

Indreni - the Nepali Intranet

A Platform for Electronic Publishing and Information Sharing In Nepal

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Abstract

This paper describes the establishment of an intranet programme, 'Indreni', in Nepal. The article commences with a briefing on the state of telecommunications in developing countries, Nepal being the prime example. The paper goes on to examine the procedures followed to establish Nepal Internet Users' group(NIUG); a non-profit NGO established to facilitate access to internet technologies through intranet in a cost-effective manner.

In establishing this network, the group was assisted by the Electronic Networking Project of the International Center for Integrated Mountain Development (ICIMOD)—a project funded by International Development Research Center (IDRC), Canada and responsible for establishing NepalNet, a group of development organisations through which a joint home page was registered on the worldwide web. The backward and forward linkages are explored—and this includes the difficulties of establishing IT networks in countries in which governments maintain a monopoly on telecommunication facilities. How these were overcome, the equipment acquired, and the partnerships formed are all given a place in this paper. The paper concludes with a brief on costs and the plans for the future, especially the role of IT in development research.

1. Introduction

As the world is embracing new technologies, the geographical distances between countries are rapidly overcome. With the advent of Internet, global electronic publishing and the distribution of information have taken the center stage. Yet, at the same time, technological and financial limitations prevent many countries in the third world from reaping the benefits of Internet. Thus, before these countries can enter the network, the technology to do so must become available locally and it must be affordable.

This is true for Nepal too. The need for a low-cost information infrastructure to publish and share information is necessary if Information Technology (IT) is to enter the public domain. Accordingly, the concept of a nationwide information network, or an "Intranet" arose. This paper describes the experiences of establishing a pilot infrastructure for this "Intranet", the rationale for such an infrastructure, and the overall effect it has upon the quality of information and the overall development of the country.

Initially, let me present a brief introduction to Nepal and its background in telecommunications and IT. This will help you to understand the issues addressed by this paper.

1.2 Nepal - An Introduction

Nepal is situated between 26.22 and 30.27°N; 80.4 and 88.12 °E. Cradled in the Himalayas, it is home to the earth's highest mountain, Everest, and the birthplace of Buddha - the apostle of peace. Within an area of 147,181 sq. km, it is a country of unrivaled cultural and natural diversity. Mountains and high hills occupy 77% of the total land surface and the remaining 23% is flat lowland (Terai). Forty per cent of the adult population is literate. Most people do not have access to drinking water, health facilities and transport.

The northern area of the country is under perpetual snow; here mighty rivers originate making Nepal a potential producer of abundant hydroelectricity. Landlocked between India and China, however, Nepal has not as yet been able to harness this potential.

The country is divided into 75 administrative districts and has approximately 4,000 Village Development Committees (VDC), 54 Town Councils, 3 sub metropolitan cities, and 1 metropolitan city. The rural area, mostly villages, covers most of the country.

According to the 1991 census the population was 18,841,097 and the annual population growth rate 2.02%. Ninety per cent of this population live in rural areas, and the main source of livelihood is agriculture. Migration to urban areas, especially into the lowlands and into the capital, is on the rise.

The main source of foreign exchange is tourism. Exports of indigenous handicraft products to countries like Germany are also on rise.

1.3 Telecommunication Infrastructure

In spite of the poor economy, the available telecom infrastructure in the country is on a par with systems in many developed countries - thanks mainly to foreign development aid.

Nepal embarked on the era of telecommunications over four decades ago, with the introduction of trunk telephone system to India, which was not available for the public at large. In 1955, with the establishment of a 300-line manual crossbar (CB) exchange, the general public also had access to telephones. The Department of Telecommunication was established in 1959 and in 1975 the Nepal Telecommunication Corporation (NTC) was established.

NTC presently provides about 200,000 subscriber lines through ninety one exchanges established throughout the country. Telephone facilities are now available in all districts of Nepal and 33 per cent of the VDCs are connected.

NTC is the only provider of international telecom connections. Direct dialing to 131 countries is available. GSM cellular mobile phones will be available in selected cities by the third quarter of 1999.

Yet, there are many shortcomings. The waiting period for a telephone line can be up to 10 years or more in some places, even in the capital. Many rural areas are deprived of basic telephone services. Since the present network was established with voice telephones in mind, it cannot provide data services according to demand to the urban areas. At present, there is 1 telephone per 100 people.

The monopoly of NTC is being broken with the recent introduction of a new telecommunication policy, which permits private sector participation in telecommunications. The international gateway as well as last mile wiring will still remain the monopoly of NTC until the year 2001.

The government has promised to provide basic telephone services to every VDC by the year 2002. Recently, V-SATs have been liberalized, and this will enable private parties to provide data services. Internet Service Providers (ISPs) are expected to benefit from this. Other data services have also been opened up to the private sector.

1.4 E- Mail / Internet

E-mail communications were introduced in the early 90s through private initiative. Connectivity was based on dialing in through India. In 1994, a local commercial company began to provide commercial e-mail services. Full Internet services started in late 1995. Mercantile Communications was the pioneering organization in this sector. Since 1996, World Link communications have provided an alternative ISP. CCSL and Capital Online are other ISPs offering Internet access. These ISPs also offer services such as e-mail to fax, fax to fax and web hosting services. Two more ISPs are in the offing.

It was private initiative that brought E-mail/ Internet to the country, and the users are also mostly private companies. Government Organizations (GO) have still to make full use of E-mail / Internet. The government has not been able to derive the maximum benefits from E-mail / Internet. There is also no strong government policy on this sector.

2. Current Information Technology in Nepal

At present, unofficial estimates put the number of E-mail/ Internet subscribers at about 10,000. This means about 40,000 users, because of the tendency to share the expensive connection. Estimates also put the number of computers in the country at about 50,000. The number of users therefore is 200,000. On the other hand, 80 per cent of these are concentrated in the capital city of Kathmandu. The lack of official figures and numbers make research work difficult, but it is estimated that the market share is roughly USD 16 Million.

International organizations, such as the UN, are the biggest consumers of IT in the country. Banks, mostly foreign Joint Ventures (JVs), make use of IT in mission critical jobs. The tourism sector is the biggest group of local users. The tourism sector has not only made use of the Internet but has also contributed to it through web-sites. Expatriates and people educated abroad form the largest number of personal users. Businesses have begun to embrace the technology, but the situation is bleak, from the wider perspective, as only large business houses have understood its importance. Many individual users as well as small businesses have started using computers, but they are not able to use the Internet, primarily because of lack of knowledge and fear of cost.

2.1 Status of On line information and Electronic Publishing

The present electronic information industry is supply driven. The Internet traffic is mostly outwards from the country. Even the meager content that has been developed by Nepali people is located mostly in North America because of bandwidth. The information in some cases is redundant and in many cases, as for example public health, it is non-existent.

Information stored in non-digitized form is also redundant in the offices of many development and government agencies. Research projects are repeated because there is no comprehensive repository of information. This has also effected the development of the country, in the sense that, if previous findings were easily available, work could have progressed rather than being repeated.

In this respect, the Electronic Networking Project (ENP) funded by the International Development Research Center (IDRC), Canada, implemented by the International Centre for

Integrated Mountain Development (ICIMOD) has proven to be very effective. One of the project's aims was to establish a network of researchers, administrators, planners and policy-makers, and development practitioners, from government agencies, university departments, research institutions, and NGOs, to share their information and resources about socioeconomic, agricultural, environmental, and sustainable development sectors in Nepal through Internet.

As coordinator of the network, ICIMOD provided training and hands-on experience in electronic networking and the Internet, web and hyper text mark-up language (HTML) publishing, and information selection, processing or analyses and repackaging. ICIMOD helped the members conceptualise, design, create, launch, and host a NepalNet web site created jointly by partners in the network. The web site at <http://www.panasia.org.sg/nepalnet> was launched on 15 September 1998. A hotline and a support desk was provided by ICIMOD for one on one interaction. Three Internet 'drop-in' sites for demonstration and research purposes were established at ICIMOD for the development community at large.

The established network - NepalNet - is a collaborative activity between these agencies, focused on sharing information about socioeconomic development in Nepal on a website. NepalNet contains the organizational profiles and unique institutional web pages of each of the 34 participating organizations. The number of partners is increasing, as new organizations continue to join the network. Nine Key Development Sectors: Agriculture; Ecology & Biodiversity; Forestry; Economy; Education; Sociology and Demography; Policy and Law; Technology and Infrastructure; and Water, Earth, and Atmosphere are covered. Links to other worldwide web destinations about Nepal are included under each of these key development sectors. The nine key development sectors are classified into 48 topics. In addition the site also contains background information on the land, history, people and government of Nepal.

ICIMOD also assisted with the establishment of the Nepal Intranet Users Group (NIUG) and supported the Piloting and Testing of a Nepal Intranet – 'Indreni.' Indreni is an on line site offering web-based information relevant to Nepal at the price of a local phone call. It is envisioned that NepalNet website will be furnished on Indreni. Indreni has attracted a lot of interest recently, and created public awareness about the value and potential of on-line information sharing.

Through ENP in Nepal, organizations in the Non Government Organization (NGO) sector, GOs, and university departments have gained access to the Internet and begun to contribute through NepalNet. This has increased awareness about the potential for sharing & publishing information on line, and NGOs, International Non Government Organizations (INGOs), and Government Organizations (GO) currently not associated with NepalNet are showing an interest in NepalNet and the Intranet service being established within Nepal by the Nepal Internet Users' Group (NIUG).

2.2 Status on Access to Information

Whilst the majority of Nepalis are dispersed and often located in isolated areas, over difficult and inaccessible terrain, IT-based solutions make it possible to make essential information available to people in different parts of the country at reasonable cost. This can be done on a sustainable basis if the costs of Research & Development (R&D) and pilot programs testing approaches to extending the telecommunications infrastructure are underwritten.

A good start has been made by improving the capabilities of NGOs and introducing innovative approaches to information sharing, through the ENP / NepalNet and NIUG projects, but additional work is needed in order to enable NIUG to carry on the work in a sustainable man-

ner. To date, the services provided by NepalNet and NIUG's 'Indreni' Intranet Service have been either accessible to a global audience, or to those limited numbers of people who can afford Internet in Nepal, or to those who can have access to the Intranet service in the Kathmandu Valley.

These limitations continue to cause constraints to access, and they have an impact also on the contribution of information, limiting it to a wealthier and more educated section of Nepal's population. Widespread geographical access across Nepal would open up huge, exciting possibilities, for sharing and utilising more localised research knowledge among different communities. This would facilitate the effectiveness of the decentralization policies already applied by empowering rural communities; the multiplier effects of shared indigenous knowledge and information resources are manifold. By reflecting the great diversity in terms of ethnicity and geography across Nepal, a more balanced and democratic distribution of information can be realised, thus improving the quality of research and development.

3. Nepal Internet Users' Group

Nepal Internet Users' Group (NIUG) was established, as the users' group of the first ISP in the country. It has now grown to include users from all the ISPs. This group was primarily established to share difficulties, ideas, and information. The group outgrew the old informal set-up and was registered in April 1998 as a non-profit NGO. It is the only IT-oriented NGO operating in Nepal with a focus on development and provision of IT supported social services.

During the past year, NIUG has grown as an organisation. It now has over 120 individual members and a contact database of over 500 individuals and organisations.

The objective of this NGO is to popularise the information super highway, encourage content development about local issues and in local languages, and provide a platform for electronic publishing in the country. In line with this objective, NIUG has come forward with the concept of an Information Sharing Intranet.

NIUG received a grant from ICIMOD's ENP for piloting and testing an Intranet service, eventually called 'Indreni', within Nepal. This service is in its infancy, but its potential has already attracted a lot of interest among Nepali organisations and the public at large.

4. 'Indreni' - the Nepali Intranet for Information Sharing

The Nepali Intranet, popularly referred to as 'Indreni', meaning rainbow in Nepali, was established as a platform for on line information sharing and publishing, as well as for indigenous R&D in Nepal. It offers a low-cost alternative to the Internet and has the potential to reach the masses. Small businesses, students, and individuals can benefit from the low cost. It also provides Nepali IT professionals with a platform through which new ideas can be researched and developed. 'Indreni' aims to change the IT scenario in the country in the long run.

'Indreni' is a new way of providing information and is, in itself, a unique endeavour. 'Indreni' aims to alter the situation vis a vis information gaps in the country, by making it possible to share information throughout the population before the gap between the information 'haves' and 'have-nots' widens. The Indreni system is being developed as a one-stop comprehensive information store for everyone. It aims to provide a platform through which information is published and made available on varied topics like business, environment, development, and education. The idea is to develop various centres of information throughout Nepal through the implementation of an Intranet in each district, to connect these centres to establish a nationwide

network of information publishing, and ultimately to connect this information structure to the Internet. Thus information from the ground up would for once be published and shared. It will create an electronic provision for basic information as well.

This means there will be a publicly accessible infrastructure; a knowledge base that can be used by all concerned in furthering the development of the country. The knowledge base, facilitated by the electronic searching and indexing capabilities, would provide users with valuable information in the shortest possible time. It would eliminate the redundancy found in development practices across the country.

The specific objectives of the Intranet and its subsequent effects on electronic publishing and information flow can be summarised as follow.

- To become a comprehensive repository of Information on and about Nepal and the Nepali people by providing a platform and medium to all and sundry to publish information.
- To provide an easily accessible platform for online information sharing by making the Intranet accessible widely across the country.
- To provide an open platform for electronic publishing, by encouraging those who are not able to publish on the Internet because of cost and knowledge. Being a platform for electronic publishing also will enable different information sources to keep the information in an electronic format that can easily be searched and indexed.
- To act as a local mirror of the content available on the Internet about Nepal, by downloading relevant content from the Internet and putting it on the Intranet.
- Redefine the information chain, by encouraging content development and the publishing of information electronically and access amongst the less wealthy who have hitherto been deprived of participation in the information network / chain.
- Become an example of IT implementation in the country and help INGOs, NGOs, and GOs in IT deployment. This objective would go a long way to establishing an information infrastructure in the country.
- Be a model of development, by demonstrating that public and private participation can enable the construction of a sizable infrastructure from scratch, eliminate bad practices, and establish best practices.

4.1 ‘Indreni’ – A Platform for Electronic Publishing

As Internet has grown, it has brought about an information revolution around the world. Information available in electronic format has many advantages over other forms. ‘Indreni’, the Nepali Intranet, uses the latest Internet technology, i.e., web servers, databases and Hyper Text Mark-up Language (HTML). This facilitates the advancement of the technology in the country and keeps the people up to date with the latest global technologies.

The platform created by ‘Indreni’ for electronic publishing encourages the otherwise disinterested local businesses and individuals to provide information. It also enables those who have information to publish it on an open platform. ‘Indreni’ primarily aims to create digitised information. This creates the scope for everyone in Nepal to use and understand the capabilities of Internet, but locally and with local content.

4.2 ‘Indreni’ - Redefining the Information Chain

‘Indreni’, as mentioned, is a new voice and a new way. It has the ability to redefine the information flow in Nepal. Presently, the information flow is limited to the producers of information. Information is from the top towards the bottom or, in other words, information is produced without public participation. Thus information is accessible only to a privileged few. The public face a lot of difficulty due to the lack of proper channels and a public body for disseminating information.

With ‘Indreni’, the information flow can be from the bottom up. One can establish or have access to information irrespective of one’s status or background. Development agencies that have no access to business data directly can acquire such information. Similarly, associations and individuals can have access to information on work carried out by NGOs and INGOs. Public inputs would add value to the information. The knowledge available publicly could fill the vacuum that exists and also bridge the information gap.

At present, ‘Indreni’ has promoted the idea of a ground-up approach to information production. At the same time a lot needs to be done to completely redefine the information flow. It will take a lot more time to achieve this, but a good start has been made.

4.3 ‘Indreni’ - the Technical Side

The Intranet system is deployed in the capital city of Kathmandu. The server, which is a Pentium 333 MHz machine, runs the Linux Operating system. This server has four modems.. Users are given a single number through which they can dial into the system and have access to the information. The system was developed with less than US\$8,000, and a lot of voluntary contributions.

4.3.1 Hardware

At the time of writing, only one Pentium 333 MHz machine is being used as the primary server. Four modems, two external and two internal, are configured on this system as dial-in modems. There are four phone lines, but public access is limited to two lines. One line is used for system administration and another for office use for e-mail and downloading. All the modems used support a transmission speed of 33.6 Kbps.

Presently, we are contemplating adding another server with additional hardware to support up to 10 lines. This will require a multi-port serial card with an interface for 8-16 modems. The new server will mean that the present server can be kept as a back-up and test server. Six more phone lines have already been applied for and the provision of a single number for connection (a hunting line).

There are two more computers that serve both for content development and as information access nodes.

The local computers are served by a 10 Mbps local network. All computers in the office are on the same network. The server has provision for a network of 10/100 Mbps.

4.3.2 Back-up Power Supply

A locally built Un-interruptible Power Supply (UPS) with the ability to provide power for up to 5 hrs has been deployed as back-up power supply for the server. Other computers in the office are served with a single UPS with the ability to give up to 15 minutes support after

power failure. With the new server and equipment, better back up is envisaged.

4.3.3 Operating System

Linux, since its inception in 1991, has emerged as a very powerful and reliable operating system. Functions, such as routing mail, serving the web pages, proxy, dial-up handling, etc, are built into the initial distribution; little has to be provided from outside sources.

The server uses Send-mail for mail, Apache for web serving, BIND for name resolution and mgetty for dial-in service. The Password Authentication Protocol (PAP) is used for user verification. The Linux distribution used is Red Hat 5.2.

Since the software is available freely on the Internet, it minimizes the cost.

4.3.4 Updating Content

Content is updated from the office. So far, users are not allowed to enter information directly. The contents are brought to the NIUG office on disks or zip disks. The ‘Indreni’ support staff then check the integrity of the contents and load it on to the server.

A system is being developed to give all users the capability of loading the contents on to the server from their own computers. The technical group already has this capability, but we are still working out long-term policies before making the service available to the public at large.

4.3.5 Database Connectivity

Although currently no databases are hosted on the Intranet, databases, mostly in CDS-ISIS format have been collected. Most libraries in Nepal make use of this system, so it is appropriate to make this library information system available on the Intranet. NIUG members are currently testing a WWW version of CDS-ISIS, WWW-ISIS, with some success. We will soon incorporate CDS- ISIS databases into the system.

Other databases, such as the census data, road statistics, metropolitan information, etc, are being developed. Generic CGI interfaces are being developed to link them to the Intranet. Although it has not been finalised, the database of choice will either be MySQL or PostgreSQL. These two systems are being tested and have proven to be both reliable and suitable.

4.4 Local Language Development and Publishing

As the standard for Nepali fonts has already been submitted to the Unicode Consortium, local language development will take the center stage. Making the Nepali languages available electronically will in itself be a significant step towards encouraging people to publish electronically. Currently, content is developed in a particular font, and users are required to download the font and use it to view the documents in the local language. We are trying to develop a font based on requisite standards and distribute it free of cost.

4.5 End-user Connectivity

The end user, who is visualized as any individual with a computer equipped with a modem, will be able to connect and publish as well as to share information on the Intranet. Clear dialing-in procedures are given to the end user, who, after connecting to the system, can gain access to the information through a web browser, just as he/she would on the Internet.

An internal e-mail system is also available for registered users; and each are given a unique user ID to send and receive mail. (S)he can send and receive mail to and from other users on the system. This mail system can be connected to the Internet for universal access.

People who otherwise cannot access ‘Indreni’ are welcome at the office to browse for information. Currently, users have to make a prior appointment. In future, when we have more computers, we will create nodes, so that anyone can drop in and use the system. We are looking for donations of used equipment from different organizations.

Schools and educational institutions are encouraged to use the system. If required, free consultation is provided to make the access easier.

4.6 Cost of ‘Indreni’

As mentioned before, the idea of ‘Indreni’ - the Nepali Intranet is to provide information at a very low cost. Similarly, the cost of the system itself was envisioned as the lowest possible, so that the system could be replicated across the country’s rural and urban areas.

For the pilot system, the total expense for one year (includes projections) is around US\$ 8,000, including the cost of the telephone access lines, the server, and other equipment. About \$2,000 goes on rent (one year), furnishings, and overheads. Around \$1,000 goes on procuring access lines, \$3,000 on the server, networking equipment, modems, UPS, and labor charges, and \$2,000 was spent on two computers and a printer for content development.

The pilot project was one of institutional capacity building of NIUG rather than only culminating in the establishment of an Intranet. Through research, we have found that, provided local support is forthcoming, the Intranet can be replicated at a cost of around \$ 4,000 in other parts of the country. Those nodes, however, will only be local access points; no content development can be actively carried out. Research and preliminary work are underway to identify and create nodes outside the capital and increase the outreach.

The voluntary contribution of time and the expertise of NIUG members eliminated the need for costly manpower. Technical and managerial expertise, that are hard to find and very expensive, were all contributed by NIUG members. This brought down the costs significantly.

5. The future

IDRC / ICIMOD has pledged support for ‘Indreni’ and the NepalNet operators and web site (www.panasia.org.sg/nepalnet), which is presently handled by ICIMOD itself, is being handed over to the NIUG in 1999. This will not only add substantial content to the site that is already available on ‘Indreni’ but also bring additional infrastructure and a group of people who are already experienced in electronic publishing. The NGOs and others that are part of the NepalNet project can contribute substantially to the electronic publishing and information-sharing objective of ‘Indreni.’

Currently, ‘Indreni’ has constraints in terms of content and work carried out. We are not monitoring usage and do not know its exact pattern. To date, the emphasis has been on getting the system up and running. Naturally, the content is lacking but the response has been positive from all quarters. As the focus of NIUG is now more on content, the platform having been established, an increase in quality and quantity of content is envisaged. In future, as the network expands and awareness increases, ‘Indreni’ will be the most effective medium inside Nepal for electronic publishing and information sharing by virtue of its unrivalled content and the community feeling that it generates.

To increase the use of ‘Indreni’, other elements in the IT sector within the country will need to

change as well. The price of PCs should come down significantly, the waiting period for telephone lines should also come down, fault rates should be decreased, and awareness must be roused. Then only can the stated objective of reaching the masses can be fulfilled. Until then, the effort lies in making ‘Indreni’ an accessible and dependable platform for electronic publishing and distribution, as well as an electronic knowledge base.

The idea of NIUG as a non-profit Internet Service Provider (ISP) has slowly emerged. Further inputs from those that are capable of supporting such an initiative are needed. It requires much more management and technical capability to transform NIUG from an Intranet Service Provider to an Internet Service Provider.

6. Conclusion

‘Indreni’ – the Nepali Intranet - is a unique Nepali experience. The successful mechanism for electronic publishing and the resulting access afforded by ‘Indreni’ prove that a platform can be created even in a least developed country on a par with technology used in developed countries. Advanced technologies developed for use in developed countries can be adapted for use in a developing country, and the implementation can be successful, as proved by ‘Indreni.’ It also proves that if an indigenous platform is provided, people can be mobilized locally to enter into the world of electronic information publishing and access.

‘Indreni’ has provided access to basic information and dissemination in the lowest possible cost frame. ‘Indreni’ has proved possible a low cost public electronic publishing platform using the latest Internet technology.

‘Indreni’ has proved that access to information at grassroots’ level is essential and electronic media can augment development; the effects will have a long-term impact in the execution of projects and decrease in redundancy of data and bad practices.

The overall impact of ‘Indreni’, will become more visible once the momentum increases and is reflected in the development of the country.