Digital Gangetic Plains (DGP): 802.11-based Low-Cost Networking for Rural Areas

A report on status as of Dec 2004 (edited by Bhaskaran Raman)
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Objective and scope of the project: The primary goal of the project is to explore IEEE 802.11 (WiFi) as a *low-cost* technology for providing Internet connectivity to remote rural villages. Although the technology is quite popular for indoor use, its outdoor long-distance use had to be explored for feasibility, efficiency, and operational issues. Our approach for this has been to deploy a real testbed to gain experience and to get cost estimates from the prototype.

Progress as of Dec 2004: We currently have as many as a dozen village nodes where we have provided WiFi-based Internet connectivity. Our primary contribution so far has been to show the feasibility of the technology for rural Internet connectivity. We have a good understanding of (1) the costs involved, (2) the operational issues, and (3) various performance issues. Going forward, we intend to work on some of the open issues. We have extensively testbed one specific application "Voice-over-IP", which can be a boon to villages where there is no telephone connection. Our contributions on technical and operational issues are documented in detail in our report (see below).

Deployment details: Our deployment currently covers twelve villages around IIT-Kanpur. These are covered using off-the-sheld 802.11b equipment, and using point-to-point wireless links. The longest link we have been able to establish so far is about 39km. Our testbed stretches all the way from Kanpur to Lucknow. One of the significant parts of the testbed is Sarauhan, where we are experimenting with Voice-over-IP. Further details of the testbed can be found in our report (see below).

Publications and Reports:

- "Revisiting MAC Design for an 802.11-based Mesh Network", Bhaskaran Raman and Kameswari Chebrolu, Third Workshop on Hot Topics in Networks (HotNets-III), 15-16 Nov 2004, San Diego, CA, USA. [Acceptance rate: 19.7%]
  http://www.cse.iitk.ac.in/users/braman/papers/2p.pdf
- "Turning 802.11 Inside-Out", Pravin Bhagwat, Bhaskaran Raman, and Dheeraj Sanghi, Second Workshop on Hot Topics in Networks (HotNets-II), 20-21 Nov 2003, Cambridge, MA, USA. [Acceptance rate: 19.3%]
  http://www.cse.iitk.ac.in/users/braman/papers/inside-out.pdf
- "Digital Gangetic Plains: 802.11-based Low-Cost Networking for Rural Areas, 2001-2004: A Report", The DGP Media Labs Asia Team, Edited by Bhaskaran Raman, July 2004 http://www.cse.iitk.ac.in/users/braman/papers/dgp-report.pdf

DGP websites:

- http://www.cse.iitk.ac.in/users/braman/dgp.html
- http://www.iitk.ac.in/mladgp