



Rural Broadband for Rural Communities



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Rural Broadband brings more with it than just email and internet access

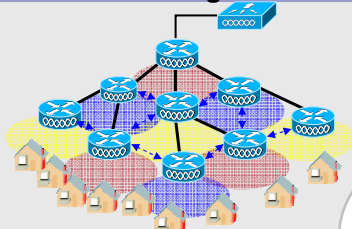
- It **positively** impacts **the quality of citizens' lives** and increases productivity **in many ways, e.g.**
 - **PUBLIC SECTOR**
e-government
 - **RURAL COMMUNITIES**
remote access
 - **RURAL BUSINESSES**
e-commerce
 - **RURAL EDUCATION / HEALTH FACILITIES**
e-learning / e-health
 - **LOCAL COMMUNITY INFORMATION**
local content
 - **AGRICULTURE/ENVIRENMENT**
poverty reduction/ sustainable development

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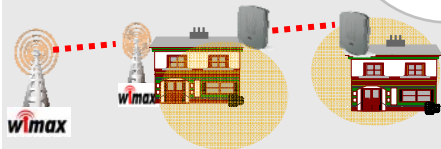
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Rural Broadband Connected Communities Options

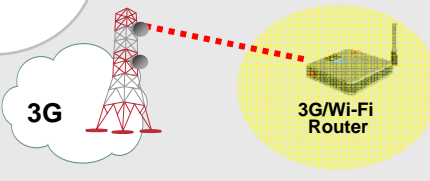
Mesh Networking



802.11a/b/g
Access



WiFi and Wimax Backhaul



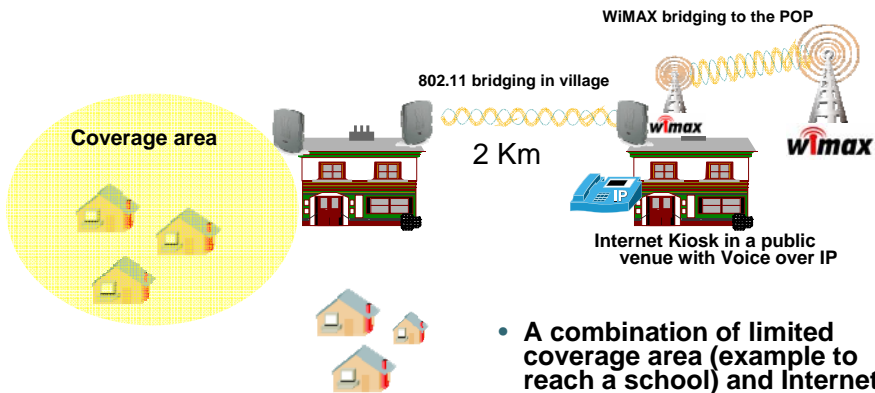
WCDMA /CDMA2000 /EVDO Backhaul

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Internet Kiosk and Extended coverage in a village 802.11 Access/Bridging & Wimax for Uplink to Backbone



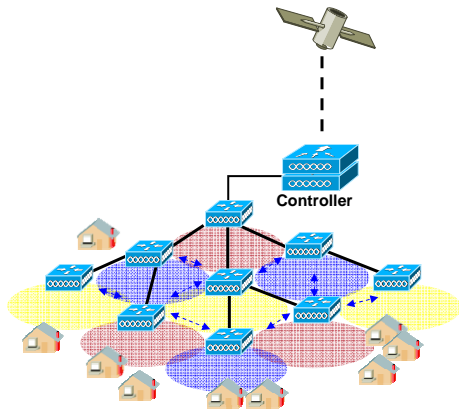
- A combination of limited coverage area (example to reach a school) and Internet kiosk for public access
- 802.11A/G Bridging between buildings for backhaul
- WiMAX for backhaul

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Mesh network for rural areas 802.11 Access & Satellite Uplink to Backbone



- Mesh networking solution for dense coverage in a village
- Cost effective workgroup bridge as CPE
- Access in 2.4 GHz
- Wireless backhaul “where permitted” in the village using 5 GHz, no wiring
- Solar energy could be used to power the access points
- Satellite uplink to the ISP or national backbone
- Multiple users groups are supported

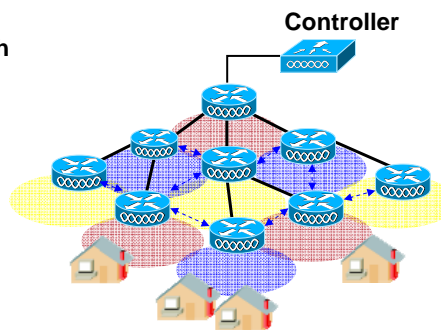
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Wireless Mesh Solution For Rural Broadband

- Self-Configuring, Self-Healing Mesh
Zero-Touch Configuration
- Dynamic & Reliable
- Easy to Deploy and Manage
- Robust Embedded Security
- Provides Seamless Mobility
- Operates over L2 or L3 Network
- Highly Scalable
- Identical Indoor & Outdoor Security,
Policy and Networks Management
- 2.4GHz, and “where permitted” 5GHz AND 4.9 GHz capable
radios

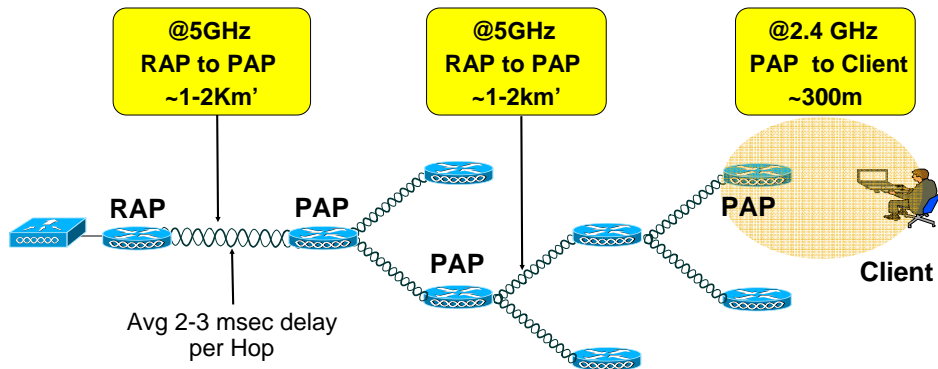


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Typical Distances for Links



HOPS	One	Two	Three	Four
Throughput	~10Mbps	~5Mbps	~3Mbps	up to 1Mbps *

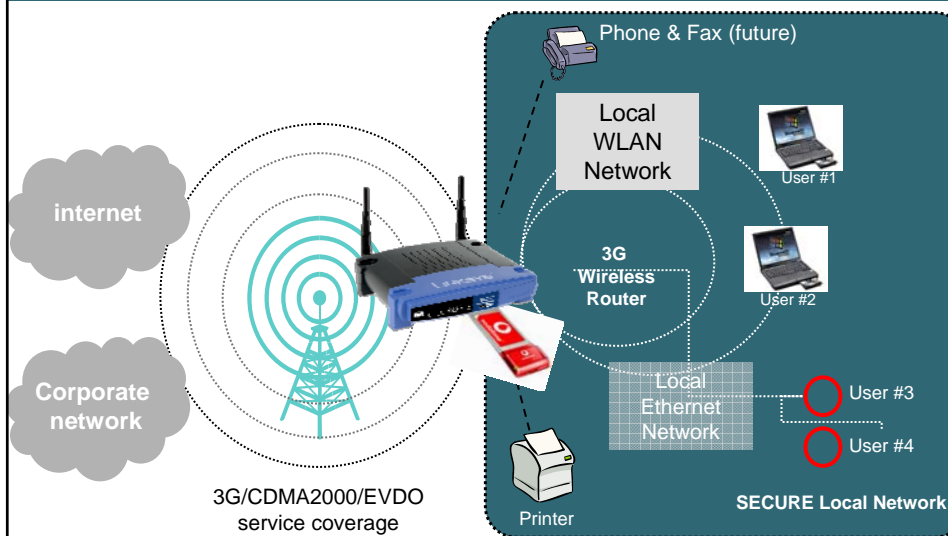
*"where permitted" 5GHz otherwise 2.4Ghz can be used also for Backhaul

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Combining 802.11 and WCDMA/CDMA2000/EVDO is viable solution today



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Rural areas in emerging markets can have the following challenges and Opportunities

Challenges

- Availability of power source for network component and Environmental issues (heat, humidity, dust, etc)
- 802.11 Related challenges, Distance and capacity are limited by regulatory domain.
- Availability of a cost effective backhaul technology and Line of sight versus non line of sight

Opportunities

- 802.11 / MESH technology can deliver a cost effective, scalable solution today.
 - Proven deployment methodology
 - Mass Market Wi-Fi benefits (very low CPE cost)
 - WiFi Evolving Standard – QoS, 100 Mbps
- Combining 802.11 and WCDMA/CDMA2000/EVDO is viable solution today
- Whilst 802.16 and 802.20 are making promises for the future,
 - Should be monitored for possible application in these environments.”