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VillageNet

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Project Profile

Villagenet is a low-cost, high performance mesh architecture that provides broadband access to villages. This proposes a low risk (low-cost) entry point for operators, in rural regions.

It targets the rural markets where there are large populations with low paying capacities. VillageNet offers a low-cost and high performance alternative to traditional wireline/cellular technologies that have prohibitively expensive deployment costs. VillageNet connects villages in a mesh using long-distance wireless links. The cost of building the network is kept low by using off-the-shelf IEEE 802.11 equipment and optimizing the network topology to minimize cost.

Problem & Opportunity

Most villages are within 25 Kms of a fiber drop - small towns (called "gateway" nodes) with Internet connectivity. The average inter-village distance is 7-8 Kms. Rural villages represent a huge but untapped market. Less than .7% of India's villages have network coverage. The providers in the world ignore the villages because of the low paying capacity and low user densities in villages.

Problem: How to extend this internet connectivity to the villages in an inexpensive manner?



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Solution

It is possible to profitably connect the villages by using a low cost broad band networking technology. Broadband rural networks can also enable many useful applications like phone services, weather forecasts, market prices for crops, information on agricultural products, distance learning, telemedicine, video services etc that in turn can generate revenues.

Using commodity IEEE 802.11 radio equipment will reduce costs and hence it is possible to install Network equipment at each village for < US\$ 250-1000. In addition to this, Multi-hop mesh architecture built out from the gateway node to cover long distance, point-topoint links and Directional antennas will ensure a wide coverage.



- The project proposes a very low-cost WiFi based approach. The VillageNet network equipment costs in the order of USD 500-1000 (depending on number of links at a node etc.)
- The project proposes a unique opportunity to provide broadband to untapped areas in the emerging markets.
- Design of novel channel allocation and link scheduling algorithms to allow interference free operation of network links with guarantees on meeting node demands.
- Algorithms for topology design to build resilient low cost networks.
- We have also constructed an outdoor testbed, which connects all the Alcatel-Lucent offices in Bangalore for performing realistic tests and experiments.

• The Point-point mesh can cover tens of kilometers







Innovation & IP

Interference mitigation: **Efficient algorithms to** allocate channels to enable full-duplex, simultaneous operation of all links, with no synchronization required.

2 filed Patents (+ 3 papers in Infocom, 1 BLTJ)

Network planning: Algorithms to assign heights to towers to establish minimum cost connected networks







Team

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