is in response to this situation that the following paper has been drafted. It outlines the various duties of each staff member and the relevant responsibilities of other AVCC secretariat staff members, and indicates areas where additional resources would be most effectively deployed with the program. For the purposes of providing a starting point for further consideration by the AVCC a potential staffing structure is outlined, together with a more general overview of potential directions of this program and associated staff issues.

1. Current AARNet Staff Structure and Responsibilities

The Role of AARNet

The general role of AARNet is the operation of a data communications network, together with the operation of an associated service structure. The clientele of this operation are the member institutions of AARNet, together with various specific user communities and individual programs and users drawn from this institutional membership. The service entities are both the provision of interconnecting data communications services and the provision of information and technical advice relating to the user requirements in accessing resources and undertaking activities across AARNet.

Overall the role is a service role, effectively undertaking the provision of communications technology related services to both institutional and individual clients

The Current Staff Structure

The current staffing structure is that of two full time positions within the AARNet Section of the AVCC Secretariat, effectively reporting to the Deputy Secretary of the AVCC. A small level of general support is provided to AARNet by other AVCC Secretariat staff. Additionally regional operational support is provided by a set of operational contracts which have been executed between the AVCC and those institutions hosting a Regional AARNet Hub.

Position Description: Network Technical Manager

This position is responsible for the day to day operation of AARNet, the project management of AARNet activities and the provision of advice to the AVCC regarding the overall direction of AARNet and the setting of strategic objectives associated with the program.

The specific duties and responsibilities of this position include:

- management of the day to day operations of the network;
- support to the AARNet Advisory Board and the AVCC:
  - reporting of activities, and
  - provision of advice and information regarding all aspects of AARNet;
- responsibility of the day to day budget for AARNet and budget preparation;
- liaison with suppliers of services to AARNet;
- technical advice and consultation to member and potential members;
- project management of AARNet activities;
- presentations to various bodies;
- coordination of the provision of services;
- liaison with international peer networks;
- technical directions and technical management;
- formulation of future plans and directions;
- specification and development of technical tools and services;
- management of provision of services and information;
- overseeing subcontracts regarding maintenance and operational activities;
- management of new connections and services; and
- administration and clerical support.

The position includes a broad base of both technical and administrative activities and requires the exercising of a high degree of technical skill and expertise as well as administrative, management and personal communication skills.

Position Description: Network Coordinator

This position, initially filled in January 1990, was intended to provide the input of further technical skills to the program and is focused more on these technical issues. Due to the small size of the staff sector there is considerable area of overlap in terms of duties and responsibilities with the Network Technical Manager.

The specific duties and responsibilities of this position include:

- operational integrity of the network:
  - identification and resolution of operational incidents and faults;
- provision of technical expertise to network members;
- liaison with suppliers of services to AARNet;
- responsibility for the deployment of new services and facilities in the network;
- service and technical support to members and users;
- evaluation of technologies and services;
- presentations to various bodies;
- coordination of the provision of services;
- specification and development of technical tools and services;
- management of new connections; and
- administration and clerical support.

AVCC Secretariat

The Network Technical Manager reports to the Deputy Secretary of the AVCC. The relevant executive responsibilities of the Deputy Secretary with respect to AARNet are:

- general responsibility for AARNet on day to day matters;
- provision of advice to the AVCC regarding AARNet;
- responsibility regarding budget and funding/expenditure;
- approval of expenditures; and
- support to the AARNet Advisory Board and the AVCC.

In additional the AVCC Secretariat provides limited financial management and clerical support to AARNet.

2. Areas where Additional Resources are Required

There are a number of major areas where additional resources would prove highly beneficial to AARNet in terms of meeting the overall service objectives of the program. These are the activities assocaited with effectively addressing end user service requirements, end user and institutional information provision requirements, liaison and coordination with various institutional service groups and general operational and clerical/administrative support to the AARNet program.

Specific areas of current weakness within the structure relate to:

Provision of Support for Network Information Services

The broad areas of activity which fall within this general category include:

- the provision of end user information:
  - coordination with relevant service units within each member site;
  - preparation and dissemination of network service information and resources;
  - management of the deployment of information tools across the network; and
  - liaison with peer overseas information service providers.

- the effectiveness of end user network applications and services:
  - dissemination of information relating to applications and services;
  - preparation of informational resources relating to available services; and
  - coordination of technical support with end user service provision.

- member and end user consultation services provision:
  - coordination of distributed service structure across members.

Attached to this document is an Internet-draft document which describes a Network Information Services Infrastructure. It is this structure which is being proposed for AARNet as being the appropriate direction for the provision of effective service to the client population of AARNet.

Provision of Operational and General Support to AARNet Staff

The areas of activity which fall within this general category are of a general operational and clerical/administrative support role:

- monitoring of network integrity;
- preparation of regular reports regarding network usage and availability;
- clerical support; and
- document production.

3. A Staffing Structure for AARNet

The above statement of requirements, and the description of existing roles and responsibilities indicate that the most effective means of addressing the staffing structure is to add additional resources in the services and general support areas.

Such an objective could be achieved within a staff structure as indicated in Figure 1. Such a structure would add two staff members to AARNet, a coordinator of service provision, with overall responsibility for the provision of network information services across the network and associated informational resources, and a general support position.

It is envisaged that the Services Coordinator would be a full time position, with roles and responsibilities as detailed in the previous section of this document.

The support position could be filled by a fractional full time position at a general clerical level.
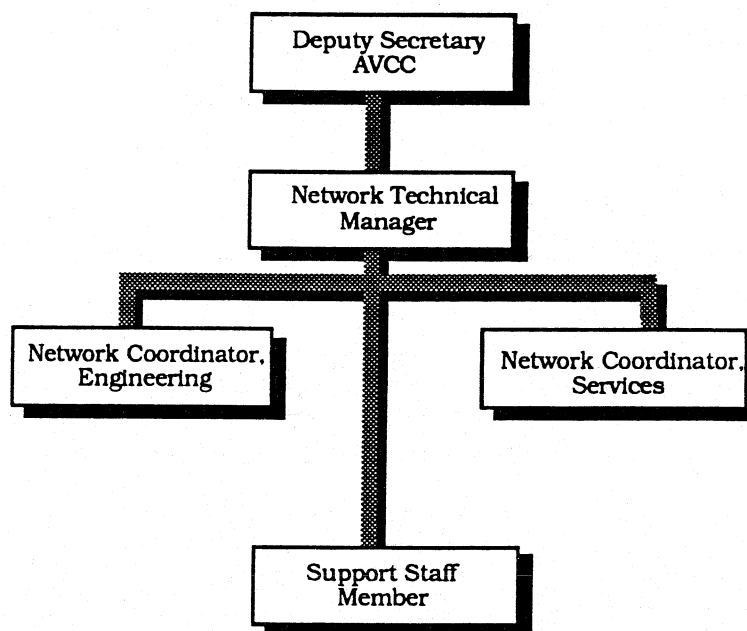

Figure 1 - A Possible Staffing Structure for AARNet

It is noted that in such a structure the role of the Network Technical Manager position would be able to include better focus on support to the executive responsibilities to the Deputy Secretary of the AVCC, through the divesting of some activities to the Services Coordinators in both the technical and service provision areas, and that such a structure would continue to have a clear forward focus on the primary objectives of AARNet through the emphasis on the role of end user service provision through use of applicable technologies.

4. General Comment

The original staffing structure initially proposed for AARNet in August 1988 was that a Network Technical Manager position, reporting to a General Manager. The General Manager position has not been filled to date, and efforts at the start of this year to appoint into such a position proved unsuccessful. While there are perhaps a number of specific reasons for this, perhaps the major reason is that there is no clear understanding that such a position is still an effective means of achieving the clear service objectives within AARNet. The current reporting structure, and the various responsibilities of members of the AVCC, the AVCC Secretariat, and the AARNet section within the Secretariat, are proving to be an effective management structure, and the critical areas of resource shortfall are not evident at this managerial level. Furthermore there is no evidence of lack of overall management ability or appropriate accountability structure within this current AVCC management structure of AARNet.

The second area of comment concerns the current range of options with regard to the future conduct of AARNet, and the potential broadening of the carrier aspects of this program into a larger domain. It is reasonable to state that the AVCC should continue to provide a leadership role in this area. Independent of any potential changes in the mechanisms of the provision of low layer carrier services, common user oriented data communications services across the academic and research sector will remain one of the most critically important aspects of our common infrastructure through this decade. There is a consequent responsibility to ensure that adequate resources are available with this sector to retain a controlling interest in the means of the provision of such communication services, and to do so within a management and funding framework which most effectively serves these requirements. For these reasons it is considered that the structures proposed would have a continuing position within the AVCC Secretariat, as a focus for this critically important common service role to the member institutions.

5. Conclusions

While this document proposes a specific direction in terms of a staff structure for AARNet, it is not intended that this document be, a priori, a final recommendation the AVCC at this point in time. However the staffing structure proposed does have the attributes of explicitly addressing both the pressing immediate and perceived future resource requirements within the AARNet program, and as such should be seriously considered by the AVCC as a part of its deliberations on the subject.

ATTACHMENT A

INTERNET DRAFT - NETWORK INFORMATION SERVICES

Network Information Services
Infrastructure Working Group
INTERNET-DRAFT

D. Sitzler
Merit
P. Smith
Merit
A. Marine
SRI
July 1991

Building a Network Information Services Infrastructure

Status of This Memo

This draft document is intended for existing Internet Network Information Center (NIC) personnel, people interested in establishing a new NIC, Internet Network Operations Centers (NOCs), and funding agencies interested in contributing to user support facilities. The document strives to:

- Define a basic set of essential services that Network Information Centers (NICs) will provide to Internet users, including new mechanisms that will facilitate the timely dissemination of information to the Internet community and encourage cooperation among NICs.

- Describe existing NIC services as an aid to Internet users and as a model for organizations establishing new NICs.

This draft document will be submitted to the RFC editor as an informational document. Distribution of this memo is unlimited. Please send comments to the authors or the discussion group *nisi@merit.edu*.

Acknowledgments

This document reflects the work of the Network Information Services Infrastructure (NISI) working group in the User Services area of the IETF. Because the working group participants represent a cross-section of existing Internet NICs, the opinions expressed herein are representative of groups currently providing information services within the Internet community.

Purpose

The purpose of this document is to define the role of NICs in the Internet and establish guidelines for new and existing NICs regarding the user services they provide. This document is also a move toward standardizing NIC services, which will aid in the development of an overall information infrastructure that will allow NICs to easily and routinely cooperate in assisting users.

NICs for networks that are part of the Internet may be called upon to serve users of the greater Internet as well as those of their own networks. This responsibility brings with it the added challenge of coordinating services with other NICs to better serve the general Internet community. Toward that end, this document also proposes some easily implemented changes to facilitate the exchange of information and services between NICs.

Development Guidelines

The NISI working group observed several guidelines when developing this draft.

1. While recognizing that the new infrastructure should be built on existing services, programs, and technology, the working group did not want to limit its thinking to the present, preferring to consider new approaches and to think toward the future. The goal is to move in the direction of an information services infrastructure for the National Research and Education Network (NREN).

2. The working group recognizes that a user support system must accommodate a diverse user population, from novice to network sophisticate.

3. The working group recognizes that not all NICs are interested in providing service at the Internet level. Many campus NICs, for example, restrict the scope of their efforts to campus computing activities. Therefore, an Internet NIC must have policies, procedures, and delivery mechanisms in place to serve not only end-users, but to aid other information providers and user support agencies.

Definition of a NIC and of a NOC

A network information center is an organization whose goal is to provide informational, administrative, and procedural support, primarily to users of its network and, secondarily, to users of the greater Internet and to other service agencies.

A network operations center (NOC) is an organization whose goal is to oversee and maintain the daily operations of a network. Although sometimes one organization may fulfill the duties of both a NIC and a NOC, this document assumes NIC functions to be separate from NOC functions and addresses NIC functions only. Obviously, however, a NIC must work closely with its NOC to ensure users get the best service possible.

History

When the original Advanced Research Projects Agency Network (ARPANET) was formed, SRI was assigned the essential administrative task of registering every host on the network and maintaining the Official Host Table. This host table was needed to interconnect the hosts into a network. SRI also became the repository for the RFCs, most of which were only available in paper copies because a file transfer protocol had yet to be specified. Because of its role as a central information repository in these ways, SRI became the natural place for users to call with questions, and the first NIC was born.

In 1984, the original network split into two networks: the ARPANET and the MILNET. The ARPANET was laid to rest in 1990, and the original NIC became the Defense Data Network NIC (DDN-NIC). This NIC is sometimes referred to as the "SRI-NIC" or sometimes simply as "the NIC." Today this NIC provides information services to the MILNET portion of the DDN, and performs several administrative duties that serve the entire Internet community,

The days of having just one or two networks are long gone. Today, the Internet is an international collection of thousands of networks interconnected with the TCP/IP protocols. Users of any one of these networks can use the network services provided by TCP/IP to reach any of the other networks.

There are other major wide area networks, such as BITNET and DECnet networks, that are not based on the TCP/IP protocols and are thus not considered part of the Internet itself. However, users can communicate between these networks and the Internet via electronic mail, so Internet NICs often answer questions regarding these networks.

NICs exist for many of the networks that make up today's Internet. For example, in addition to the MILNET, in the United States there are the National Science Foundation Network (NSFNET), the Energy Science Network (ESnet), and the NASA Science Internet (NSI). All of these networks provide NICs.

BITNET is a non-TCP/IP network that is accessible to the Internet via electronic mail. Its administrative organization, the Corporation for Research and Educational Networking (CREN), supports NIC services for BITNET users.

Many networks in countries other than the United States also provide NIC services. For example, such services exist for NORDUnet, which connects national networks in the Nordic countries, and JANet, the Joint Academic Network in the United Kingdom. The BITNET counterparts in Europe and Canada are the European Academic and Research Network (EARN) and NetNorth, respectively.

Essential NIC Functions

Network Information Centers exist to provide services that make using the network easier and more attractive to users.

To help meet this goal, four essential NIC functions have been identified as those that every Internet NIC should perform. These are the basic functions that define the minimum level of Internet information service. Each Internet NIC should:

- Provide information resources.
- Support end-users through direct contact.
- Collect and maintain information regarding other NICs.
- Support the NIC infrastructure mechanism.

The level of each service and the exact mechanisms for providing these services depend on the needs of the particular network user community. Funding, staffing, and implementation issues related to these functions are left up to individual NIC organizations.

Presently, only the first two functions, providing information resources and directly supporting end-users, are routinely performed by Internet NICs. The variety of ways in which these services are provided is described more fully in the section on "Present NIC Services."

The last two functions, collecting information about other NICs and supporting the NIC infrastructure, are new roles that have evolved as the Internet community and the number of NICs have grown.

Each of these four essential functions is discussed in some depth in this section.

Provide Information Resources

Information resources refers to both online and hard-copy resources, such as online files, marketing information, and newsletters. NICs help users gain access to relevant information in several ways.

- Obtain information online from other sites and store it at the local NIC where users may access it.

- Refer users to information stored at other locations around the Internet. This option requires that each NIC maintain up-to-date information regarding such Internet resources.

- Create information, such as newsletters, marketing information, tutorial files or documents, and make it available to users. In this case, the "creating NIC" is solely responsible for the content and accuracy of the information provided.

In all of the cases above, users need a way to verify the authenticity and currentness of the information. Accordingly, each NIC should provide the following information for everything it makes available to its users and the Internet community: 1) a time stamp, 2) a revision number, and 3) the name of the NIC that produced the document. The NIC should also maintain contact information regarding the source of a file, but does not necessarily have to include such a contact in the on-line file.

Fully Support End Users

A NIC serves as the principle source of network information for its end users. NICs field a variety of user inquiries, such as requests for how to get connected to the Internet, how to locate and access a particular application on the network, how to determine an e-mail address, and how to solve operational problems. Each NIC must take a best effort approach to responding to these inquiries and take responsibility for a user inquiry until it is resolved in some way. Resolution may be answering the question, referring the user to the appropriate information source, or coordinating with a NOC to resolve a user connectivity problem.

To facilitate this role of information provider, the following delivery mechanisms are used:

- Telephone "hotline" support. All NICs need to be available to answer phone inquiries during the business day.

- Electronic mail. An electronic mail address acts as an electronic help desk. For consistency, the electronic mail address should be of the form NIC@domain (e.g. NIC@DDN.MIL). Such a common addressing convention will move toward standardization of these "electronic help desks" and will increase the chance that users will know where to ask for help. In addition, a user inquiry to a NIC e-mail address should either produce a human response or an up-to-date machine response that performs a triage function by advising the user where to go for particular categories of problems. For example, a message to NIC@NSF.NET could return a message alerting the user to the NNSC@NNSC.NSF.NET and the NSFNET-INFO@MERIT.EDU mailboxes, both of which provide information for NSFNET.

- Electronic information transfer. NICs should provide information in electronic form, and make it available across the Internet through mechanisms such as anonymous file transfer, electronic mail, and remote databases.

Coordinate NIC Referral Information

With the recent dramatic increase in the number of networks, users, and applications accessible via the Internet, it is impossible for any one NIC to maintain comprehensive, up-to-date information of all the services and information available. Because such information is distributed among many NICs, it is essential for each NIC to be aware of other NICs and their areas of expertise. Such shared information among NICs ensures that Internet users will be referred promptly to the correct information resource.

In an effort to gather data about NICs and their resources, information will be solicited from each NIC and placed in a database called "nic-profiles." This database will be available to all NICs. Such shared information among NICs ensures that Internet users will be referred promptly to the correct information resource. Further details on nic-profiles may be found in Appendix A.

Support the NIC Infrastructure

It is essential that each NIC take an active part in supporting the NIC/Internet infrastructure. Two means of providing such support are suggested here.

- Attend the IETF User Services Working Group (USWG). NICs are encouraged to participate in the USWG, an ongoing working group of the IETF, which is chartered to identify, discuss, and recommend solutions to user service issues. The group meets regularly at the IETF meetings. (Information about IETF meeting schedules, etc., is available for anonymous FTP from nnsc.nsf.net. The directory is ietf.) The USWG has spawned a variety of working groups dealing with specific user service topics. To join the USWG mailing list send an e-mail request to uswg-request@nnsc.nsf.net.

- Participate in nic-forum. A new electronic mailing list, "nic-forum," will provide NIC personnel with a means of soliciting information from other NICs, offering solutions to common problems, and posting

information of general interest. A NIC can register in the nic-forum, as well as provide information for the nic-profiles database, by sending a message to nic-forum-request@nsf.net. Further information and a sample template may be found in Appendix A.

Examples of Present NIC Services

There are a variety of ways through which existing NICs fulfill the basic requirements previously indicated under "Essential NIC Functions."

Today's Internet NICs provide network users with a wide array of value-added services. The types and levels of services vary for any particular NIC depending on a number of issues such as funding, audience served, available resources, and mission of the network organization.

An overview of some of the services offered today by Internet NICs is listed below. This overview provides examples of the essential services recommended earlier, and also gives a flavor of the many avenues through which value-added user services are provided. This section provides examples, not recommendations.

Direct User Support

The main objective of a network information center is to provide support for network users. Most NICs provide both telephone and electronic mail hotlines for convenient user access. Existing NICs also often serve as intermediaries between users and the technical experts who provide specific information. Because NICs interact directly with end-users, they can frequently evaluate their services, and modify them to accommodate changing user needs.

- Referrals. Today's NICs are aware of other Internet resources and keep such referral information as up-to-date as possible.

- User-to-user communication. NICs can facilitate interactions between network users. Often this is done through conferencing or electronic mail. For example, a NIC can set up a computer conference dealing with a specific discipline or perhaps a specific topic so that users can share ideas and information with each other. Some NICs establish special interest groups and hold in-person meetings to promote the exchange of information between their users.

- Application support. NICs often provide user support for specific host applications in addition to providing information and support about the network to which the host is attached.

- Technical support. Technical experts are available at NIC locations or elsewhere to trouble shoot user problems. The range and variety of technical expertise varies with the organization.

- Emergency service. Most NICs provide immediate notification to users of impending events that may affect their network usage. This is often done through electronic mail bulletins which state the particular event, its impact, and its duration.

User Training Services

NICs sponsor seminars, classes, and training workshops intended to assist users in understanding the network environment. These training events range from general "what is the Internet" to workshops on specific topics such as how to use a super-computer application.

Marketing and Public Relations Services

- Newsletters. Some Internet NICs publish newsletters which are used as marketing documents to try to get more organizations to attach to the network.

- Other publications. Many NICs also produce a variety of general purpose brochures and "how-to" documents which are distributed to potential network users.

- PR activities. NICs may be involved in a variety of public relations activities from writing and distributing press releases about new network developments to holding press conferences to announce significant technological events.

Information Repository Services

An important activity of NICs is producing and/or collecting information of interest to their users. Most NICs provide hardware to store such information online and distribute the information to their users both electronically and in hard-copy form.

Administrative Services

Many NICs perform registration services, such as registering user information in a white pages database, keeping a record of hosts on their networks, or keeping a record of contacts for hosts, networks, or domains.

Examples of Present Information Delivery Mechanisms

Information is delivered to network users via a wide variety of mechanisms. The most common methods are electronic mail and file transfer protocol (FTP); however, information is also relayed via the telephone, FAX machines, U.S. mail, and in-person seminars, as well as via electronic bulletin boards and remote database access. NICs are always looking for ways of making information broadly accessible so that the maximum number of network users can use it effectively.

The following table lists the various information delivery methods used in the Internet today, and notes the kind of information distributed using each method.

TABLE 1: AVAILABLE INFORMATION AND DELIVERY MECHANISMS	
Delivery Mechanism	Type of Information Available
FTP	Network maps, functional specs, draft RFCs, newsletters, protocols, any information in a file: ASCII, binary, etc.
electronic mail	General information, newsletters, announcements, security alerts, network status information
bulletin board	General information, announcements, source code
hard copy	Newsletters, user guides, resource guides, press releases, promotional information
presentations/seminars	Network applications, technology trends, technical overviews, general information about Internet environment, TCP/IP overviews
Telnet	Remote systems, applications

person-to-person	Answers to specific questions, contact information, referrals
electronic conference	Other users, discipline-specific information
information services	General information, promotional information, local interest information
directory services	Phone book information (white pages)
library services	Bibliographies, full text, references
phone	Specific requests, contacts, referrals, connecting assistance
Letter mail	Newsletters, user guides
FAX	Variety of printed material
Finger	DNS ("whois") User data

Security Issues

Because NICs interact directly with network users, they will have to deal with security issues at times. NICs should be aware of those agencies and groups on the Internet that have the responsibility of handling security incidents so that users can be properly referred when necessary and so the NICs themselves have resources to call on should a major incident occur. The NICs themselves should be aware of security issues, and advocate the importance of security considerations to their users.

Authors' Addresses

Dana D. Sitzler
Merit Network, Inc
1075 Beal Avenue
Ann Arbor, MI 48109-2112

Phone: (313) 936-2648
EMail: dds@merit.edu

Patricia G. Smith
Merit Network, Inc
1075 Beal Avenue
Ann Arbor, MI 48109-2112

Phone: (313) 936-3000
EMail: psmith@merit.edu

April N. Marine
SRI International
Network Information Systems Center
333 Ravenswood Avenue,
EJ294 Menlo Park, CA 94025-3493

Phone: (415) 859-5318
EMail: april@nisc.sri.com