

Some observations and recommendations for spreading integrated telecommunications infrastructure in rural Bangladesh

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Telecommunication requirements (including Internet) of the villagers of developing nations like Bangladesh are quite different from those of a developed nation and normal city dwellers. A few observations and suggestions to be developed for the villagers of Bangladesh are as follows.

1. The villagers need voice connectivity for private use with normal PSTN Tariff as enjoyed by city dwellers. Overhead for cellular mobile communication equipment becomes a heavy burden, as they are mostly immobile. Providing PSTN type connectivity should be the topmost priority.
2. Valued added services, like SMS, Microsoft outlook mail, over PSTN type end user equipment will be useful and a stepping stone towards adaptation of internet use. They need to be developed.
3. SMS must be capable of communicating in regional language.
4. Small, low cost end user equipment needs to be developed, based on simple hybrid technology, for above value added services. Institute of Electrical and Electronics Engineers (IEEE) may lead in developing standards. For example, there may be a common hardware including telephone type keyboard, over which any regional language key operation can be downloaded or configured.
5. Availability of power source is a necessity. If electricity is not available, batteries may be recharged/refilled from a common point within the village (something like a gas station).
6. The last mile connectivity to the villagers for private use should be circuit switched, capable of providing voice and data.
7. For public use, e.g. Kiosks, schools, health centers etc, internet services will be a necessity. Bandwidth for such facilities can grow on demand.
8. Contents of websites to be developed in Bangla for generating interests of rural people.
9. Internet data centers should be developed. ISPs and PoPs should grow.
10. Population density of Bangladesh is highest in this subcontinent. Effectively cost of core infrastructure will be lowest. The government and people should take this advantage. A structured network covering all villages needs to be planned. Optical fiber backbone with SDH ring architecture covering all upo-zillas and beyond, are highly recommended. DWDM over FO backbone will be essential for Dhaka to Cox bazaar (smw-4) link. That can be extended further as and when necessary.

11. The backbone should have voice and data channels in parallel up to the telephone exchange building, nearest to a user in a village. The user will use circuit switched last mile connection for private use both for data and voice communication. As the exchanges are non-blocking, voice networks will never be occupied for data services.
12. As data is transmitted in a shared media, cost is obviously low. The user in a village must enjoy the privilege of low cost shared data communication channels.
13. The last mile connectivity may be wireless, for quick deployment, lower cost, remote locations and for difficult terrains. WLL based on CDMA-01x is a good choice. But wired connectivity always saves wireless bandwidth which is precious. Hence last mile solution of entire country with high population density should not be only on wireless if a high tele-density is to be achieved. Wire line should grow gradually, may be using direct exchange link (DEL) or using other technology.
14. Internet should penetrate in educational institutions, business premises, industries, health centers, and in public places through Kiosks. For this purpose leased line connectivity is a better choice. For quick deployment, link may be wireless. Wi Fi is a good choice for the last mile where Wi Max should be the back haul. As the end user interface cost is high in terms of individual monthly income of a user in a remote village of a developing nation like Bangladesh, a single connectivity has to be shared by many machines (through LAN).
15. Wi Fi may be used by a group of users for specific use (e.g. education sector, or local village community or some pilot projects), but not to be considered for general purpose data communication services. Wireless systems like Wi Fi, which operate in unlicensed band frequency, may face interference from other sources. Hence the wireless part of the national network must be based on licensed band of frequency only.
16. IP telephony (IPv4) based on such Links are not recommended as QoS is poor, and it is not tested over an entire country with such a large population.

Expanding national telecommunication infrastructure is a complex task and to be planned carefully. A single technology cannot provide complete solution. Rural economy and communication needs will grow side by side. Access to knowledge base upto a level, should be fundamental right. Government should come forward with new views and determination. Global community should continue in helping these people and the government in all respects. IEEE should extend its role in down sizing technology for the rural community of developing nations.