WIMAX Promise – Wireless Networks in the State of Gujarat in India, and Western Australia

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The WiMAX Standard

- The world's first Universal Telecommunications Standard
- Collaborating with IEEE 802.16 WirelessMAN and ETSI HiperMAN standards
- Throughput up to 70Mbps
- Range 48km.+
- 256 FFT (Sub-Carrier) OFDM technology
- Sub 11 GHz Frequency Bands
- Flexible QoS
- Strong security support
- Clear migration path to mobility (802.16e)
- Industry has recognized the benefits of W-OFDM

WiMAX and Standards Bodies Cooperation

- ETSI
  - WiMAX and ETSI are working to establish a cooperative agreement
  - WiMAX members are working with ETSI on HiperMAN Conformance and Interoperability testing standards
- IEEE
  - WiMAX has been working, since it's inception, with the IEEE 802.16 Working Group
  - WiMAX is a major contributor to IEEE Conformance standards

WiMAX Forum
Proliferating W-OFDM

Founding Members

NOKIA Connecting People · Wi-LAN · ENSEMBLE Communications

WiMAX Members *

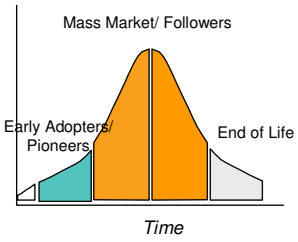
Fujitsu	OFDM Forum
Hughes Network Systems	France Telecom
Intel	Tata Teleservices
PCCW	Alcatel
Reliance Infocom	Atheros
China Motion Telecom	British Telecom
LG	Qwest
Cisco	Nortel
Sprint	Aperto Networks
Siemens	ZTE

* Partial List – Membership currently over 300 Members

- Non-profit corporation comprised of key industry players.
- Wi-LAN was instrumental in founding WiMAX
- Formed to promote and certify the conformance and interoperability of IEEE 802.16 and ETSI HiperMAN FWA equipment.
- WiMAX focus is the 256FFT OFDM (based on Wi-LAN's W-OFDM technology) in the sub 11GHz bands.
- Wi-LAN's Shane Rogers is on WiMAX Board
- Wi-LAN's Gordon Antonello is on WiMAX Board and Chair of its technical committee.
- Efforts will help accelerate the proliferation of W-OFDM based Broadband Wireless Devices

The WiMAX opportunity

- WiMAX brings:
  - Spectral Efficiency/Throughput
    - A big fat pipe – 288 Mbps per cell*
  - Non Line of Sight/Range
    - Access to more customers
    - Lower Deployment Costs
  - Lower CPE costs
    - Penetration into the residential mass market
  - Clear pathway to Broadband Mobility

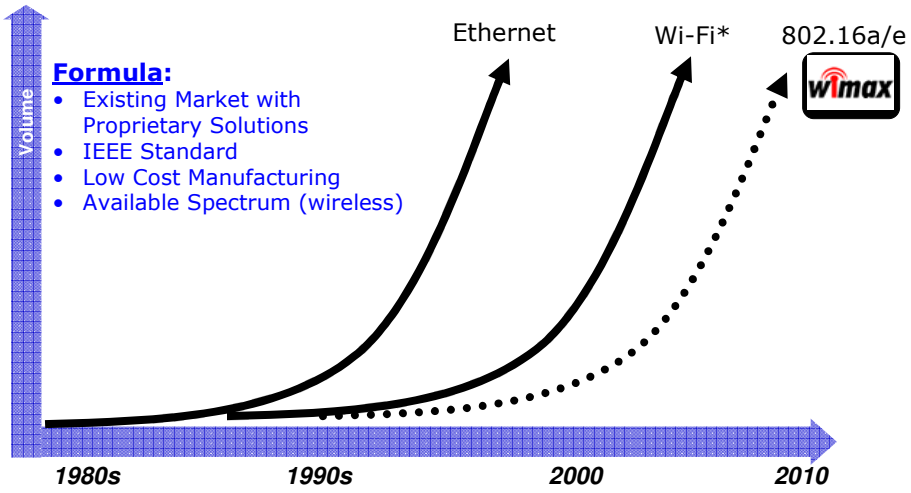


*Full Duplex, 64QAM, 7MHz channel, 6 sectors

Wireless Broadband Markets

- **Fixed Business**
  - **T1/E1 level service for Medium/Large Enterprise (MLE)**
  - **Fractional T1/E1 level service for SME/SOHO**
  - **Back-haul for hotspots**
  - **Telco point-to-point link**
- **Fixed Consumer**
  - **Residential and SoHO DSL replacement**
  - **Indoor or Outdoor CPE possible**
  - **Rural Connectivity**
- **Mobile/Nomadic/Portable**
  - **Infill for Wi-Fi hotspots to provide ubiquitous connectivity**

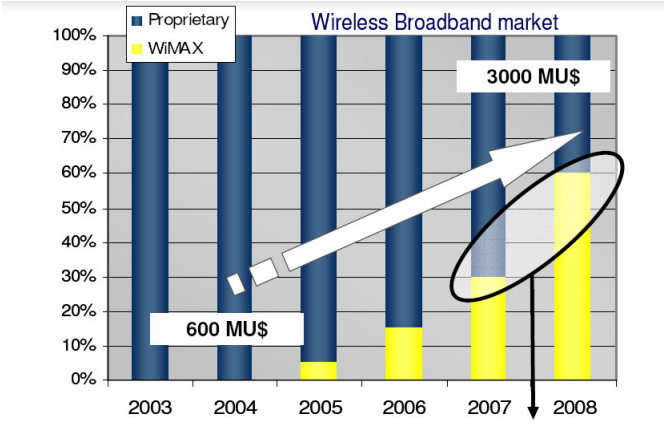
Standards & Interoperability
The Path to Volume Economics



Formula:
- Existing Market with Proprietary Solutions
- IEEE Standard
- Low Cost Manufacturing
- Available Spectrum (wireless)

*Other names and brands may be claimed as the property of others.

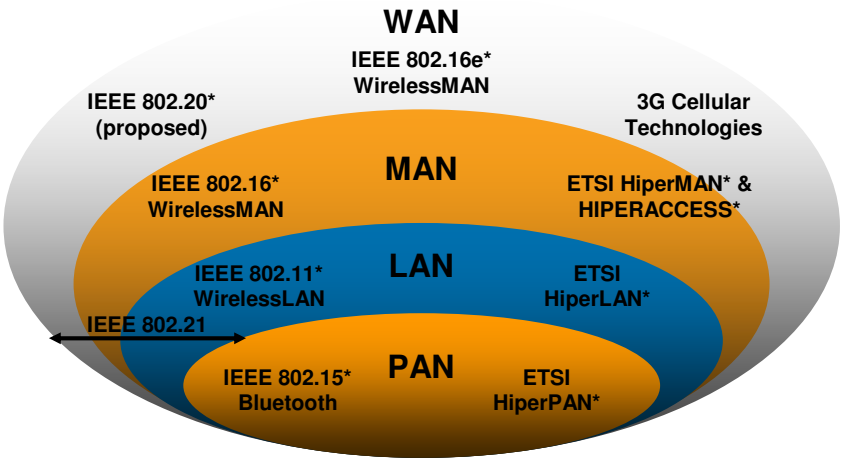
WiMAX Market



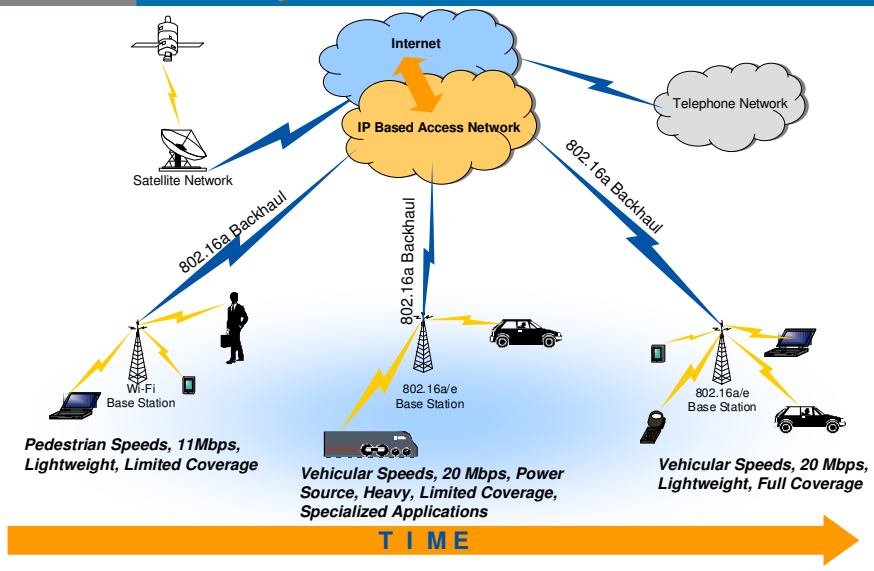
Source:Pyramid strategies

Operators will start to benefit from economies of scale

Global Wireless Standards

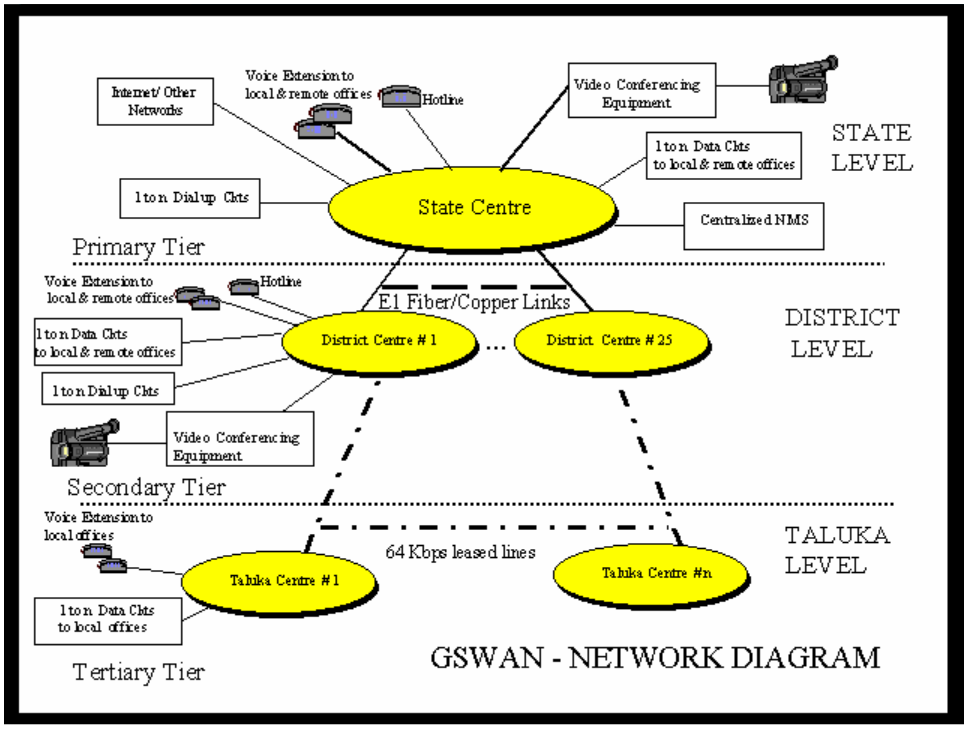


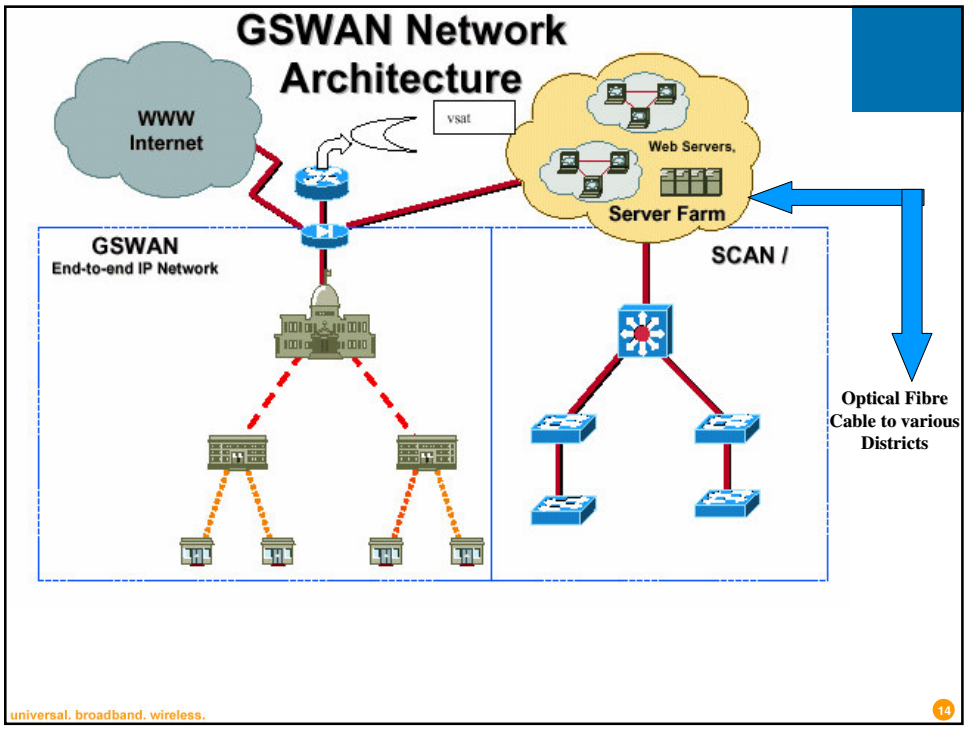
Evolution of Universal Broadband Mobility




WiLAN
Rural Networks in the State of Gujarat in India
universal. broadband. wireless.

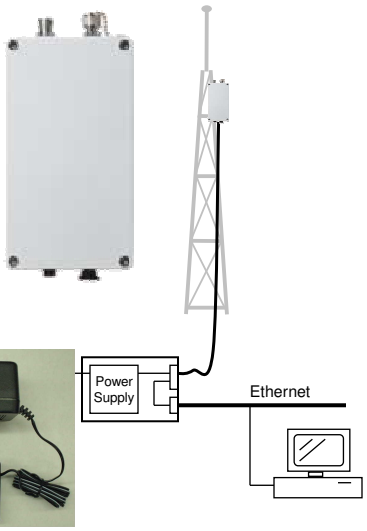

PAKISTAN
RAJASTHAN
MADHYA PRADESH
MAHARASHTRA
DADRA & NAGAR HAVELI
Banas Kantha
Rann Of Kachchh
Patan
Little Rann Of Kachchh
Mehsana
Sabar Kantha
Gandhi Nagar
Kachchh
Ahmedabad
Kheda
Panchmahal
Dahod
Gulf of Kuchchh
Surendranagar
Jamnagar
Rajkot
Anand
Vadodara
Porbander
Bharuch
Narmada
Junagadh
Amreli
Bhavnagar
Surat
Gulf of Khambhat
Navsari
The Dangs
Diu (Daman & Diu)
Daman (Daman & Diu)
Valsad
ARABIAN SEA
Map not to Scale
State Boundry
District Boundry
State Headquarter
District Headquarter
Creek


Internet/ Other Networks
Voice Extension to local & remote offices
Hotline
Video Conferencing Equipment
STATE LEVEL
1 to n Data Clts to local & remote offices
1 to n Dialup Clts
State Centre
Centralized NMS
Primary Tier
Voice Extension to local & remote offices
Hotline
E1 Fiber/Copper Links
DISTRICT LEVEL
1 to n Data Clts to local & remote offices
District Centre # 1
District Centre # 25
1 to n Dialup Clts
Video Conferencing Equipment
Secondary Tier
Voice Extension to local offices
64 Kbps leased lines
TALUKA LEVEL
Taluka Centre # 1
Taluka Centre #n
1 to n Data Clts to local offices
Tertiary Tier
GSWAN - NETWORK DIAGRAM


GSWAN Network Architecture
WWW Internet
vsat
Web Servers,
Server Farm
GSWAN
End-to-end IP Network
SCAN /
Optical Fibre Cable to various Districts
universal. broadband. wireless.
14

VIP 110-24

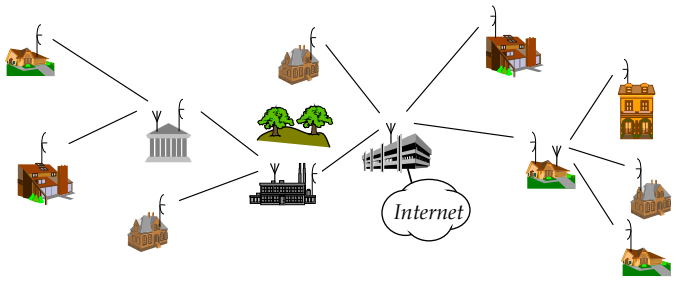
- All Electronics in Outdoor Unit
- Cable carries DC Power and Ethernet
- Dual Antenna Port
- Antenna Alignment Port
- VINE technology enabled



Key Features

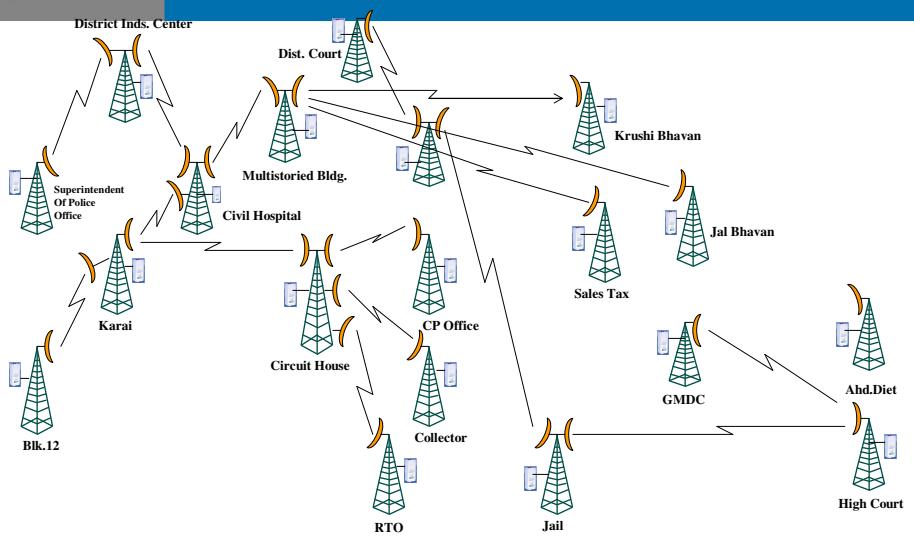
- Overcomes Non Line of Sight issues with patented VINE technology
- Provides effective data throughput of 8 Mbps, up to a distance of 40 Kms.
- Quality of service gives you more flexibility to control bandwidth to the users and as a result maximizes their revenue intake.
- The VIP 110-24 physical unit is configured as a single piece, outdoor unit. This outdoor unit effectively reduces installation time and eliminates the cable loss, thereby increasing the range. Easy to Program
- Headphone / Audible Port reduces installation time by up to one hour at every location.
- Built-in Spectrum Analyzer scans spectrum to determine best channel
- Unisex design enables the units to be configured either as a remote, base, or repeater allowing the VIP 110-24 to be the only product you'll need for your entire network.
- Lower Power Consumption
  - 5 Watts
- Over-the-air Upgrades

VINE Solution

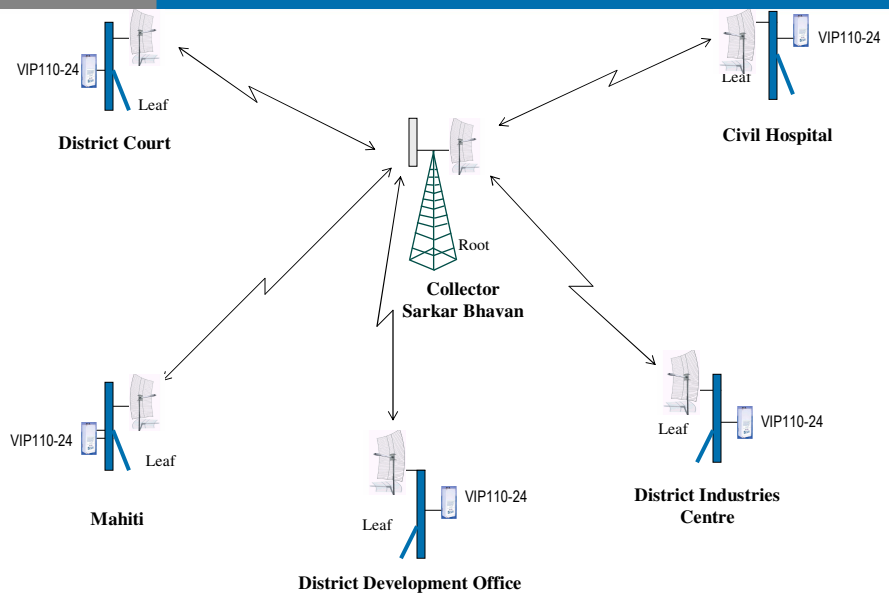


- Unique “Anypoint-to-Multipoint” architecture
- Keeps advantages of “Point-to-Multipoint” (cell) and “Multipoint-to-Multipoint” (mesh) with none of the disadvantages

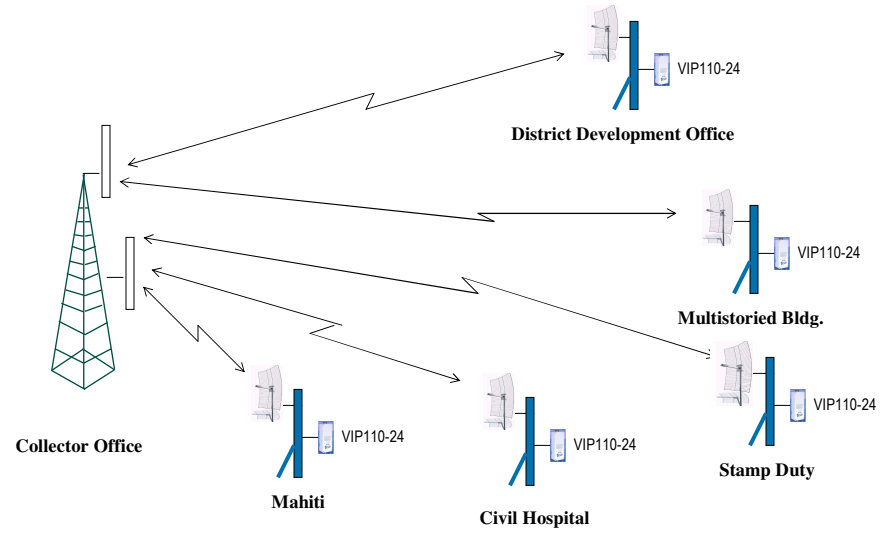
AHMEDABAD SETUP



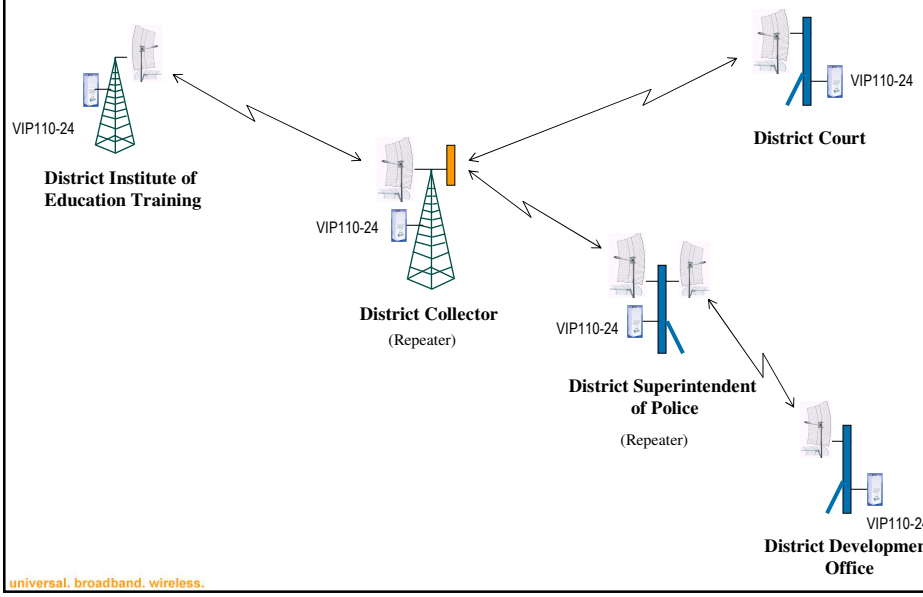
SETUP OF NADIAD



SETUP OF PALANPUR



SETUP OF PATAN



The GSWAN Network today, and the future

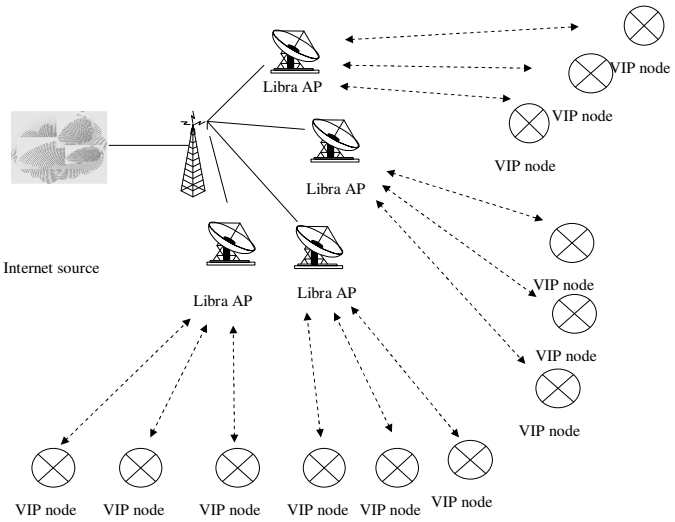
- Deployed base stations at all the 25 district headquarters, and 55 block headquarters.
- Currently base stations are being deployed stations at 225 blocks. That will be done by end October, after which the plan is to bring 2900 villages on this network.
- The government of India recognizes that the fast and the most economical way to broadband to the villages is to go wireless, and has launched a scheme to enable the states to set up Wireless base stations at the state, district, and block head quarters.
- An amount of INR 30 Bn has allocated for this.
- The broadband revolution is happening today and Wireless and WIMAX are playing the key role.

HIBIS Initiative of the DCITA, Australia

- HiBIS is a $157.8 million initiative of the Australian Government providing registered Internet service providers with incentive payments to supply higher bandwidth services in regional, rural and remote areas at prices comparable to those available in metropolitan areas.

- Bushcom is a Telecommunications Carrier and a registered provider of services under this scheme.
- BushCom is rolling out a full scale Wireless Broadband network in small towns and rural areas of Western Australia.
- BushCom instals, with the homeowner's permission, wireless (low frequency) receivers to the roof or eaves of every household within the selected Shires (and within BushCom's wireless network range).
- Bushcom now has broadband internet services available in

1. Lancelin, WA
2. Donnybrook, WA
3. Corrigin, WA
4. Toodyay, WA



(Each VIP node has one Libra CPE, one VIP root, five VIP repeaters, and 125 VIP leafs)

Approx 2 km away

View of DonnyBrook from base of Tower

Approx 4 km away

View of Corrigin from base of Tower

Conclusions

- The Governments will have to play the leading role in taking the Broadband revolution to the villages, either directly, or through financing the efforts of the private sector.
- The demand in the rural areas will primarily remain for FWA.
- The proprietary technologies will continue to play a role in the BWA roll outs.
- While availability of Licensed bands will be a key to the growth of the networks in the urban areas, the rural areas are best served with unlicensed bands.
- On Standards - Interoperability and economies of scale will bring in volumes, reduced costs, lead to penetration of market, and still higher volumes.
- Eventually, WiMAX will become THE way to deploy new fixed and mobile services

Thank You

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