

# The Mesh Potato

- The Problem
- Village Telco
- B.A.T.M.A.N.
- Demo
- Lets build a Mesh!
- Mesh Potato
- Memes



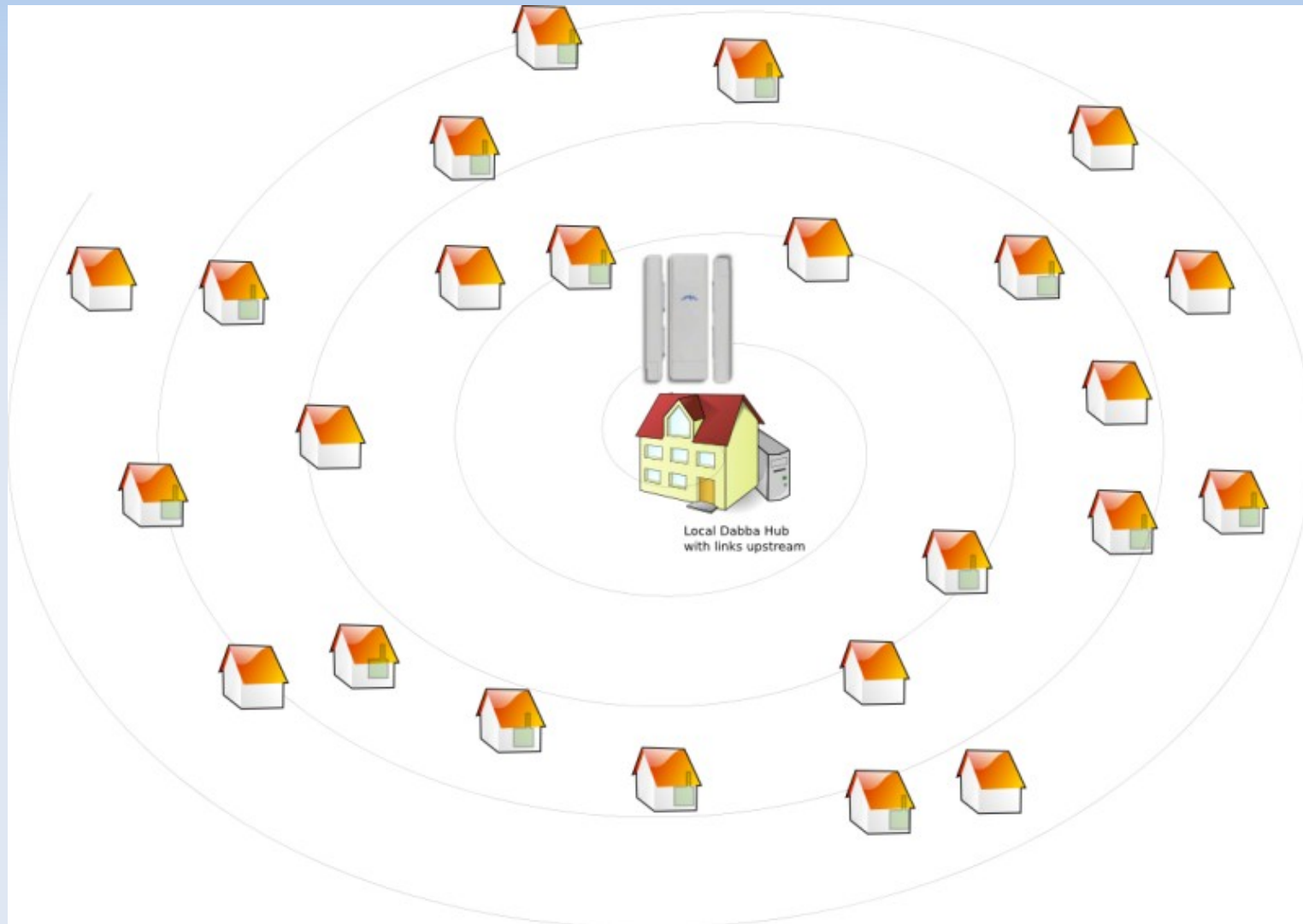
# Cities of the Future



# June 2008 Workshop



# Village Telco



# Village Telco Goals

- Small Telco business for 2<sup>nd</sup> or 3<sup>rd</sup> world
- Self sustaining business (viral growth)
- Scalable up and down
- Business for a reasonably geeky entrepreneur
- \$5,000 Capital
- 6 months break even
- Grounded in business (not tech or charity)

# Village Telco Components

- Mesh Potato
- B.A.T.M.A.N.
- Gateway Server with Billing System
- Entrepreneur
- Up stream VOIP and PSTN
- Modest Capital
- Business Model

# Village Telco Kit

## Server



## SuperNode



## 40 Mesh Potatoes



# Dabba

- dabba.co.za have a prototype Village Telco network in actual commercial operation
- Orange farm, township near Johannesburg
- uses commodity hardware and open source software
- free local calls
- pre-paid vouchers for calls to other networks

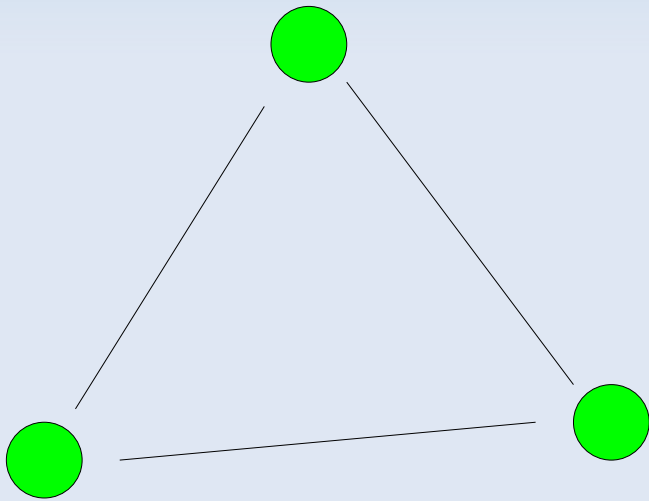


# Village Telco and Cell Phones

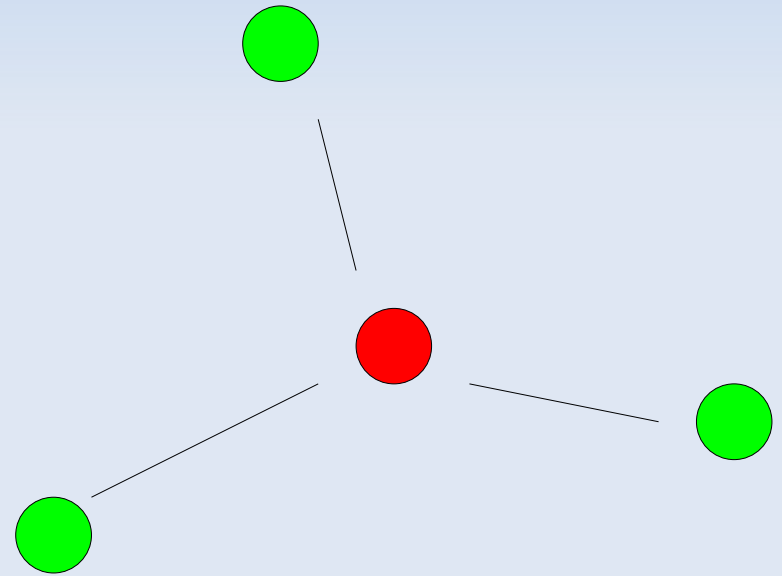
- Call Cost
- Community Approach
- Unlicensed Spectrum
- Infrastructure cost and availability
- Cell Phone networks don't scale down
- Capital (it's not just the handsets)
- Walled gardens versus the Internet

# B.A.T.M.A.N.

- Better Approach to Mobile AdHoc Networking

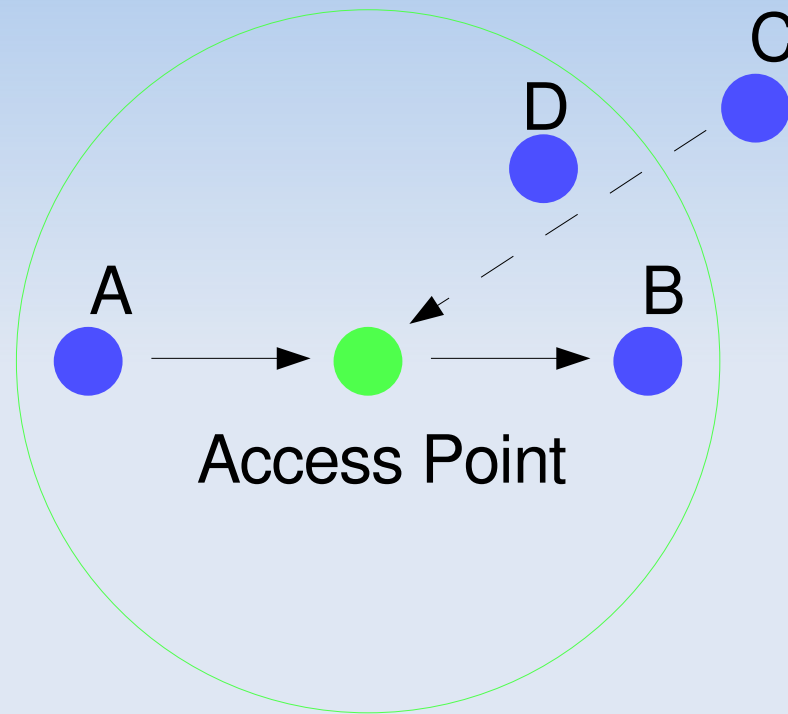


Adhoc



Infrastructure

# Advantages of Mesh Networks



Extended range over Infrastructure mode

# Mesh Network Problems

- Unstructured
- Unreliable Medium
- Dynamic changes

# B.A.T.M.A.N.

- Distributed intelligence
- Every node knows: Available nodes, total metric towards each destination and best **next hop** for each destination
- No information about the full routing path is necessary. Works well as nodes come and go.
- Works well in practice (e.g. 500 node Freifunk network in Berlin)

# Demo

- 3 node mesh
- Running on commodity wireless hardware
- Next Hop information
- Mesh adapting to changes

# Lets Build a Mesh

**wget [http://rowetel.com/batman\\_demo.txt](http://rowetel.com/batman_demo.txt)**

- x86 Linux user mode daemon
- Not all Wifi drivers will work in Ad-hoc
- Choose a random 10.0.0.0/8 IP (e.g. 10.1.2.3, 10.20.21.22, 10.x.y.z)
- Internet connectivity

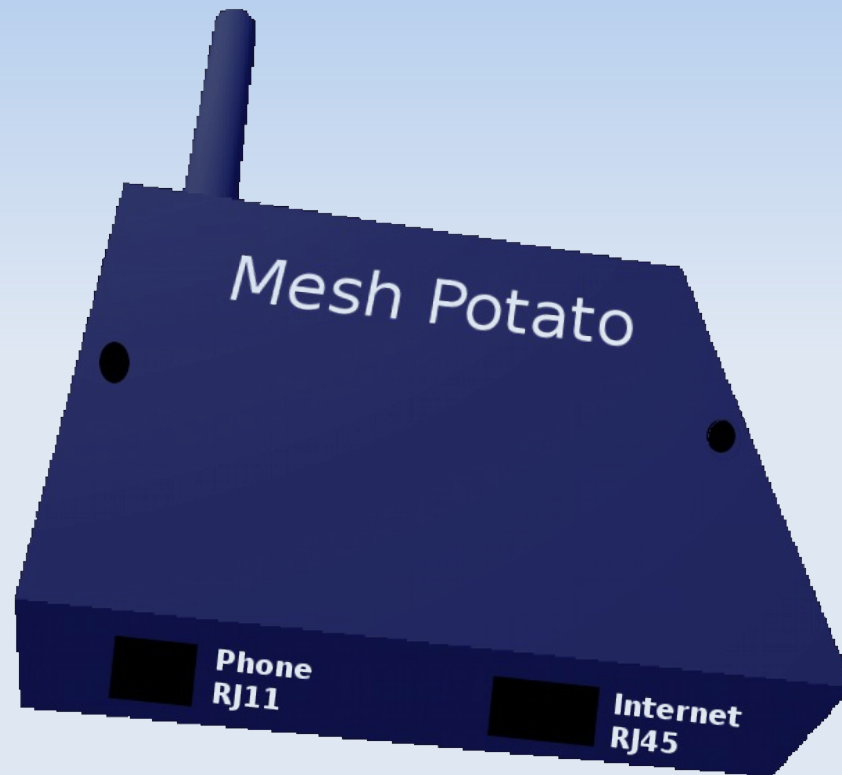
# Village Telco Challenges

- Ease of customer and billing management
- Cost of Access Points
- Range of WiFi Phones





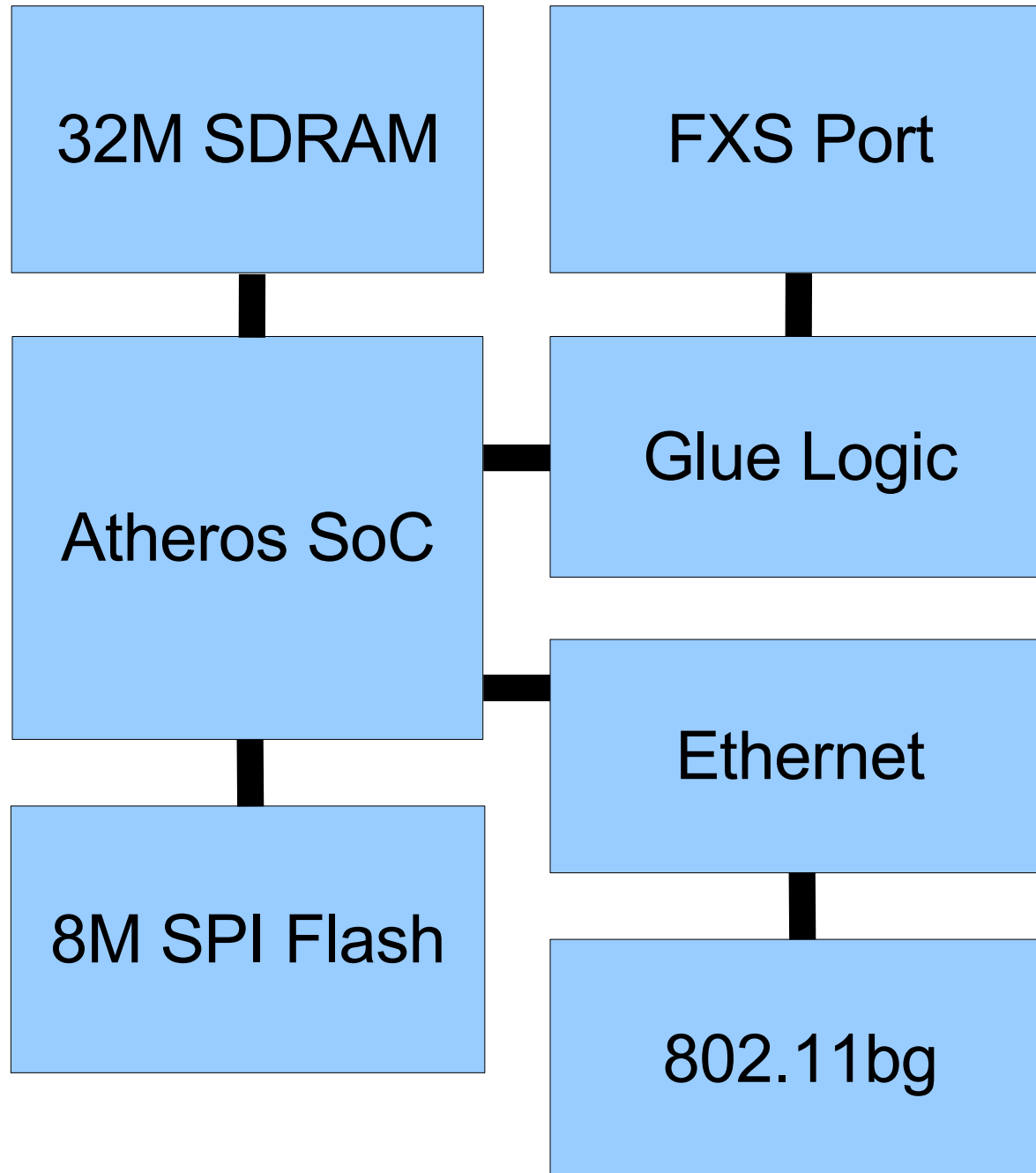
# POT-ATA



**Projected Cost: USD 60 per unit**

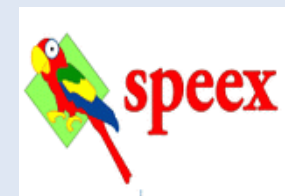
# Mesh Potato Design

- Low Cost, SoC
- Maximum use of existing Open components
- OpenWRT
- MadWifi on Atheros (Ad-hoc problems)
- CPU load (Asterisk, Speex Codec, Oslec Echo Cancellation)
- FXS port interface



# Software

- OpenWRT
- MadWifi
- B.A.T.M.A.N.
- Asterisk
- Speex (GSM)
- Oslec



# Mesh Potato Plan

- What we have done
- What's next

M1  
Software

M2  
Hardware

M3  
Beta

M4  
Production

# Open Hardware

- Designing exactly the hardware we want
- Community based development (many eyes and skill sets)
- Partnering with commercial companies for volume manufacture
- Good Business (IP04)
- Opportunities for novel business models
- Completely open and keeping it that way

# Africanisation

- Design for real world problems based on field experience of Village Telco team
- Static electricity on antenna
- Reverse polarity on DC connector
- 240VAC connected to DC connector!
- Wide range AC adaptor (350VAC)
- Humidity, rain, hail, connector weatherproofing
- lightning protection on FXS port



# Memes

- Cell Networks (closed, strong licensing, high cost/bit) versus the Internet (open standards, unlicensed, anyone can connect, low cost/bit).
- Community ownership versus big business or government
- Development: Many good projects have been ruined by money
- Voice is the killer application. Once voice network is deployed we have built an Internet backbone

# Memes

- 60% of all calls are local (value without upstream connectivity)
- Mesh Potato useful outside of Village Telco
- Very Very Open
- The future for many is the township
- You and I are going to help them get connected

# Links

- Village Telco Google Group
- [shuttleworthfoundation.org](http://shuttleworthfoundation.org)
- [villagetelco.org](http://villagetelco.org)
- [manypossibilities.net](http://manypossibilities.net)
- [open-mesh.net/batman](http://open-mesh.net/batman)
- [dabba.co.za](http://dabba.co.za)
- [rowetel.com](http://rowetel.com)

