



African Advanced Institute for Information  
& Communications Technology

## **IPv6 based Wireless Mesh Networks**

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<http://www.meraka.org.za/wireless.htm>



# Overview

- Background:
  - Wireless Africa vision
  - Wireless Mesh networks (WMN)
- First IPv6 WMN: Pretoria testbed
- Challenges
- Multi-radio IPv6 WMN
- What's next?

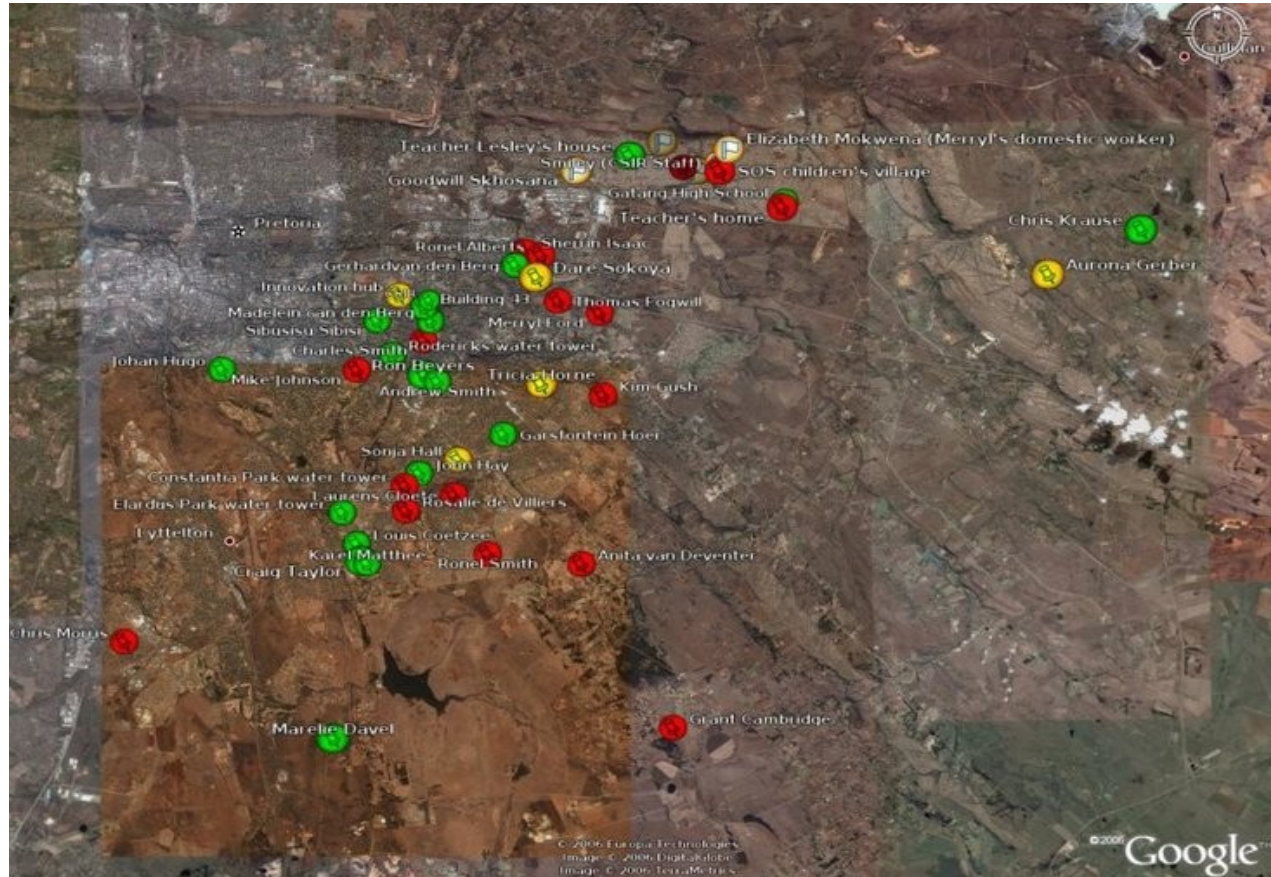


# Background

- Wireless Africa is about researching ways and means to develop sustainable information and communications technology in developing countries. The focus is to address the challenges of closing the digital divide that exists within and between developing countries.
- Wireless Mesh networks
  - Removing technology barriers
    - Mesh protocols
    - Auto-configuration
  - Social research



# First IPv6 WMN: Pretoria



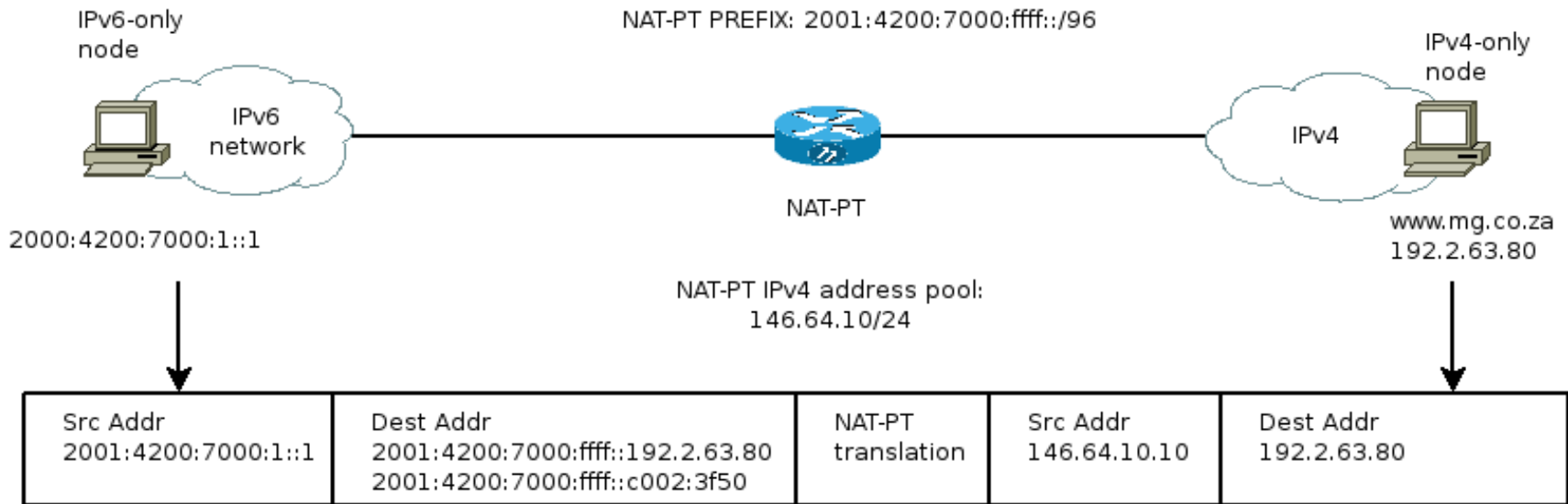
# Challenges

- FreeBSD OLSR (Optimized Link State Routing)
  - interoperate with existing Linux IPv6
  - released back to FreeBSD community
- Freifunk firmware
  - Install IPv6 kernel module
  - Startup scripts
    - Generate IPv6 addresses
    - OLSR IPv6

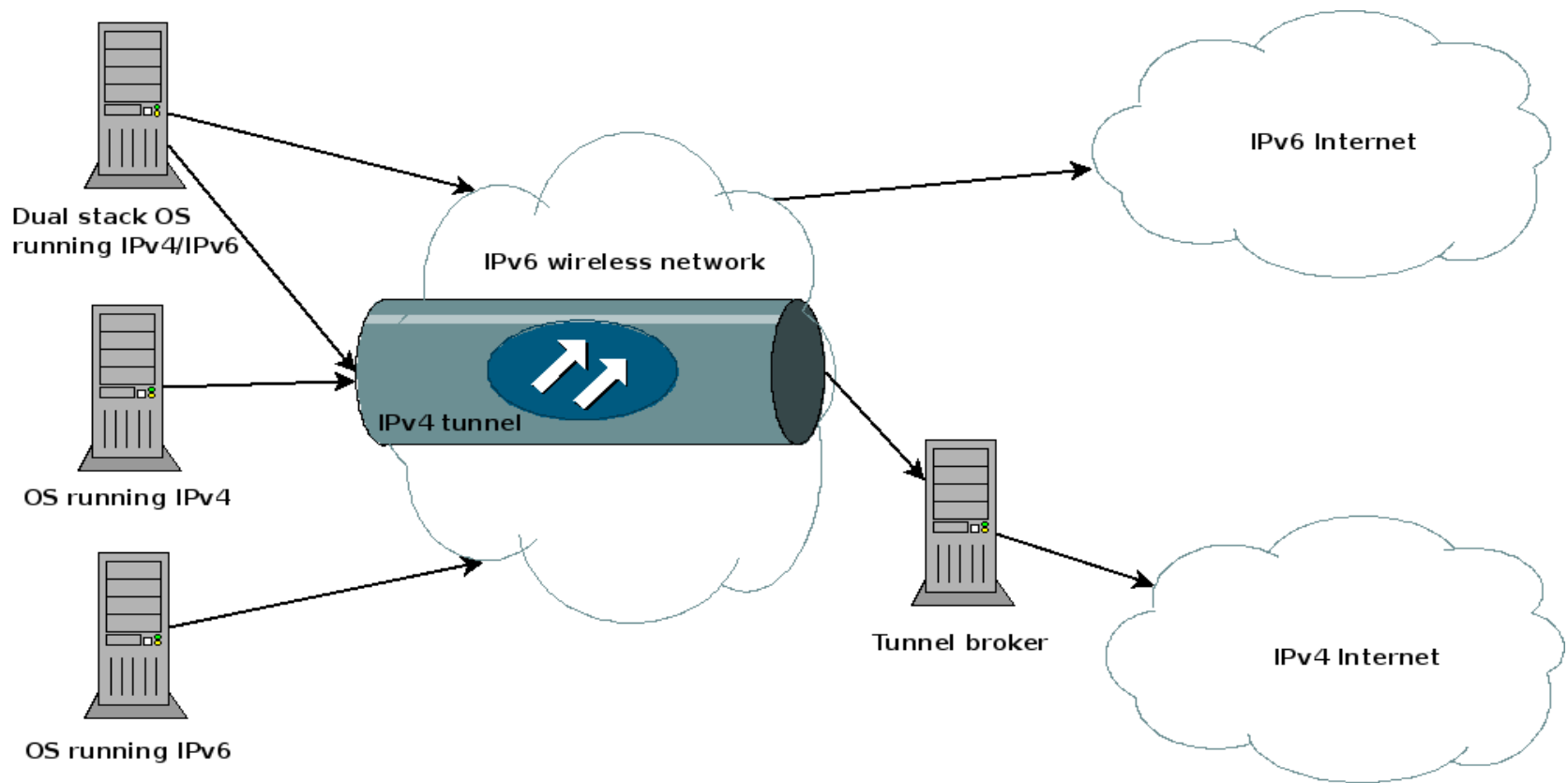
# Challenges

- Windows XP Ipv6
  - DNS requests over IPv4
- Reaching IPv4 world
  - NAT-PT
  - Ipv4-over-IPv6 tunnels

# Challenges: Reaching IPv4 world



# Challenges: Reaching IPv4 world

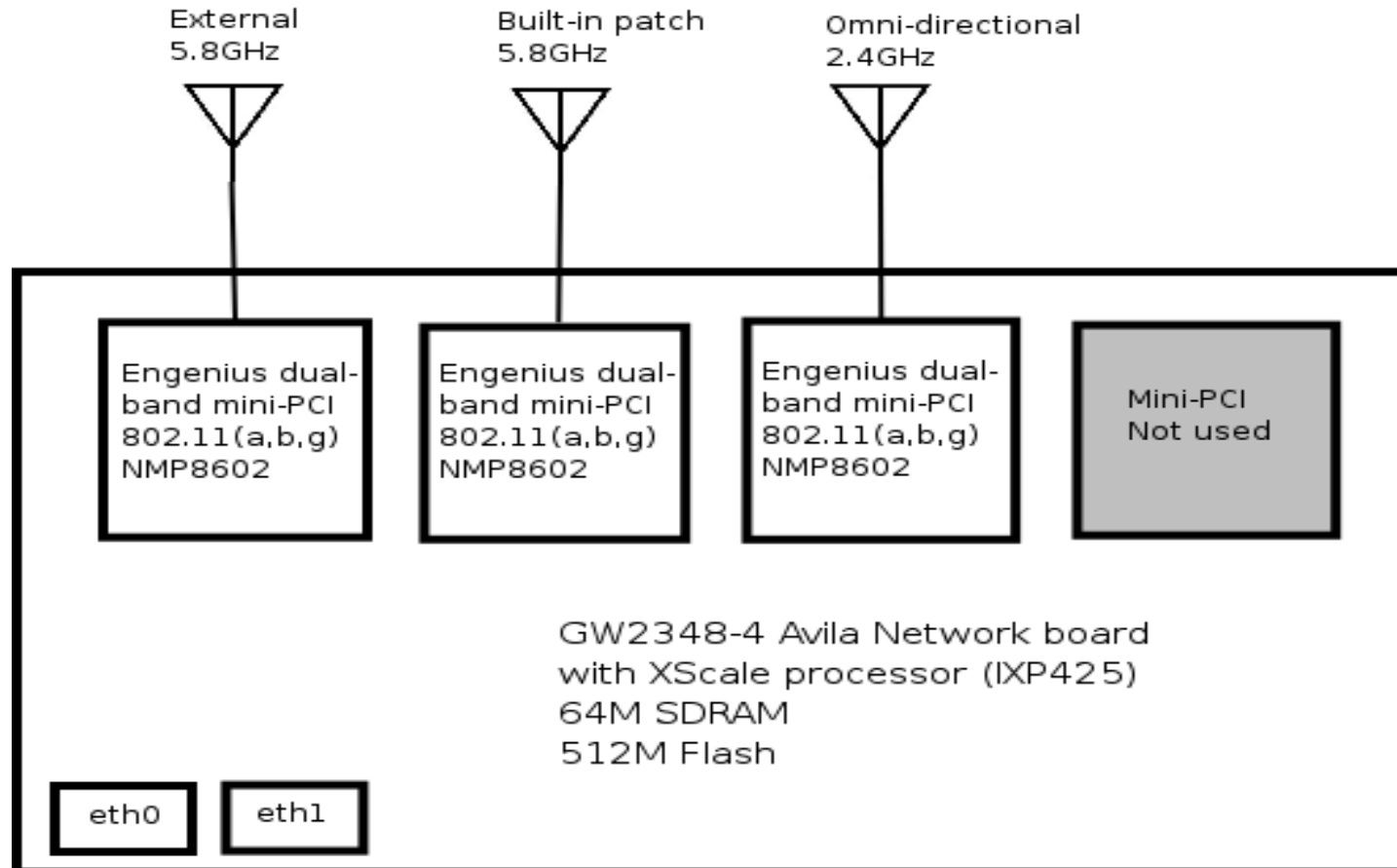


# Multi-radio IPv6 WMN

- Architecture



# Multi-radio IPv6 WMN



# Multi-radio IPv6 WMN

- Architecture
- Auto-configuration
  - Pre-determined prefix (RFC4193)
  - Subnet derived from MAC address

# Multi-radio IPv6 WMN

- Architecture
- Auto-configuration
- IPv6 Stateless DNS recovery
  - well known local unicast address
    - fec0:0:0:ffff::1
  - Host route: injected into routing domain:  
OLSR's HNA

# Multi-radio IPv6 WMN

- Architecture
- Auto-configuration
- IPv6 Stateless DNS recovery
  - well known local unicast address
- Pilot network
  - Portal page
  - Chat program

# What's next?

- DIY guide: add IPv6
- VoIP: IPv6 based PABX
- Distributed DNS
- Auto-Migration tools