



# FIRST MILE SOLUTIONS

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Developmental Entrepreneurship  
Class Presentation  
MIT Media Lab  
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# Overview

- ✍ Introduction: Why are we here?
- ✍ The Problem (Opportunity)
- ✍ Approaches
- ✍ Experiences
- ✍ Business Strategy
- ✍ Lessons Learned & The Way Forward

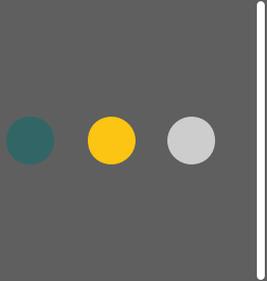


# Why are we here?

- ✍ Why are you here?
- ✍ Developmental ventures require interdisciplinary teams and more than just technology.
- ✍ Political, cultural dimension is critical



# The Problem (Opportunity)

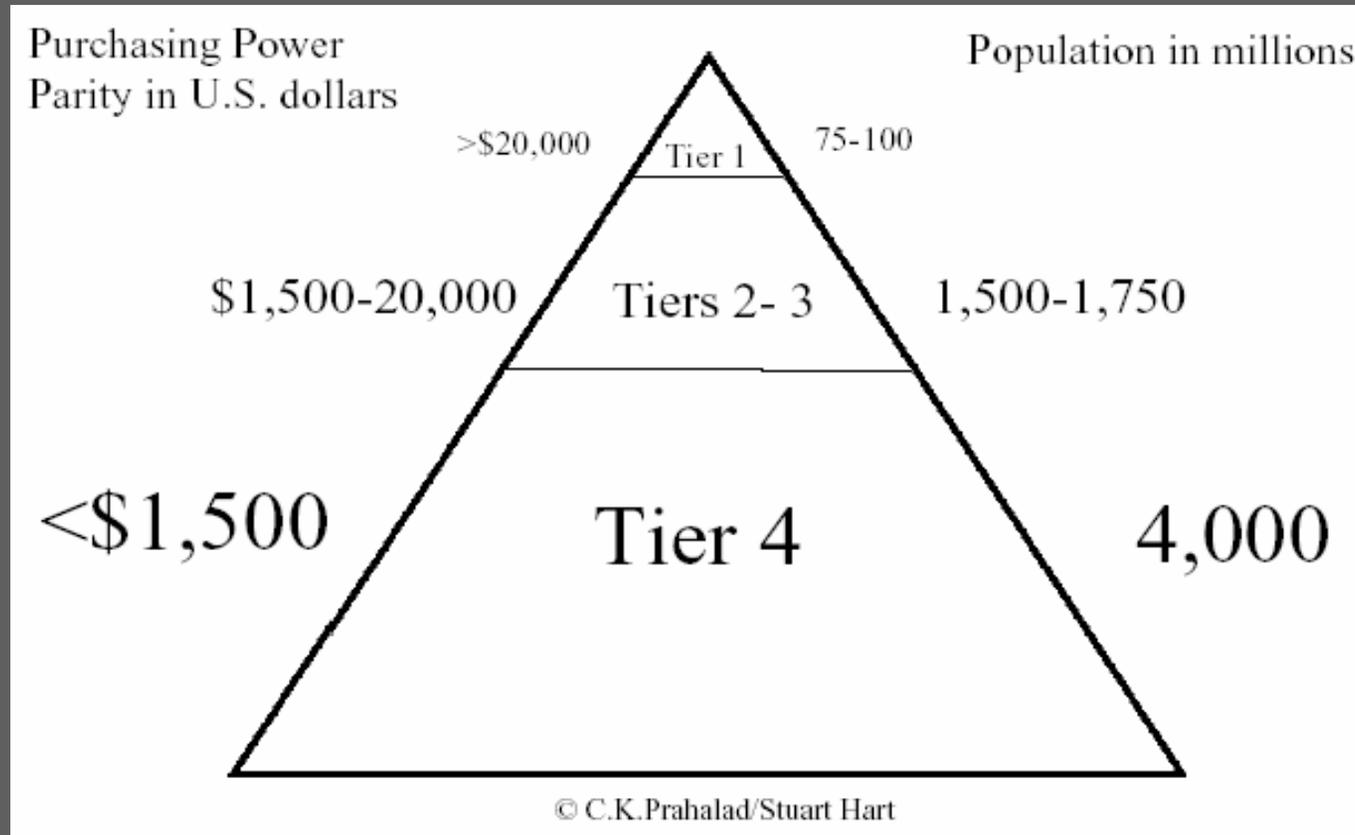


# 4 Billion Rural People Remain Unconnected

- ✍ Chicken and egg problem:
  - ✍ Egg: No affordable, sustainable rural communications infrastructure
  - ✍ Chicken: No market for rural communications
- ✍ What is needed: a low-cost, low-risk means of providing widespread connectivity so as to:
  - ✍ Overcome infrastructure cost barriers
  - ✍ Test out digital rural applications/services
  - ✍ Stimulate the rural development dynamic
  - ✍ Create incentives for deregulation and delicensing



# The Opportunity



Every 1% increase in value-add or efficiency in this population segment represents a \$40 billion opportunity.

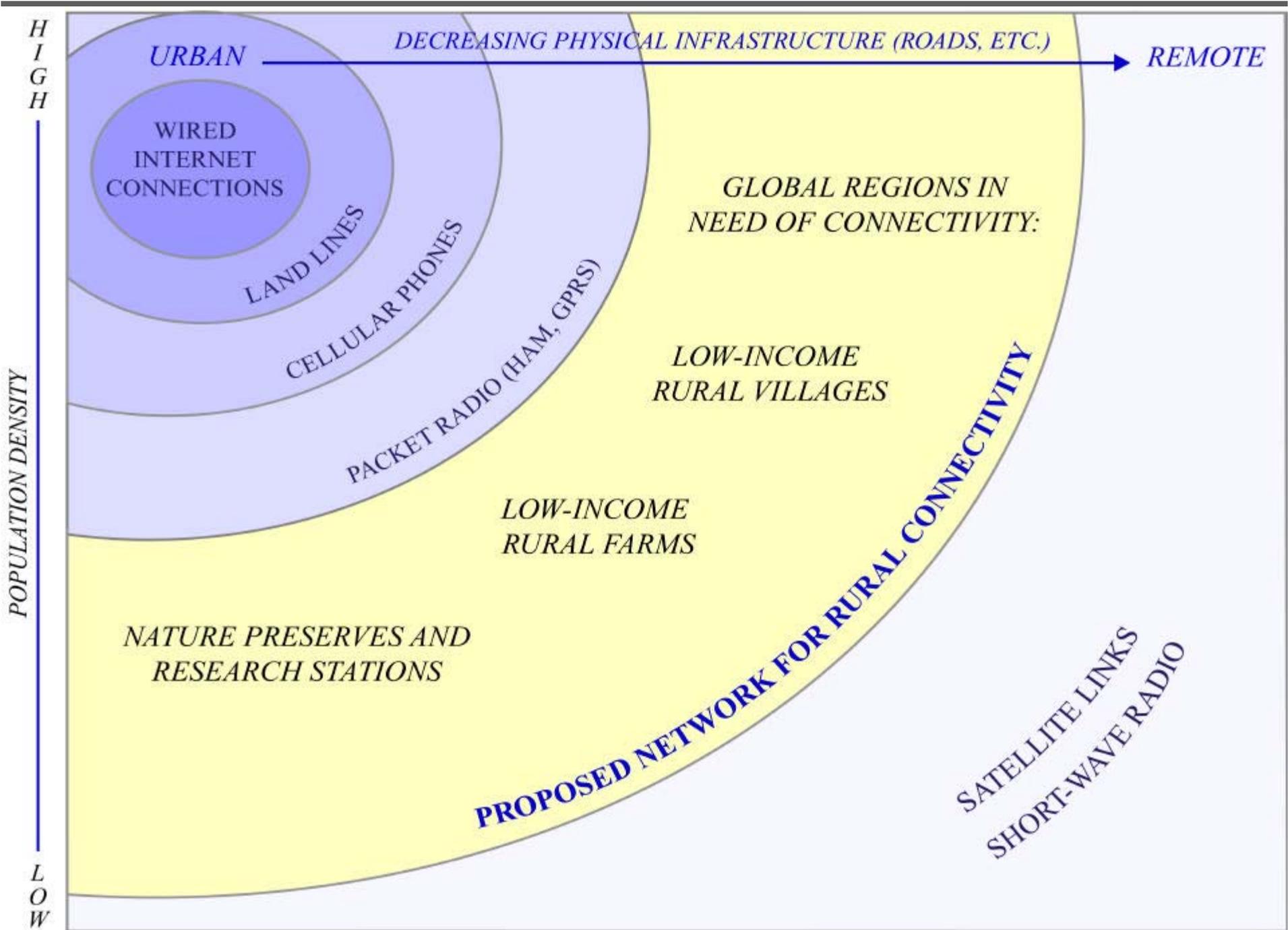


# Approaches



# Traditional Approaches

- ✍ Lay Copper
- ✍ Lay Fiber
- ✍ Set up UHF/VHF Radio
- ✍ Set up Cell Phone Towers
- ✍ Set up Real-Time wLAN Towers
- ✍ Setup Satellite Connections

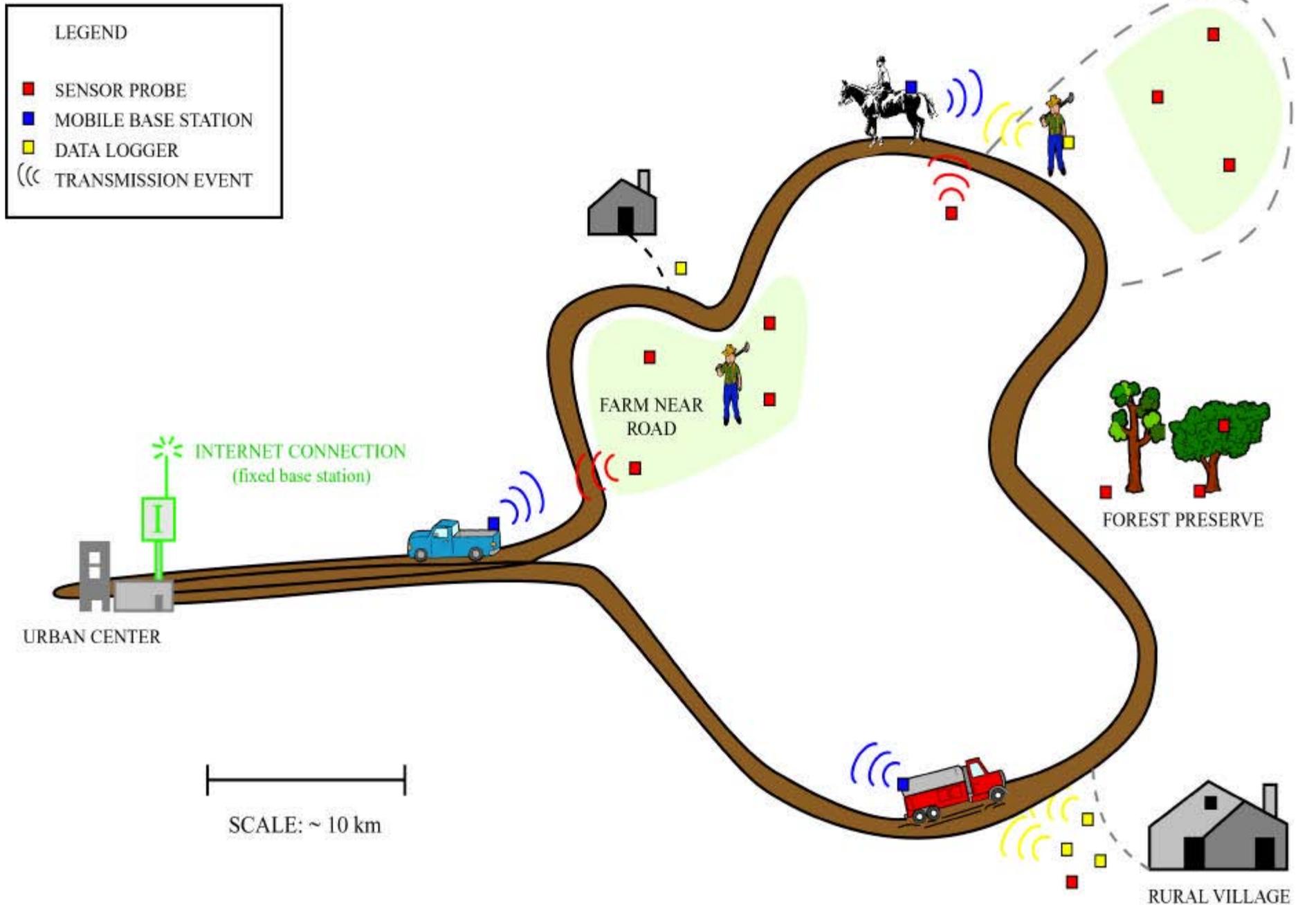




# FMS Approach

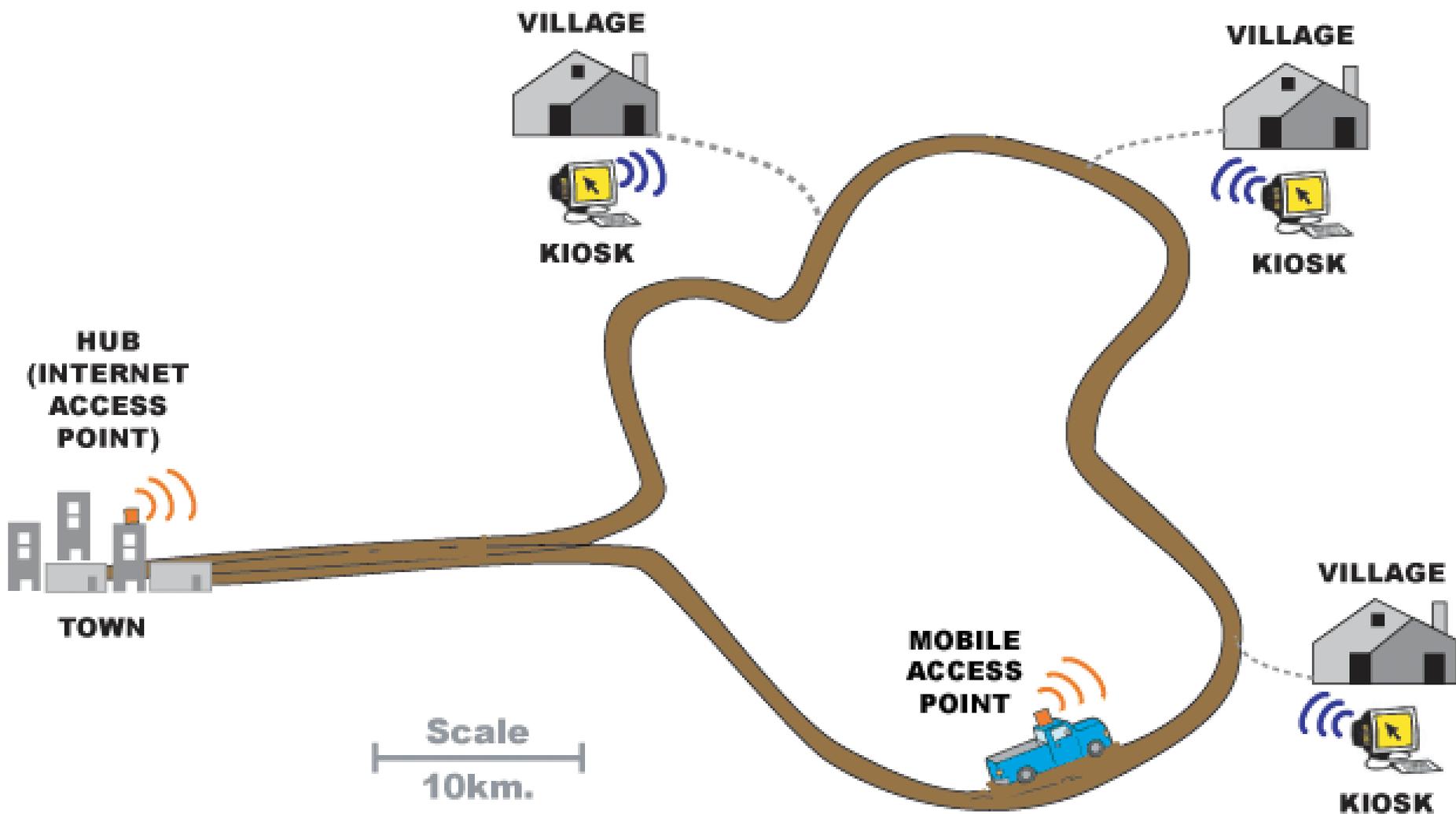
- ✍ Is real-time really necessary?
- ✍ ICTs introduced as shared resource
- ✍ But this has serious drawbacks for real-time infrastructures:
  - ✍ high level of adoption required to achieve cost recovery
  - ✍ who am I going to call?
  - ✍ shared communications infrastructure is typically asynchronous
- ✍ *Transportation infrastructure can be used to create a network*

FIGURE 2: SYSTEM ARCHITECTURE (THE BIG PICTURE)



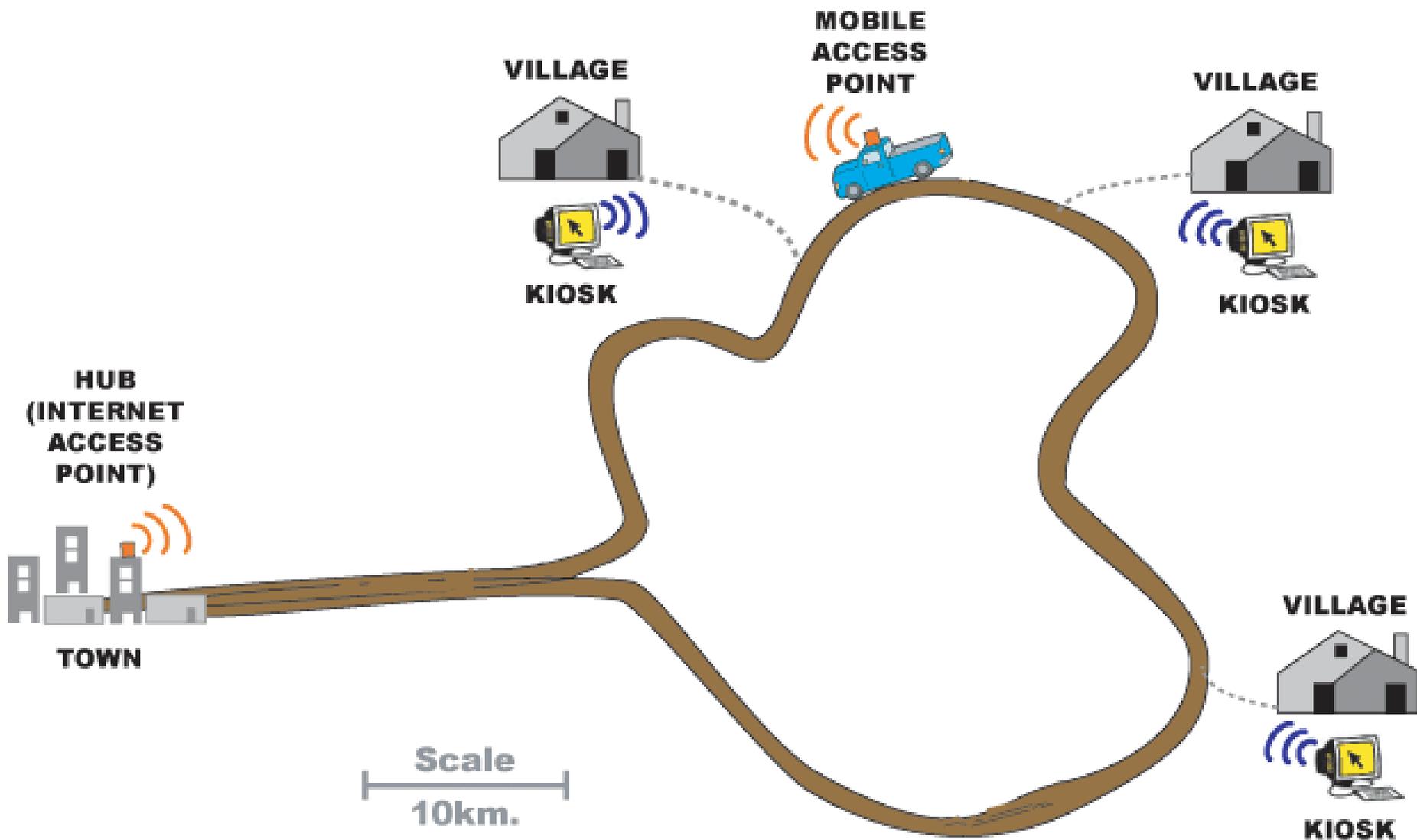
# FIRST MILE SOLUTIONS

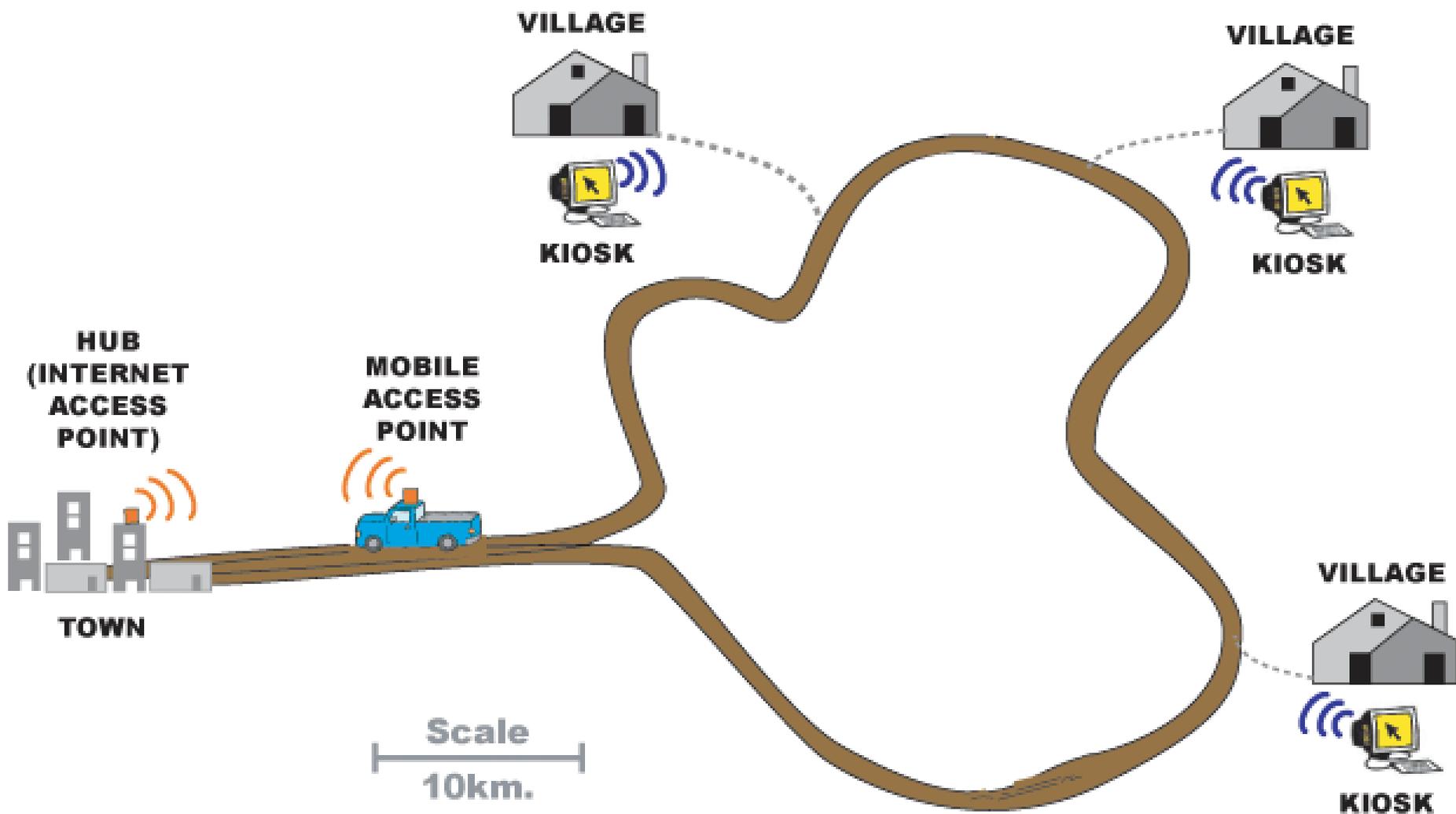
## Store-and-Forward WiFi



# FIRST MILE SOLUTIONS

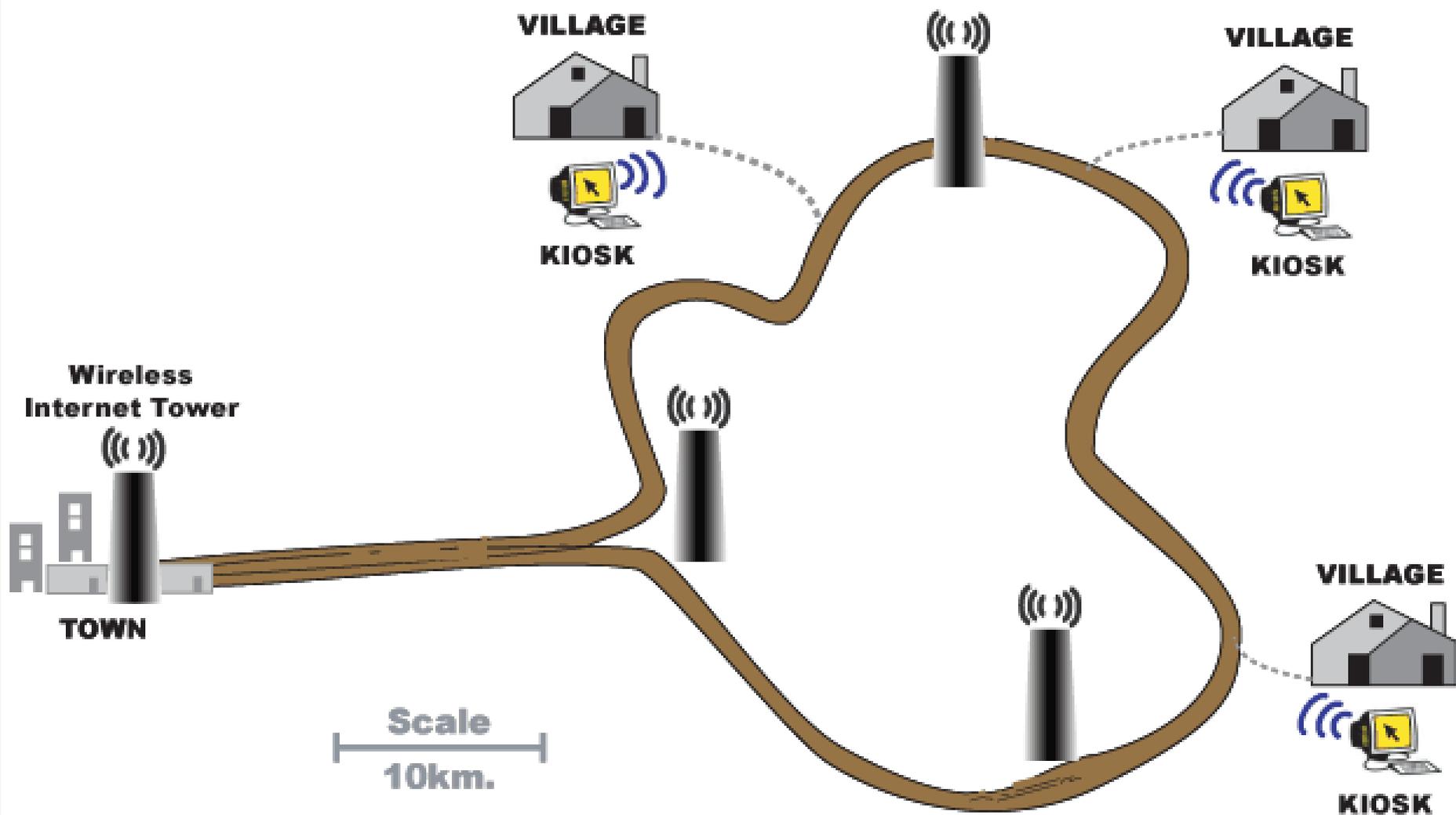
## Store-and-Forward WiFi





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## Real-Time Wireless WAN





# Experiences

# DonkeyNet



Photo: Bony HearnHingod



# India: Bhoomi



- ✍ First National eGovernance Initiative in India
- ✍ Computerization of all land records in state of Karnataka -  
- Manual land records illegal
- ✍ Some 500,000 land record transactions/ month
- ✍ Seeking means of decentralizing its database using wireless technology



ARUDHI

Bhoomi Kiosk

Bangalore District  
powered by:

**DakNet**  
your electronic postman

SASSALU

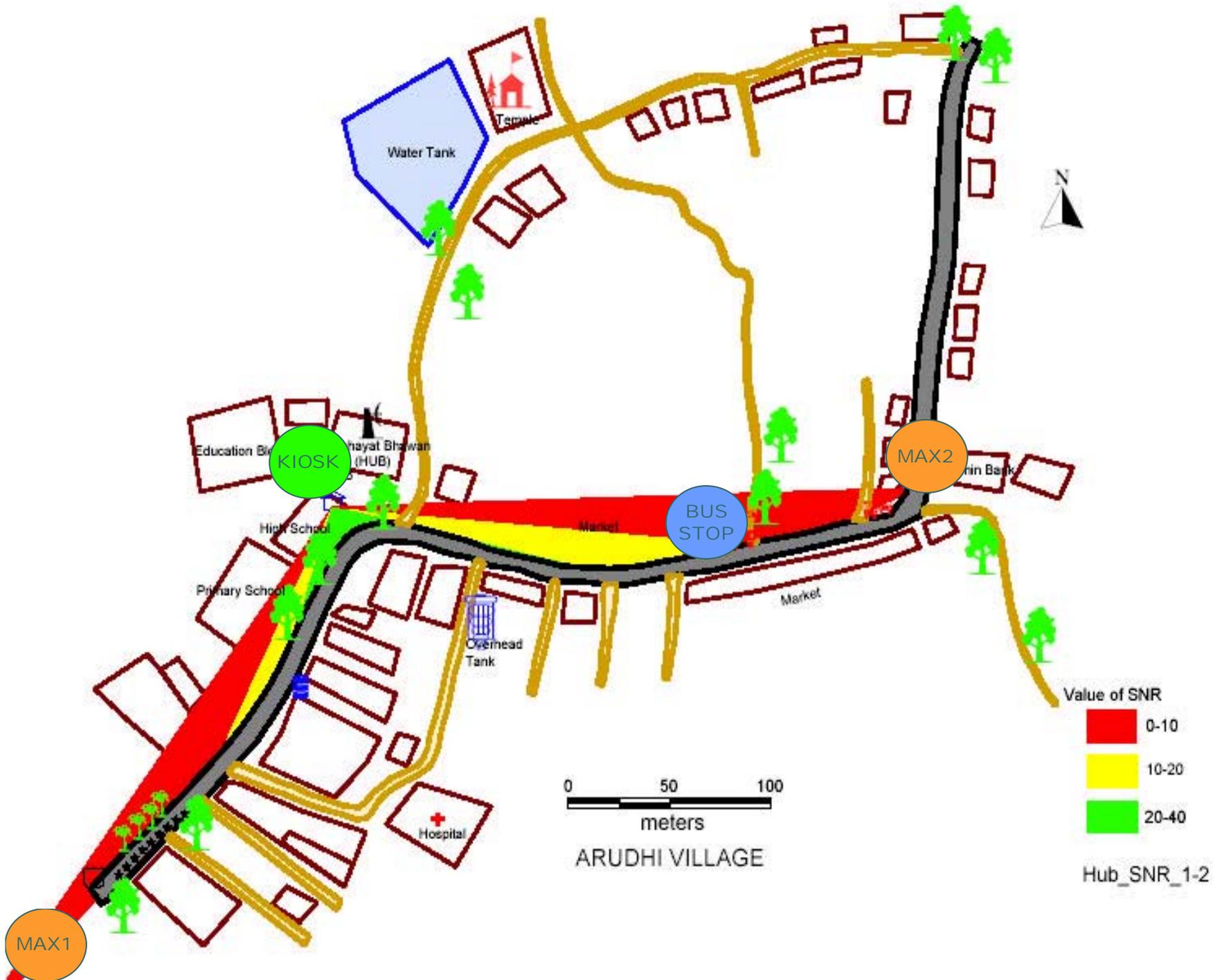
Bhoomi Kiosk

Bhoomi Database

DODDABALLAPUR



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# DakNet-Bhoomi Pilot

*Rough Cut*

Rural Karnataka, India

# Cambodia: Village Schools

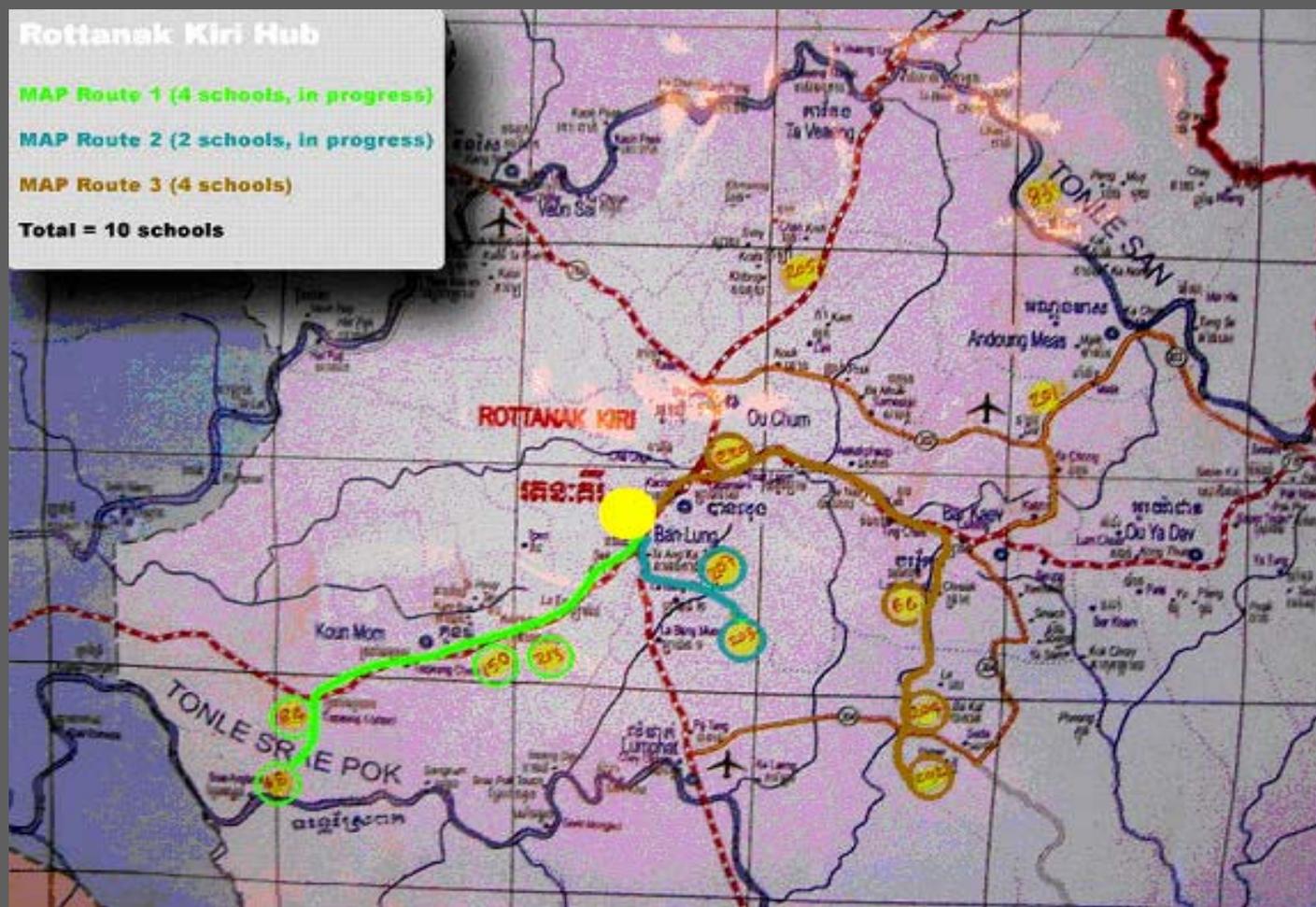
**Rottanak Kiri Hub**

**MAP Route 1 (4 schools, in progress)**

**MAP Route 2 (2 schools, in progress)**

**MAP Route 3 (4 schools)**

**Total = 10 schools**



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RATANAKIRI REFERRAL HOSPITAL TEL. 075 974149















# Business Strategy

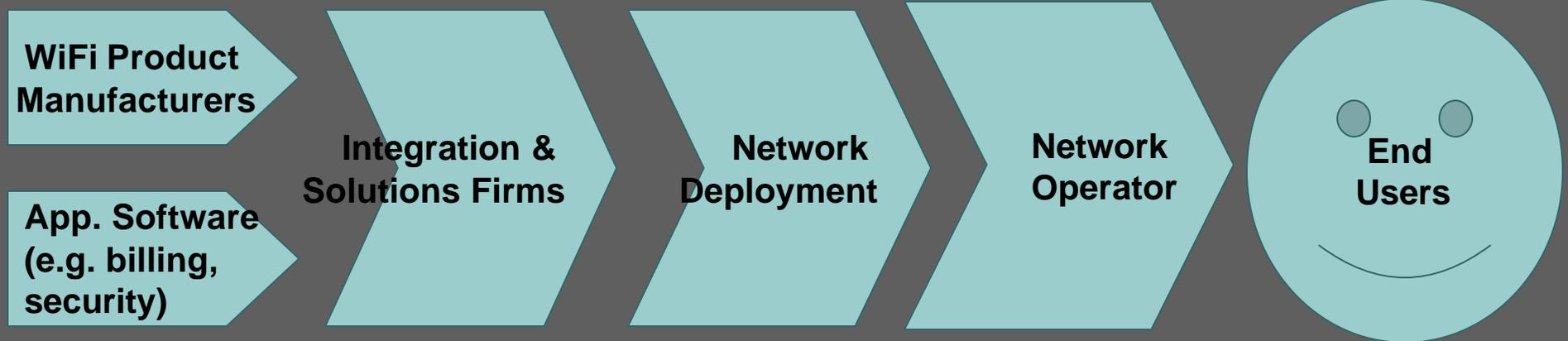


# Vision

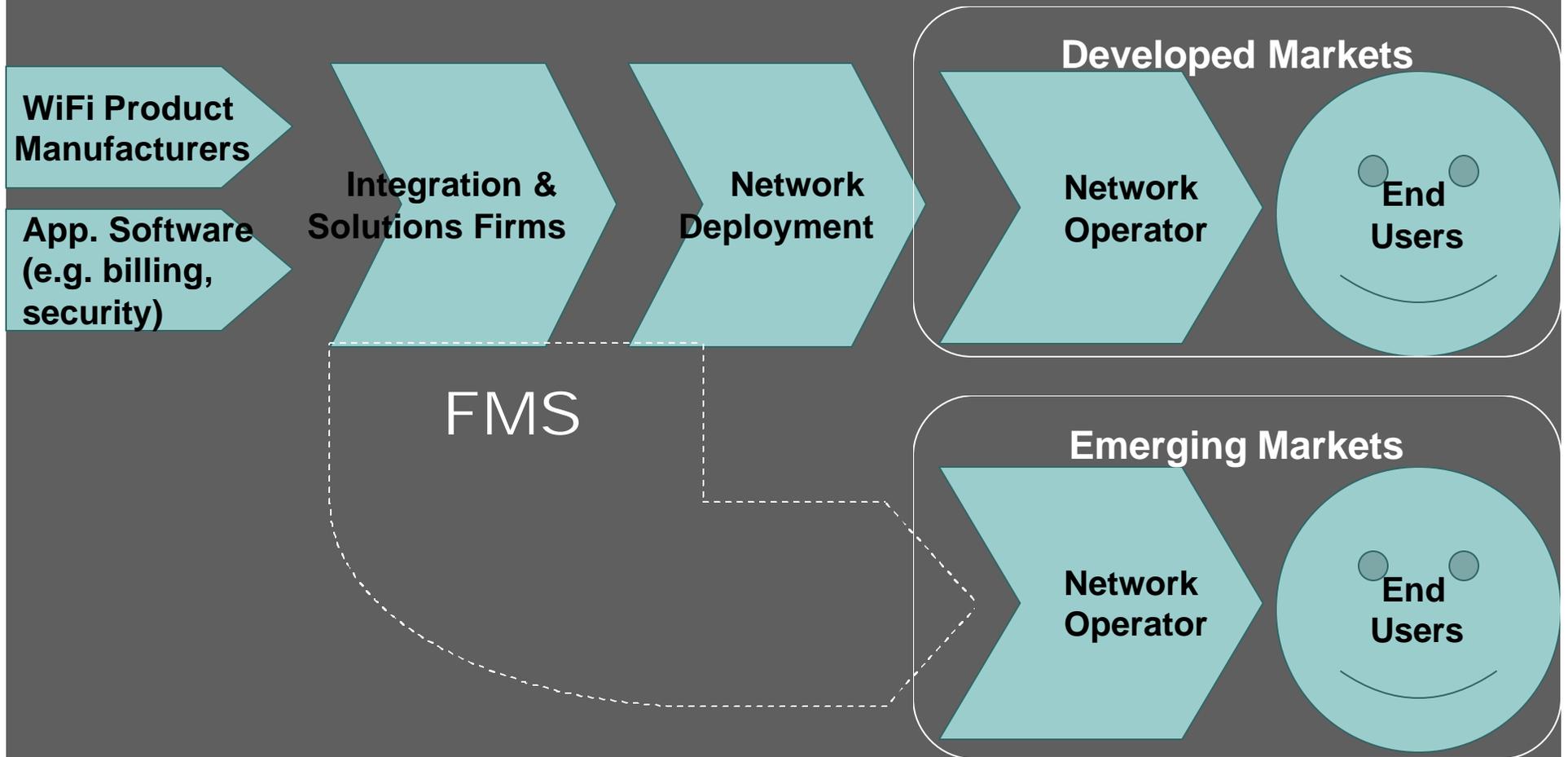
- ✍ Same factors driving WiFi revolution in developed world could drive a revolution in developing world:
  - ✍ low cost for users and providers
  - ✍ east of setup, use and maintenance
  - ✍ high bandwidth
- ✍ Local entrepreneurs within developing countries will use WiFi to:
  - ✍ solve chicken and egg problem: market~infrastructure
  - ✍ proliferate wireless infrastructure
  - ✍ grow seamlessly with rural market, scaling up to universal broadband connectivity



# WiFi Value Chain

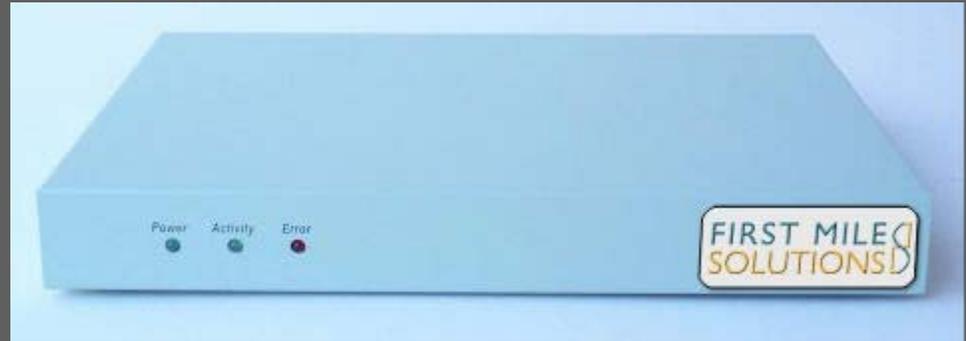


# WiFi Value Chain: Emerging Markets





# Products



## ✍ Village WiFi Kit

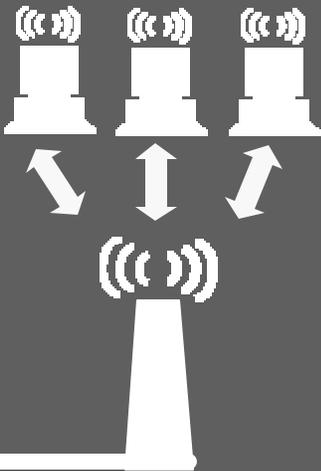
- ✍ Desktop
- ✍ Printer
- ✍ Fixed Access Point
- ✍ Antenna
- ✍ Client Software
  - Network Code
  - Email
  - Non-real-time search engine (TEK)
  - Working VMOIP and Search Agents

## ✍ Administrator Kit

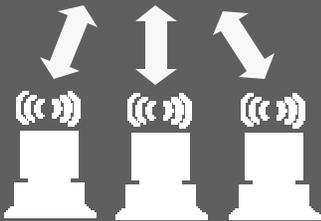
- ✍ Mobile Access Points
- ✍ Hub Access Point
- ✍ Administrator Software



# Network Solutions: wISPs

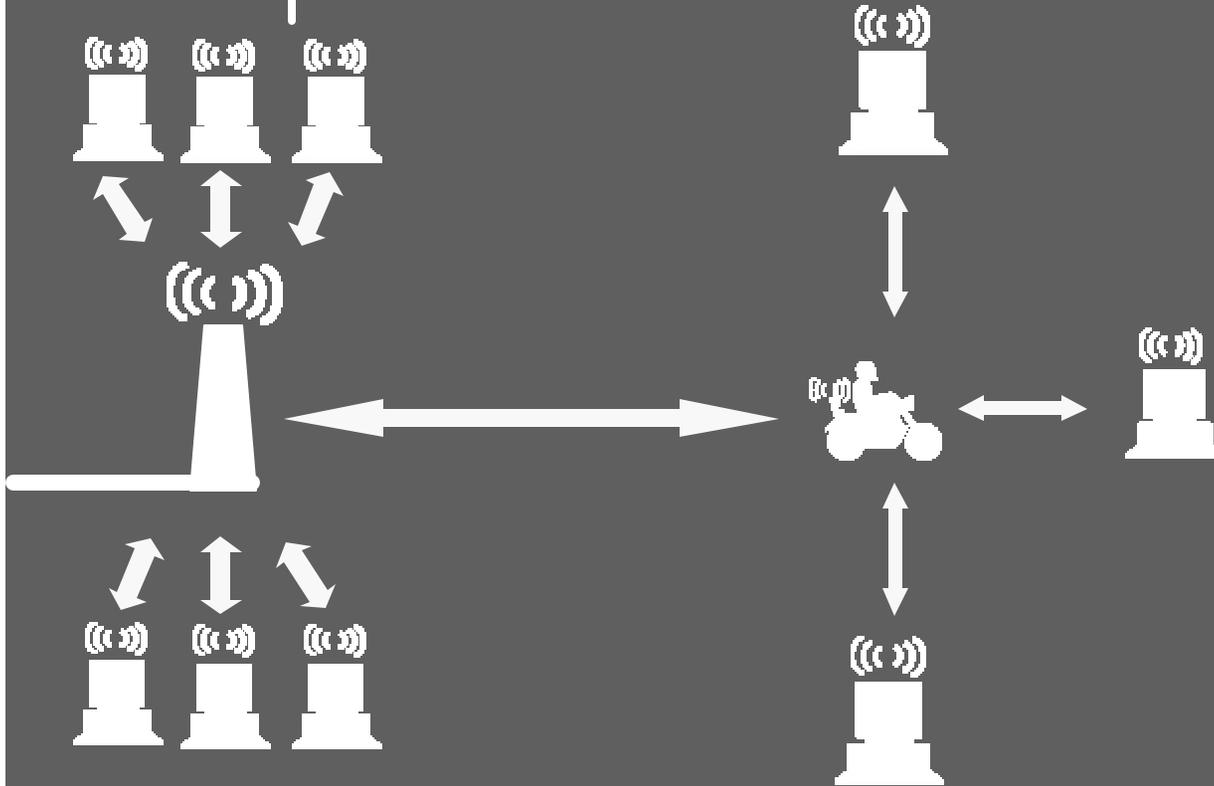


WiFi “hotspots” for urban and semi-rural communities

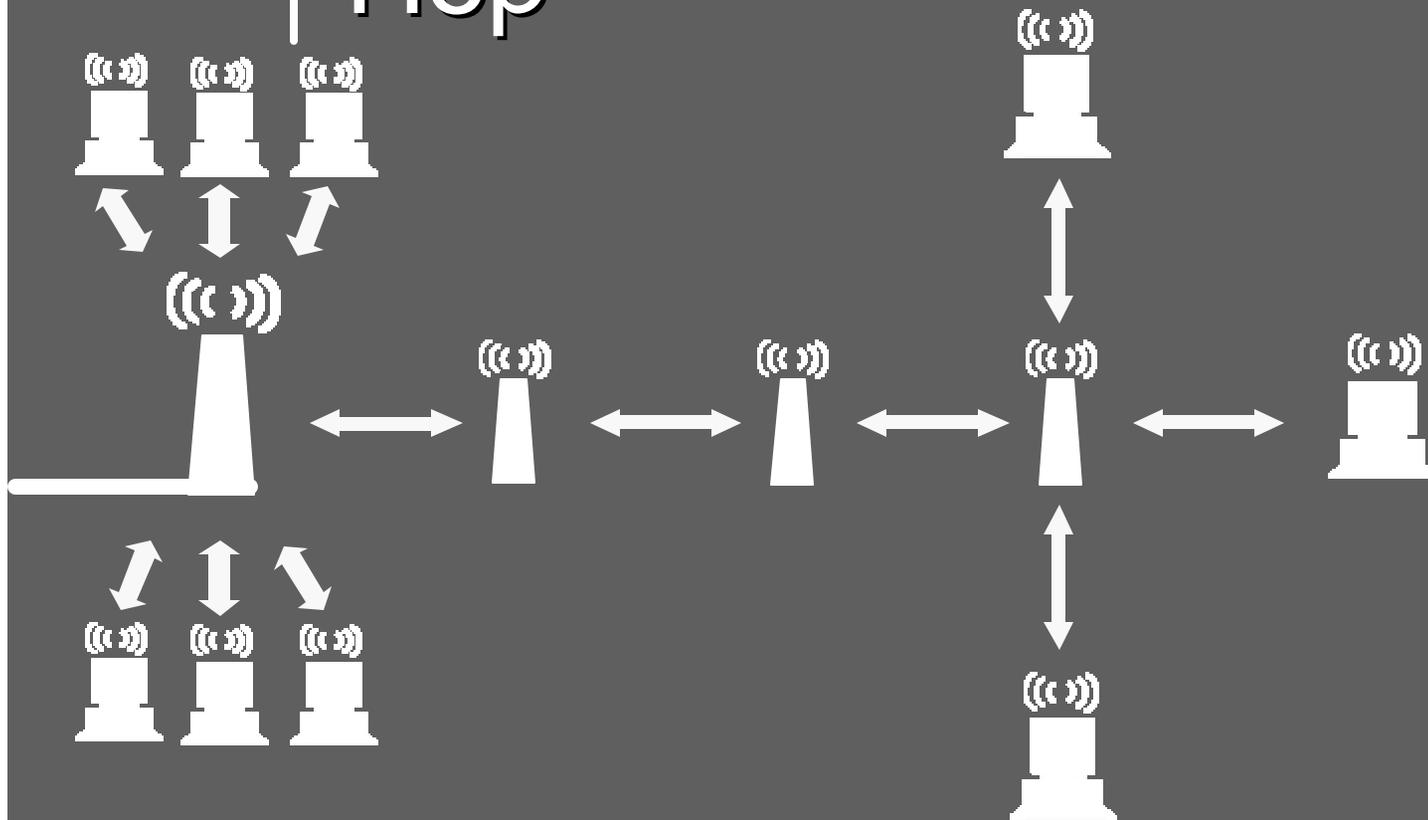


- Enables affordable devices and services
- Stepping stone for surrounding WiFi footprint

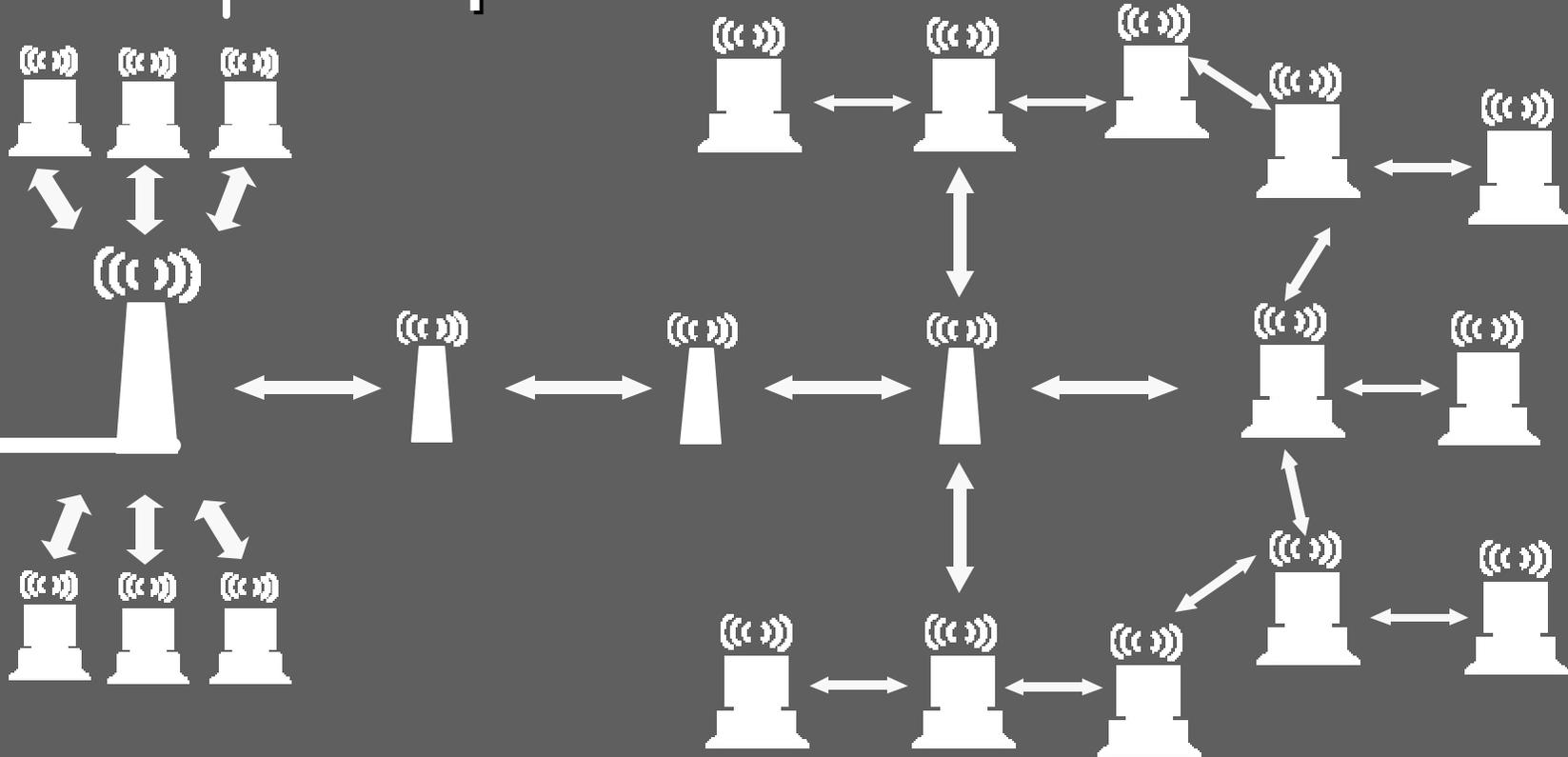
# Network Solutions: Store-and-Forward Wireless



# Network Solutions: Multi-Hop



# Network Solutions: Private Adoption & Meshes





# Customers, Funding Sources

- ✍ NGOs
  - ✍ CambodiaSchools.com
- ✍ Rural Service Companies
  - ✍ Drishtee.com
- ✍ ISPs/ Telcos
  - ✍ SIFY
- ✍ Foundations/ Agencies
  - ✍ WSIS
- ✍ Long Run: Network Equipment Companies
  - ✍ Cisco



# Lesson Learned & The Way Forward



# Lessons Learned

- ✍ Development ventures require **collaboration** across functions, fields, and cultures
- ✍ Solve **one problem** at a time
- ✍ Hardware should be cheap, rugged, and **ugly**
- ✍ Must adopt a **user-based** approach
- ✍ International shipping and national regulations can be considerable **obstacles**
- ✍ Must be prepared for a long-haul and **never give up**
- ✍ You **can** make an impact!



# FMS Going Forward

- ✍ Pursue urban/enterprise markets in developing countries?
- ✍ Focus just on “First Mile”?
- ✍ Non-profit vs. For-profit?
- ✍ Internship opportunities during IAP...



# “ICT4D” Brainstorming

- ✍ World Computer?
- ✍ Language/interface/content/  
application localization?