NREN Organisational Best-Practice

Introduction

There is sometimes an implicit assumption that the concept of an NREN is very clear. NREN's started to appear in the 1970's as the opportunity emerged to provide data networks to connect tertiary education institutions. Looking around the world, the way NREN's are structured in terms of funding and organisation can vary considerably. Nevertheless, there are a number of common functions that all NREN's need to carry out. This document analyses the functions that an NREN will need to perform. It also develops a statement of NREN organisational best-practice that considers how an NREN should best be structured to implement such functions.

Specifically, in addition to defining the canonical set of NREN functions it:-

1. Defines a generic Mission Statement for an NREN. A Mission Statement is a very high-level reference as to the purpose of an organisation. It can provide a focus as to the priorities that an NREN should pursue.
2. Sets out a model organizational structure for an NREN. This structure defines the key organisational elements that an NREN requires and maps the NREN functions identified onto this model.
3. Provides a statement of best-practice for the organisation of Governance.

The following set of concepts is intended as an overall statement of best-practice for an NREN organisation.

NREN Functions

There is a set of functions that an NREN needs to be able to perform in order to be relevant and add value to its connected end-users. These are described briefly below. Not all of the functions are basic. A basic function is defined as one which an NREN must be able to carry out in order to be viable. In addition to these basic functions, represented by the initial eight functions listed, there are an additional four functions, which depending on context, an NREN may choose to carry out.

1. **Organise National Connectivity.** A key raison d'être for an NREN is the implementation and operation of a National network interconnecting the various connected end-users within the country. The network needs to have some selling proposition when compared with other national sources of connectivity e.g. cheaper connectivity, better performance, additional services, advantages of a community etc.
2. **Provide User/Potential User Support.** Support should be provided both for the network service and any other services offered. As well as dealing with issues experienced by existing users, the support function should be able to support new users and assist them in obtaining and operating services. Many users will belong to campuses or connected institutions who will have their own local ICT capabilities. User support will need to interact with these, but it is important that connectivity issues outside the campus/institution and, more controversially,

between end-users in different campuses/institutions are owned by the user support function of the NREN.

3. **Manage operational aspects of services.** Services have finite reliability. They also need maintenance and development. These functions need active management to log, supervise and resolve operational service issues. The functions can be seen as being related to User Support but it is basically concerned with interacting with equipment more than with users. The functions are operated in tandem in many support models.

4. **Participate in regionally based global connectivity initiatives.** Research and Education are generally global activities. The range of communicating parties, particularly in research, is world-wide. The Research and Education community has organized international and global networking on a co-operative basis, as it is more cost effective and efficient to do so via a co-operative model. It is, generally, very inefficient for an NREN to organise its own individual international connectivity. The economies of scale achieved by doing this, on a shared basis, as well as the management efficiencies associated with co-operation are enormous. It does require participation in the joint management though at least at a decision making level. This is especially the case with Aid related projects where there is a particular need to interact with the funders and other beneficiaries.

5. **Organise interconnectivity with Commercial Internet.** Although Research and Education networks are typically closed user groups, there is nearly always a need to interact with the broader commercial Internet. By managing this function centrally, it is normally possible to obtain significant economies of scale. Many NREN's use their commercially neutral status to act as Internet Exchange Points. This both facilitates national Internet connectivity, as well as reducing costs and, possibly, providing a revenue stream.

6. **Manage finances/business.** There are significant costs associated with being an NREN. Whether these costs are funded by end-users or by other sources, or possibly some combination, there needs to be clear accounting and financial management functions. In an addition an NREN will need to deal commercially with the private sector. It will have a framework of contracts with users and suppliers. This type of activity needs an appropriate commercial structure to succeed. A company is universally recognized as the standard structure for managing all these elements. It also has the practical effect of defining a legal limit on operational liability. An NREN is never a static object and it is necessary, therefore, to provide standard business planning and commercial functions e.g. procurement. Where an NREN is collecting costs from end-users pricing, billing, accounting and auditing mechanisms are also necessary.

7. **Interaction with national funders.** Research and Education almost inevitably involves interaction with national governments. National Funders/Governments will typically be seen in the roles of customer, policy maker etc. Since this is the case, they will, typically, play a significant role in the overall direction of an NREN. It is, therefore, advisable to focus carefully on the interaction with national funders and to see this focus as a dedicated function in its own right.

8. **Publicity and Promotion.** In a competitive world, it is necessary for any organisation to promote its existence, to assist users by appropriately targeted

communications, to publicise its activities and successes, and to encourage new or latent users by publicity and promotional literature.

9. **Supporting E-government.** E-government covers a range of government activities. As well as the use of ICT within the process of government, it also includes ICT in related government activities such as e-health, e-education etc. The application of ICT is an increasingly important issue for governments. It is becoming an area of public policy where NREN's have a potential role to play. A great strength of an NREN is its relative independence from major ICT suppliers. This, coupled with a high level of technical expertise and experience serving a more ICT literate customer base, make NREN's potentially natural partners to assist governments with the implementation of E-government. This is a policy area that has to be approached with some caution as government needs may not be realistic but it is, nevertheless, a potential opportunity.

10. **Pro-active role in service provision to groups.** The basic role of an NREN is to provide service to individual institutions and campuses. Users of the service often co-operate as groups on 'subject specific' developments. The requirements of the group are often additional to the basic service portfolio (e.g. security, performance etc.). By co-operating with, and supporting groups of users, an NREN can enhance network usage as well as providing more useful multi-end-point services.

11. **Engagement with Regulation and Liberalisation.** Telecommunications has historically been provided as a monopoly service, reserved to quasi-state organisations. The liberalisation of national and international telecommunication's markets, in many parts of the world, has had a dramatic effect in reducing prices for service and improving service capabilities. As technically literate representatives of advanced users, NREN's can be in a strong position to engage with the liberalisation and regulation of telecoms. Such engagement has the beneficial effect of enhanced political visibility. By helping to create a more competitive market, and by allowing direct NREN access to infrastructure, it can also help in achieving lower costs.

12. **Contribution to Technology/Service development.** NREN's generally serve advanced users with service demands ahead of the public marketplace. As such they are in a position to trial new services and also contribute to the general development of technology via experimentation and contribution to standardisation. Such activity improves political visibility and acts as a stimulus for NREN staff.

Mission Statement

The Mission Statement is intended to provide a high-level set of guidelines for the functioning and direction of an NREN. The following objectives are defined.

- A National Research and Education Network (NREN) provides and operates network communications, and other associated services, to the Research and Education community within its country.
- An NREN provides operational capabilities to manage and develop the services which it offers and to support connected users and institutions.

- An NREN will operate on a 'not for profit' basis. It will adopt a cost based pricing policy.
- Where appropriate, it will provide its services in co-operation with the local institutions within the country who are responsible for the support of users and potential users. Depending on the national policy these users will be researchers, students, or pupils in primary or secondary education. It will define and implement a portfolio of services to support the needs of these users.
- An NREN will assist users and potential users in exploiting its services via a pro-active user support function that will provide technical and other support capabilities to encourage usage of its services.
- An NREN will co-operate with other similar organisations within a region to jointly develop global services in co-operation with other similar regional co-operations worldwide.
- The fundamental technical function of an NREN is to provide a national data network connecting its associated users. It may do this either by directly acquiring infrastructure or by purchasing suitable services on behalf of the user community.
- An NREN may offer a portfolio of other services related to the network service
- An NREN may be involved in the development of new services and/or the testing of new technologies.

Model NREN Organisation

In order to fulfill its mission, an NREN needs four distinct organisational elements each of which needs to have a separate management focus. It is assumed that these elements are separately represented in the organisational management which is led by a Chief Executive Officer (CEO). The CEO has the primary leadership role in the organisation taking overall responsibility for

1. Leadership of the NREN team
2. Overseeing all the activities of the NREN
3. Supervising a team of specialists ensuring that internal communications function effectively.
4. Acting as the principle channel of communications with the board and other representative bodies.
5. Representing the NREN in the wider world
6. Managing the human resources function including Staff management and appointments

These responsibilities need to be seen in the context of the organisational elements described below. A CEO should act as a leader, but also as an orchestrator of all the NREN functions.

The four elements are defined here. There is also a mapping between them and the NREN functions identified above. The mapping identifies a 'lead' element for a function. In practice, the division is not always clear-cut. As an example, Finance will have an interest in all aspects of NREN activities, but it will not lead them all.

1. **Finance.** Finance has responsibility for all the financial transactions of the NREN. It will be responsible for all contracting, billing for services, interaction with any funding bodies, staff remuneration, cash management etc. It will operate an accounting system capable of producing monthly management accounts and annual audited accounts. (NREN lead on *Manage finances/business, Interaction with national funders*)

2. **Operations.** Operations will be responsible for the management of the services provided by an NREN. It will operate an appropriate management system for these services. This may be a function directly provided by the NREN or may be acquired as a service. Operations takes prime responsibility for interacting with users and potential users. Directly, and via contacts with end user institutions, it will provide support and assistance to users and potential users of the NREN services. Operations shall report regularly (on a monthly basis; monthly service reports) about the performance of NREN services both from a service and from a user perspective. (NREN lead on *Provide User/Potential User Support, Manage operational aspects of services, Pro-active role in proactive service provision to groups*)

3. **Technology.** NREN's need to deal with technology. This is in relation to the acquisition of technology or services. It may also be that an NREN takes part in the development of new services or is prepared to trial new technology. The technology function will lead in these areas. It will have overall responsibility for the technology policy and for design and development functions. It will co-operate with operations in the implementation of services. (NREN lead on *Organise National Connectivity, Organise interconnectivity with Commercial Internet, Organise interconnectivity with Commercial Internet, Contribute to Technology/Service development*)

4. *NREN Outreach/Visibility/Communications.* An NREN needs to interact with various organisations. These include user organisations, funders, policy makers etc. The creation and presentation of an NREN viewpoint as well as the public interaction between an NREN and its stakeholders or interested parties represents a specialist function in its own right. Outreach/Visibility/Communications has the specialist communications capability to manage and implement this process. (NREN lead on *Participate in regionally based global connectivity initiatives, Publicity and Promotion, Engagement with Regulation and Liberalisation*)

One function, *Supporting E-government*, including contributing to National ICT activities, has not been allocated. Experience has shown that it is difficult to generalize about the requirements that governments may place on NREN's

All of the elements are broadly equivalent in terms of importance. The overall management of the NREN organisation, via CEO leadership, needs to deal with each element and to supervise the way in which the individual organisational elements deal with their primary functions, in particular it needs to ensure the internal interactions between elements necessary for seamless delivery of services

Best Practice Governance

Governance defines the way in which an NREN makes decisions; the way an NREN interacts with its stakeholders; the way an NREN interacts with its users and the way it is accountable. It is important that there is clarity in respect of NREN governance. An NREN should have a single Board that oversees its activities. The Board should be responsible for the strategy of the NREN and should take overall responsibility for overseeing its activities. It is important however to draw a distinction between strategy and implementation. Whereas the Board should develop strategy, it should not involve itself in its detailed implementation. Implementation needs to be left to the NREN management led by its CEO.

Specific points relating to governance are

- Clarity of Board decision making. In needs to be precisely defined how decisions are made and what level of commitment is required to make decisions. It is strongly recommended to avoid decision making processes that require unanimity. It can be useful to have different levels of commitment for different types of decision e.g. special majority for key decisions such as budget approval but simple majority for less significant issues.
- Size of Board. A Board needs to be engaged with the activities of its NREN but also to be efficient in terms of decision making. The Board needs to have a representational element regarding funders and stakeholders. Allowing for these considerations small boards (5 or fewer) are more efficient.
- Board representation. It needs to be defined who is eligible to be a Board member and on what basis. Rotation of Board membership and limitation of terms of office are important elements in determining Board representation. A factor that is relevant is to consider having a Board member, with business experience, who is independent of the NREN environment. This 'non-executive' approach is helpful in breaking down 'group think.'
- Clarity of devolved authority. The levels of devolved authority allowed to management and, within the NREN organisation, to individual managers needs to be explicitly defined.
- Reporting. An NREN needs to provide external statements of its activities as part of accountability. It is important to define the audiences for such reporting and its frequency.