Proposal:

Facilitating the Village Panchayats to become an OFC distribution agency

Introduction

In India, rural teleconnectivity is the need of the hour. Thousands of villages in India are not connected simply because, at first glance, it is not profitable. Along with the low levels of education, poor information availability stifles the economic development of nearly 600 million Indians – which is especially true with the women in rural areas. BSNL has already announced[1] Rs. 1000cr losses on the as-yet-undeveloped rural sector, and these will only increase as the disparity of connectivity between the urban and rural areas grows.

Some efforts have already been made towards availability of connectivity in the rural areas, but these are mainly in the form of kiosks (Kiosks operated by ITC[2], or the *Vigyan Ashram* project at Pabal in Maharashtra[3], IIT Kanpur Digital Gangetic Plain[4] project, etc). However, these projects focus on creating a localized access point rather than improving the infrastructure in rural areas.

I am proposing a system whereby a proper Information and Communication Technology (ICT) infrastructure can be provided to villagers as end-users, rather than providing specific access points where the villagers have to go to obtain access. This will also involve the *gram panchayats* to facilitate the establishment of network infrastructure in rural areas, as well as provide e-governance solutions on the network.

Need to have proper infrastructure

Currently, Information and Communication Technology (ICT) infrastructure in rural areas seems to be a chicken/egg problem – nobody wants to have a long-term investment in a solid infrastructure, and nobody will know immediately what to do with it when it is available. However, we should consider the fact that, unless economically viable in the short term, private enterprise will shy away from creating a strong system that can scale to future capacities.

Good infrastructure is the key to getting information access to the rural parts of India. Improved infrastructure will attract small business as well as foster the development of local business and ensure their visibility in a regional, national or even global market. In addition, the improved access to information will help towards creating a good e-governance system. As the system is a village-level infrastructure, the *gram panchayats* can co-ordinate the network (if not own it), and use it to provide e-governance systems. Encouraging local entrepreneurship can also help retaining and attracting students to the rural areas to develop new services that can be delivered over the infrastructure, as well as a testbed for research into the economics of rural systems.

1 10 June 2002, from myiris.com via Yahoo! India Finance (reference link not available)
2 http://www.itcportal.com/ruraldevp_philosophy/fair_price.htm
3 http://www.vigyanashram.com/
4 http://www.iitk.ac.in/mladgp/

Some of the key benefits that will be achieved are:

1. Improved access to information for villagers and systems in the villages
2. Availability of Internet access in schools to facilitate education
3. Electronic libraries can be established
4. Improved systems for e-governance
5. Improved healthcare facilities (e.g. Tele-medicine)
6. Fostering new business investment in villages
7. Enabling telephony and Internet providers a sound infrastructure
8. Improving the economic conditions in villages

It should be noted, however, that a radical change in the village functioning will take a few to several years, as we are introducing new technology into a market that is not immediately ready for it.

Current lack of ICT Infrastructure in villages

Currently, the ICT infrastructure in villages and small towns is limited to what BSNL or MTNL provide (the traditional phone network). In some of the smaller towns cellular networks (BSNL, Hutch, Idea, Reliance, etc) exist, but the coverage is restricted to the town itself, and not to the surrounding villages. Even where companies advertise "Full connectivity on the highway" the connectivity is restricted only to highways and not to the interior areas. In many cases, geographical terrain plays a major factor in availability of infrastructure in a given region.

Improving the situation

When researching for similar past projects, I noticed a trend in each to provide a specific set of services. I have split the services into two parts – Infrastructure, which deals with the network availability and Services, which deals with what will be provided on top of the network infrastructure.

Infrastructure

1. Network access to the village from the outside world. (The uplink)
   This is usually achieved via a Microwave or Optic Fiber link from the nearest available service provider.
2. High Speed Network access within the village
   This step is currently woefully inadequate, and one which I plan to address
3. Establishing a network access-node which people can come to and use
   This is usually done, with a few PCs at the node, which people can use for email, Internet, etc.

Services

4. Providing Internet availability to the village network (or functioning as an ISP)
   This is usually achieved via the uplink to the outside world
5. Software required to perform village-level activities (e.g. *Mandis*)
   This is available in some access-nodes, and not available in other nodes.
6. Training the local people to perform the day-today maintainence tasks needed, and how to handle network outages.

Importance of Step 2 – high speed network access within the village:

High speed network access is a very useful tool for the villagers, due to the host of services that can be provided over it. Also, a well-connected village is more likely to attract new investment opportunities from any kind of business. In addition, such an infrastructure can be leased out to private companies that have dedicated line requirements (e.g. Cellular phone companies for their cell towers).

Importance of Operator independent network within the village:

Operator independent networks are very useful for promoting competition. Because the network owner has no vested interest in promoting one specific provider over another, multiple service providers can co-exist on the same network. In addition, it becomes a "shared infrastructure", and therefore there is little duplication of investment. Thus,

- A single organization manages the creation, management, and expansion of infrastructure
- Duplication of investment is avoided
- Revenue can be based on a purely service-based model, without requiring to recover infrastructure costs – which will effectively drive down the end-user prices
- Special leased lines can be provided for businesses that do not want traffic over a shared medium, or need quality of service guarantees
- Customers (i.e. Villagers) get a choice of providers for the services they desire (e.g. Internet access)
- The providers don't need to start from setting up their own network infrastructure, thereby reducing their startup costs as well as damage to the existing infrastructure (e.g. Digging roads to lay OFCs)
- Local services providers can be encouraged, as the setup cost is relatively much lower, as compared to establishing their own network. For example, this can become the basis for 2 or 3 cable operators sending video signals over the network infrastructure (e.g. With IP-Television or IP-Telephony)

To this end, a high-bandwidth network is essential, and I would recommend the use of Optic Fiber links for this purpose. I have also prepared a comparative study of OFC vs. Wireless networks, available at **http://www.hrishi.org/Projects/OFCvsWireless-Comparison.pdf**.

Implementation

My idea is based on a model adopted in Sweden – that the city government operates and maintains a high-speed city-wide OFC network. One such network is Stokab (**www.stokab.se**). Companies, universities, and organizations can lease fiber from one point to another for a reasonable fee. Thus, internet availability in Sweden is much higher and much faster than in most parts of the world. As a comparison, the cost of a broadband connection in the USA is about $40 for a 2Mbps connection. As opposed to this, the cost in Sweden for a 10Mbps connection is $50. In addition to internet, new companies also provide Television and Internet-Telephony over the same OFC line.

Such a model will need to be adapted to successfully work in Rural India. The the network infrastructure

should still be established and managed by the *gram panchayat* like any other village infrastructure (roads, water, etc). This ensures the operator independence, as well as provides an initial investment. In addition, to facilitate interest in the system, the *gram panchayat* will also establish an access-node consisting of Internet access and e-governance systems. Some additional details of the model are provided in Appendix 1

The *gram panchayat* will initially provide the following:

1. High Speed network infrastructure using optic fiber lines
2. Equipment to operate the OFC network (e.g. Switches)
3. Internet access via a suitable upstream provider (e.g. GailTel)
4. Provide Internet connectivity to the village schools and training the students to use the Internet
5. Access node, consisting of about 4-5 PCs which are connected to the Internet. (The e-information center)
6. Repository of all government forms required at the Gram Panchayat level, as well as facilities to print the forms
7. Software based IP-Telephony server, which will be used to provide free telephone services within the village
8. Bulk-price end-user network equipment (e.g. Fiber to Ethernet converter devices)
9. Bulk price IP Telephones

In addition, the gram panchayat should also encourage local entrepreneurship that utilizes the city-wide network. Later, as a way of recovering investment and maintainence costs, a per-user fee can be collected from service providers (e.g. Rs.10 per user for Cable TV), and from the users directly for the services provided by the *gram panchayat*, if any.

The e-information center will require about 200 sq.m. space for 4-5 computers. A trained villager will be available to help other villagers with their needs. For convenience, the e-information center can be co-located within the *gram panchayat* office area. For the purpose of this project, the *panchayat* can be connected to the Internet in co-operation with GAIL.

My role

I plan to do this as a part of my Masters degree Thesis at the Royal Institute of Technology (KTH), Sweden. My role in the whole process will be to act as an external consultant to the *panchayat* to help them with establishing the network, training the people who will be in charge of operating the network, and overseeing the operation, for a total period of 6 months (initially). In addition, I will also study the uptake of technologies in villages, and viability of such a system if implemented by more villages, and report on the same. I am also willing to teach the students at the village schools regarding usage of computers and the Internet.