

MUNICIPAL WIRELESS NETWORKS



Brookline, Massachusetts

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Wireless Networking Evolution

Basic Wireless Connectivity



Wireless Access Switches



Wireless Mesh Networks



Why Wireless

(Why Wi-Fi)

- Improve Public Safety
- Improve Municipal operations
- Economic Development
 - Free Hot Spots
 - Commercial Districts
 - Public parks
 - Digital Lifestyle
- Community Development
 - Closing “The Digital Divide”
 - Access to municipal resources
- Increases Broadband Competition

4.9 GHz Licensed Public Safety Frequency

- Dedicated Frequency Spectrum for Public Safety and First Responders
 - Licensed, So It Is More Secure With Less Noise (Interference)
- Several Mesh Network Providers Now Integrate 2.4 GHz (Wi-Fi) and 4.9 in the Same Unit –Build The Network Once!
- Get Your License!-Apply On-Line:
- [Http://wireless.fcc.gov/uls](http://wireless.fcc.gov/uls) (No Cost for Public Safety)

Public Safety Applications

- **Public Safety's 4.9 System**
 - Wireless LAN access for: Uploading reports accessing criminal databases, downloading video and images of missing and wanted persons...
 - Special Event communications and monitoring, setting up on-the-fly Incident Command Center.
 - Video Surveillance and On-scene cameras
 - Mobile Data : Laptops, Handhelds, and PDA's
- Access to GIS data in the field : Building schematic download (public buildings, schools)
 - Vehicle Tracking : Automatic Vehicle Locaters

Commercial Services

- Residential
 - Starting at \$20 per Month (or Less)
 - Faster than Comparably priced DSL
 - 1Mbps x 1Mbps (Symmetrical Service) up to 5 Mbps
- Small and Medium Business
 - Starting at \$40 per Month (or Less)
 - Faster than Comparable DSL
 - 1Mbps x 1Mbps (Symmetrical Service) up to 5 Mbps
- Enterprise
 - T1 Replacement Service
 - With Full Service Level Agreements
- Faster Speeds as Technology Evolves

The Brookline “Deal”

- Procurement from Statewide Contract ITT13
 - Simple Procurement
 - Open Process
 - Awarded to Galaxy Internet Services (Newton, MA)
- Mixed Use Public Safety, Municipal, and Commercial System
- Free Service in Commercial Hot Spots / Zones
- Free Services in Public Parks
- Free Services for Municipal Workers
- Free Services for Public Safety (Police and Fire)
- Limited Free Services to Public Housing Residents
- No Capital Costs to Brookline Residents
- Licensee (Galaxy Internet) Makes Money on Paid Commercial Customers

What Does It Look Like



Infrastructure Topology

- Flexible Service Delivery
 - 5 GHz mesh backhaul
 - 2.4 and 4.9 GHz Wi-Fi access
 - Transparent network infrastructure
- Supports Multiple Applications
 - Data access
 - Video surveillance
 - Voice over IP (VoIP)
 - Mobility
- Network Segmentation for Multiple User Groups
 - Virtual LANs
 - Traffic prioritization
 - Traffic filtering



Items to Consider

- Support for 2.4 GHz and 4.9 GHz (Licensed Public Safety Access)
- Number of Radios at Each Node (Brookline will have 6).
- Mesh Capacity to Backhaul Traffic
- Upgrade Path to New Technologies (WiMAX, 802.11n, etc).
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- High Speed Mobility
- Cost Users
 - Laptops
 - Handhelds
 - Police Cruisers
 - Fire Apparatus
- Start Thinking About Applications
 - It's not just the network

Wireless Business Models (1)

- Municipality Invests In Infrastructure
 - Operated and Maintained by Municipality ?
 - Operated and Maintained by Private Company ?
 - City Offers Services and Tech Support ?
 - Private Company (ISP) Offers Service and Support ?
 - Cost Recovery for Municipality (Percentage of Revenue)
- Private Entity Invests In Infrastructures
 - Operated and Maintained by Private Company
 - Private Company Handles Support
 - Private Company Looks to Recover Investment
 - Selling Commercial Services
 - Selling Services to the Municipality (Anchor Tenant)
- Non-Profit Invests in Infrastructure (Boston Model)
 - Need to Raise Money
 - Non-Profit Pays to Install, Operate, and Maintain Network
 - Non-Profit to Cover Costs by Selling Wholesale to Private Entities
- Hybrids
 - Anything goes – this is a new world!

Wireless Business Models (2)

- Typically Some Kind of Public-Private Partnership
- Often an Exchange of Rights to Use Municipal Assets (Poles, Fiber, etc.) for Something
- Factors for Private Investment
 - Population Density
 - Lower node count (cost) per potential subscriber
 - Projected Take Rate
 - Economic Demographics
 - Availability of Other Services
 - DSL, Cable, FiOS
 - Deployment Issues
 - Terrain & Foliage
 - Municipal Facilities
 - Poles (Power)
 - Fiber