OSDL Wireless Summit

April 7, 2006

Linux and 802.11 from the perspective of a community wireless group

The Personal Telco Project

www.personaltelco.net

Outline

- A Brief Introduction
- Typical Personal Telco Nodes
  - Hotspot
  - Rooftop
- Some of our projects
- Linux Wireless Needs

About Personal Telco

- A volunteer-based 501(c)3 non-profit corporation dedicated to:
  - *"Promote and Build Public Wireless Networks through Community Support and Education"*
- Started in August 2000 by unemployed geeks.
- Support installation and operation of about 100 free wireless hotspots in/around Portland.

The Goal

- User owned/operated communications infrastructure...

- Using off-the-shelf and hacked hardware to route around Telco monopoly damage.

- Learn, Educate, Build, Share.

A Typical Hotspot

- DSL connection from friendly ISP.

- Linux server acting as gateway and captive-portal (e.g. NoCatAuth)

- A consumer-grade Access Point with SSID: "www.personaltelco.net"

- Often located in a cafe and serving a dozen or more users a day.

A Typical Rooftop Node

- DSL connection from friendly ISP.

- A single-board computer (e.g. Soekris 4826), in a weatherproof enclosure:

  - mounted to a chimney

  - using an omni. antenna

  - power over ethernet (PoE 802.3af)

A Current Project

- Mississippi Grant Project
  - An effort to provide free wireless internet to a neighborhood in North Portland.
  - Operating on $15k grant
  - Internet connection donated.
  - Uses dual-radio soekris boards, Atheros radios, 802.11a backhaul, b/g for local service.
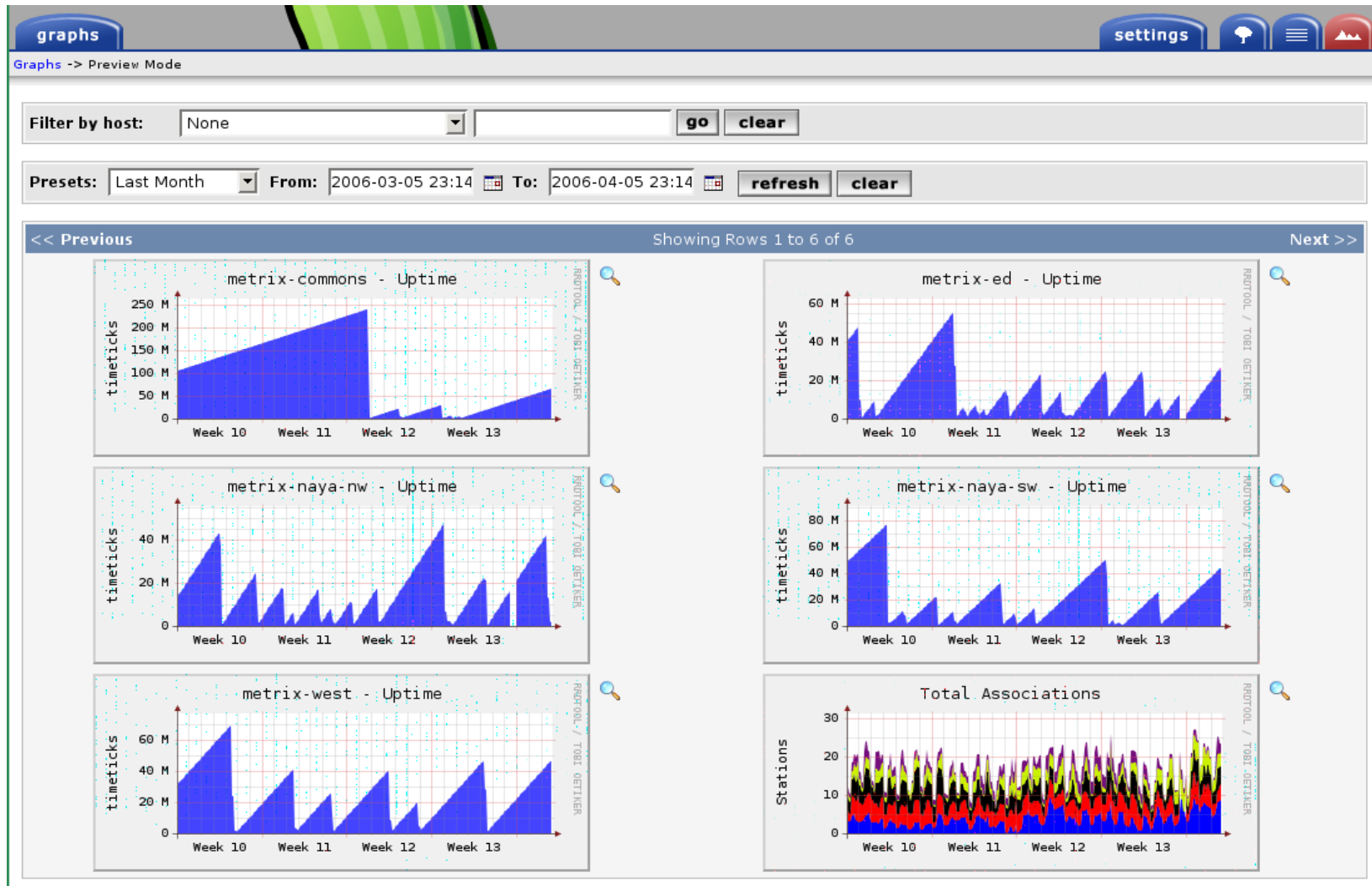 - Covers about a ½ mi square

Other Projects

- Experimenting with MIT's roofnet

- Experimenting with OLSR

- Network stumbling using a Netgear WGT634u running OpenWGT (Linux)

- Building two-radio "repeaters" using a Netgear WGT634u and a USB radio.

Linux Wireless Needs

- 802.11 a/b/g driver support. e.g.,
  - Atheros (madwifi):
    - master and managed modes
    - adhoc for mesh
    - wds

Linux Wireless Needs

Linux Wireless Needs

- Driver support for USB radios. e.g.,
  - Zydas (zd1211)
    - monitor mode (for stumbling)
    - should support more than one device at a time
    - our repeater mysteriously loses association
    - documentation: Zyxel USB radio doens't work with zd1211 despite manufacturer's claims
- Support for non-PC architectures (e.g. for embedded devices: OpenWRT and similar)