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Broadband Mobility and Digital Cities



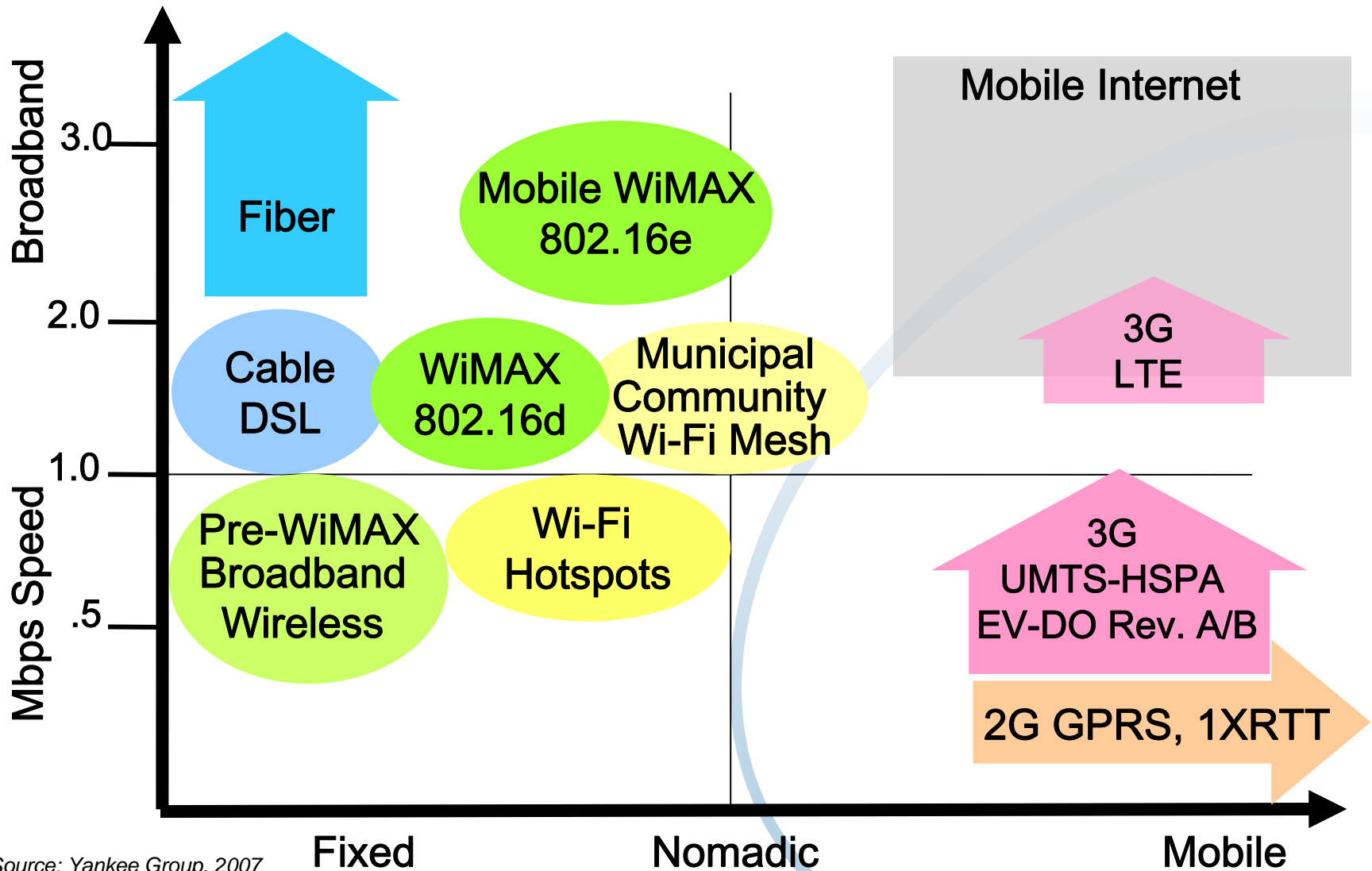
James Farstad

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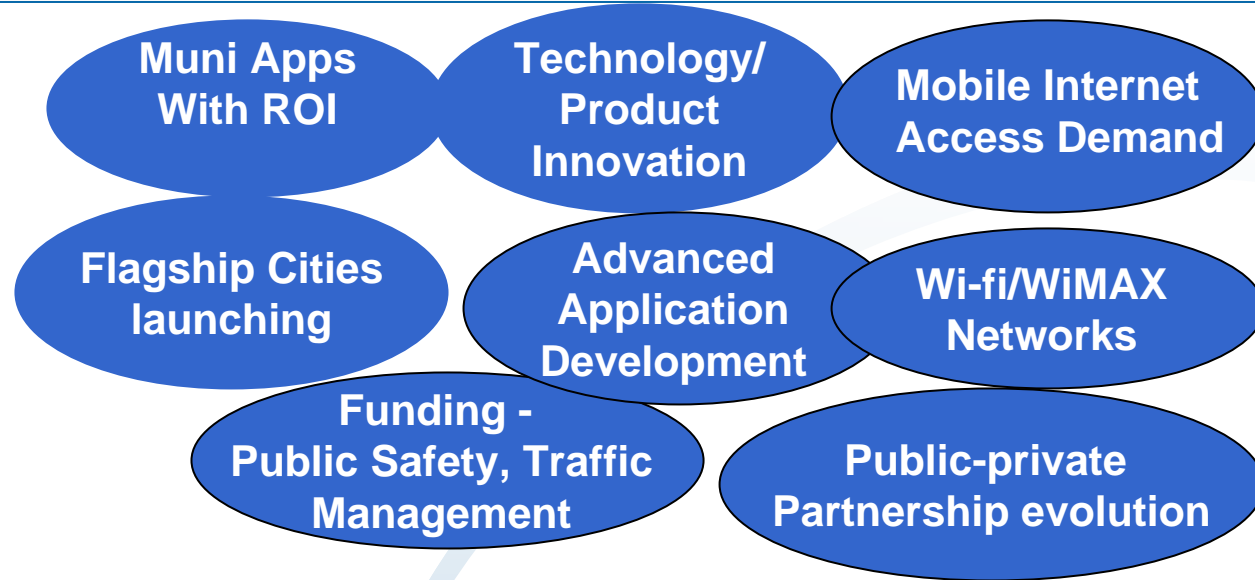
Road to Personal Broadband – Mobile Internet Revolution



Source: Yankee Group, 2007

Digital City Market Reassessment

Positive



Negative



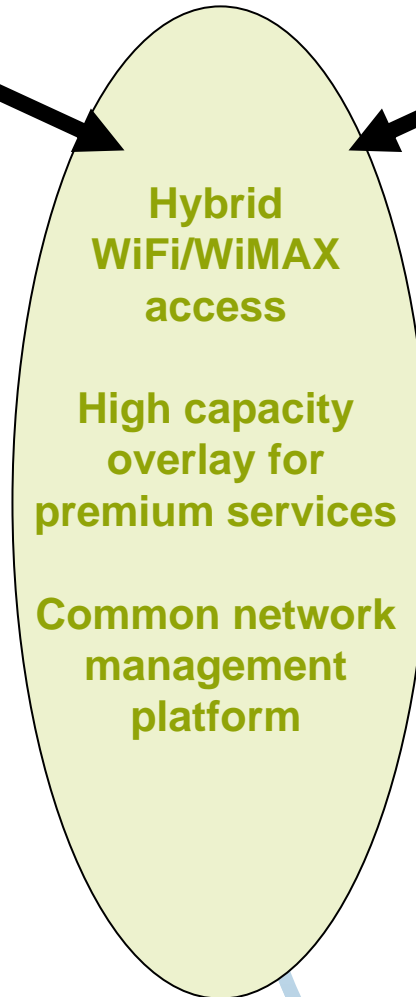
Convergence of Digital Cities and Mobile Networks

Wi-Fi Digital Cities

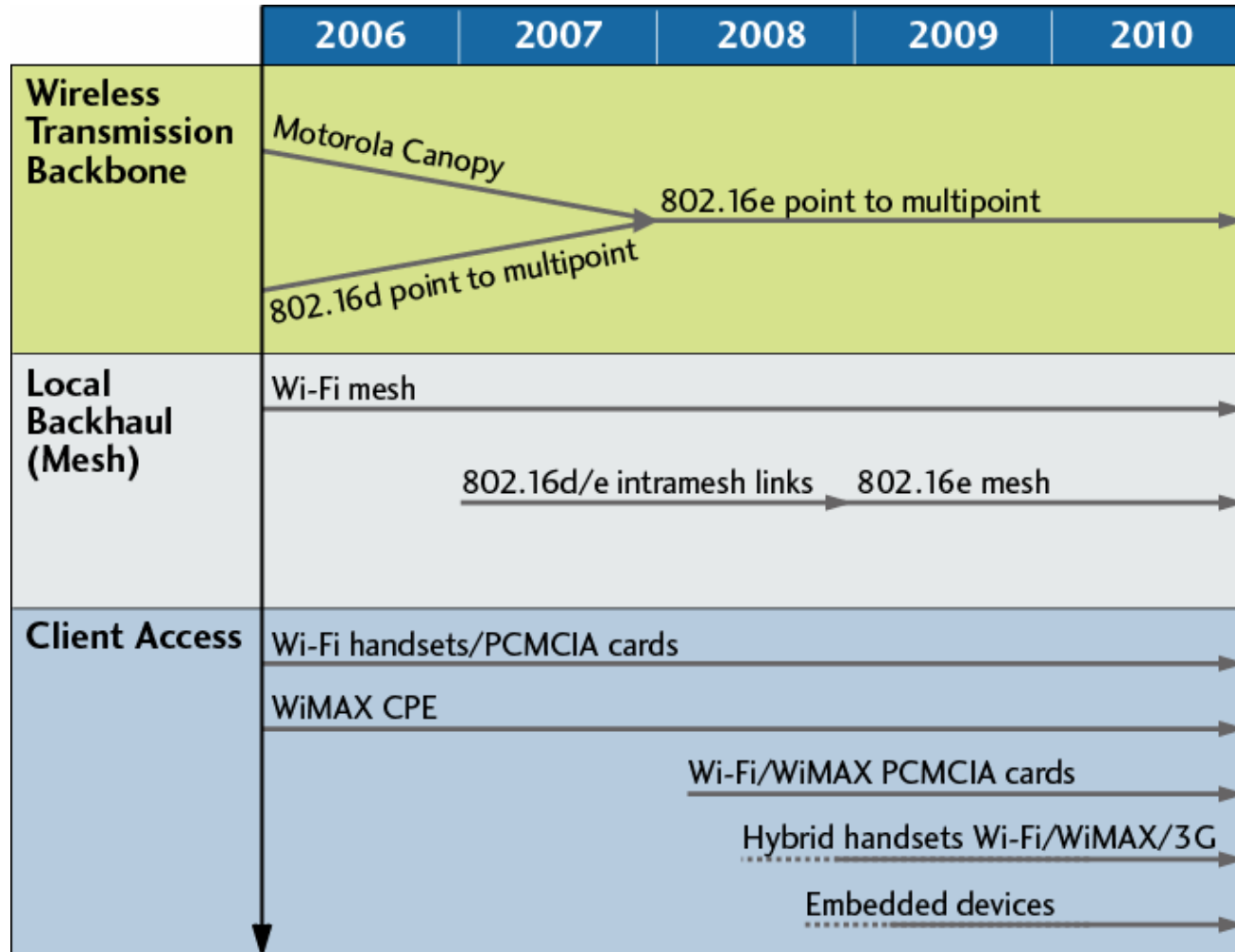
- Best effort technology operating in unlicensed spectrum
- Relying on anchor tenancy commitments from local governments for base revenue
- Leveraging city hanging and network assets in return for preferred customer status
- Well positioned to support funded applications – video surveillance, meter reading

WIMAX Networks

- Carrier grade technology operating in licensed spectrum
- Being brought to market by well funded service providers
- Sprint and Clearwire are overlaying on 3G network, collocating towers and leveraging backhaul
- Focused on selling subscriptions and advertising to build consumer market



How Do Wi-Fi and WiMAX Play Together in Digital City Networks?



Source: Yankee Group, 2007

Key Requirements In Identifying The Right Technology

✓ Mobility

- Do NOT assume that mobility is enabled
- Will voice calls & VPN seamlessly hand-off between WiFi APs

✓ Broadband

- Do NOT settle for “*wireless dial-up*”
- Deliver true broadband today and plan to scale

✓ Multi-service

- It's NOT just about WiFi!
- What about 4.9GHz Public Safety? What about WiMAX?

✓ Mesh

- Proven mesh backhaul – capacity on demand
- Reliable, low latency, support for high quality video/voice

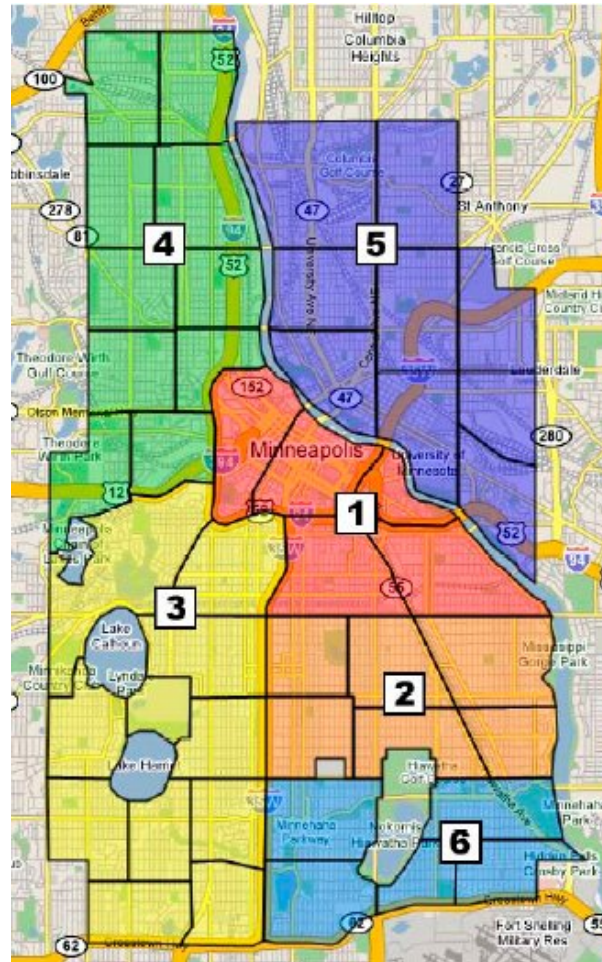
Wireless Minneapolis Goals

- **Support Public Safety Communications**
- **Streamline the Delivery of City Services**
- **Accelerate Digital Inclusion Activities**
- **Introduce New Community Amenities**
- **Promote Economic Development**
- **Enable Neighborhood Civic Garden Portals**
- **Enhance the Visitor Experience**

USIW Implementation Schedule

City-wide Roll Out Anticipated Completion Timeframes

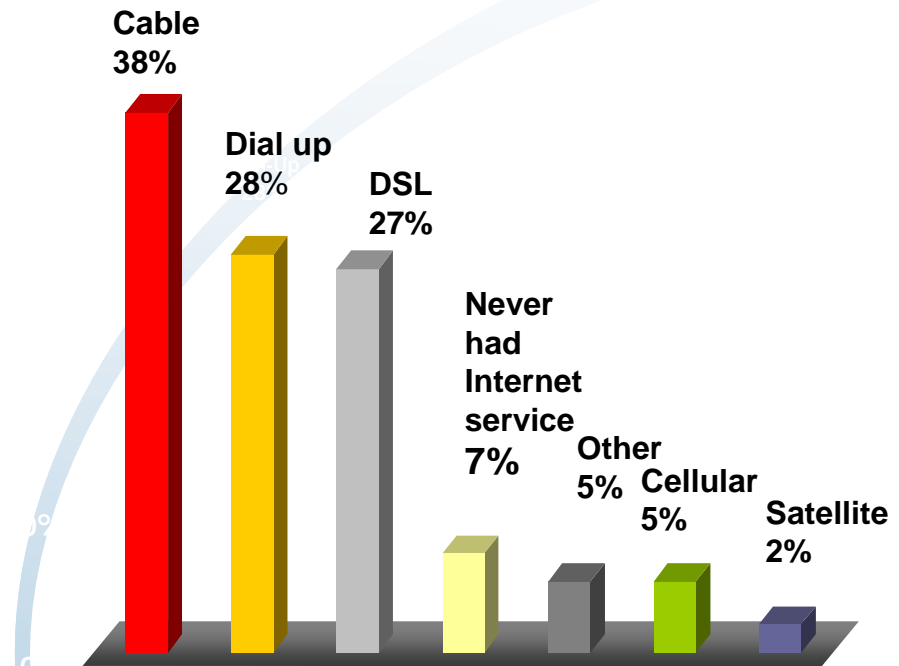
- Region One Completion
August, 2007
- Region Two Completion
September, 2007
- Region Three Completion
October - November, 2007
- Region Four Completion
November, 2007
- Region Five Completion
November - December, 2007
- Region Six Completion
December, 2007



Clearwire Example: Differentiation Drives Demand

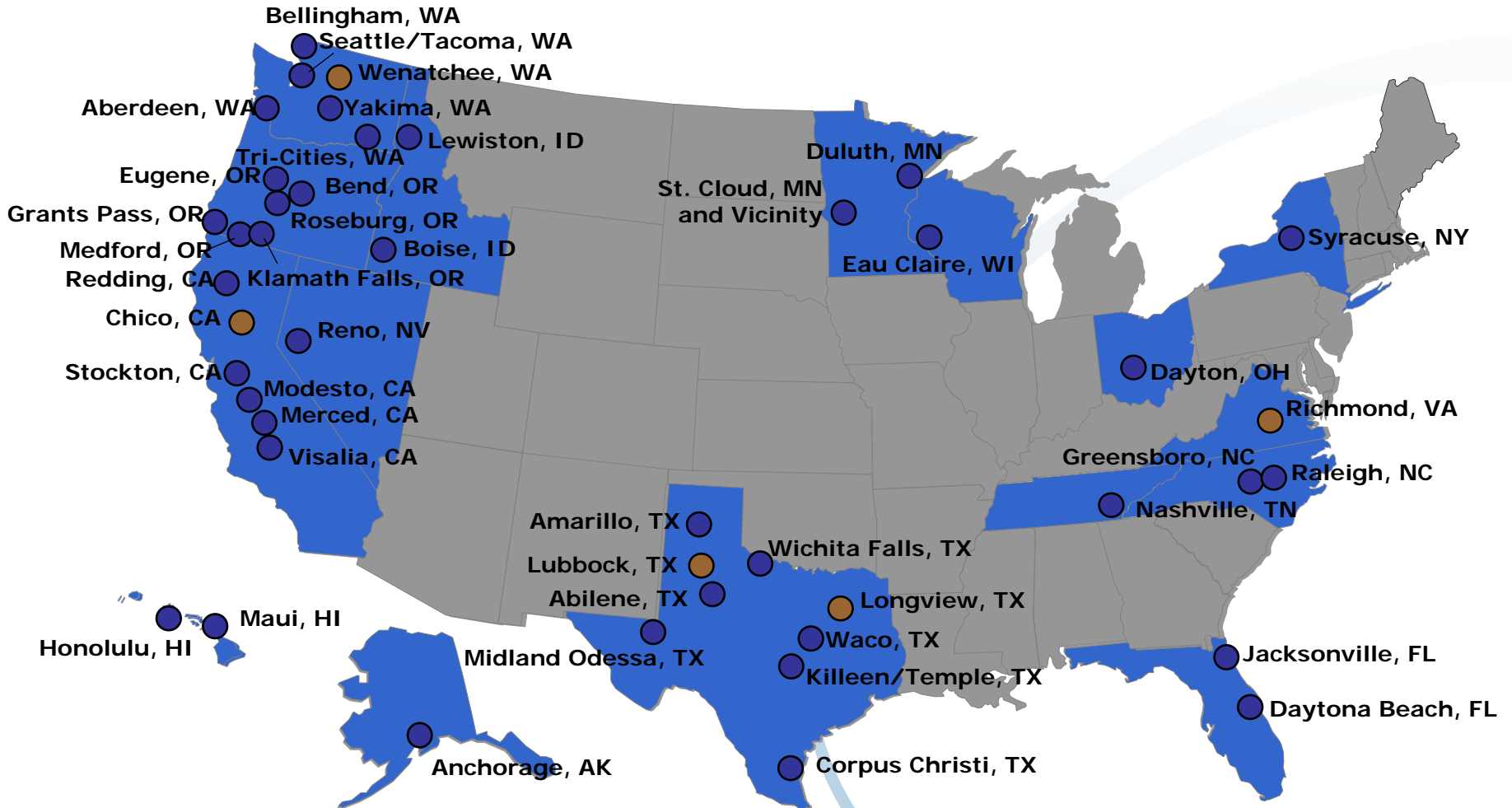
- First to test WiMAX service using local government needs to contribute to its business case
- Marketing to cable/DSL customers who prefer a wireless alternative and value mobility
- Partnership with Sprint will accelerate network infrastructure, service delivery and device ecosystem, resulting in reduced costs
- Engagement of consumer electronics players for WiMAX enabled devices and marketing channel

Sources of Clearwire's Customer Base



Source: Clearwire Customer Survey Jun 2007

Clearwire US Markets



Source: Clearwire, Sept. 2007

Clearwire Municipal Coverage



Clearwire

City of Bellevue MuniWiFi

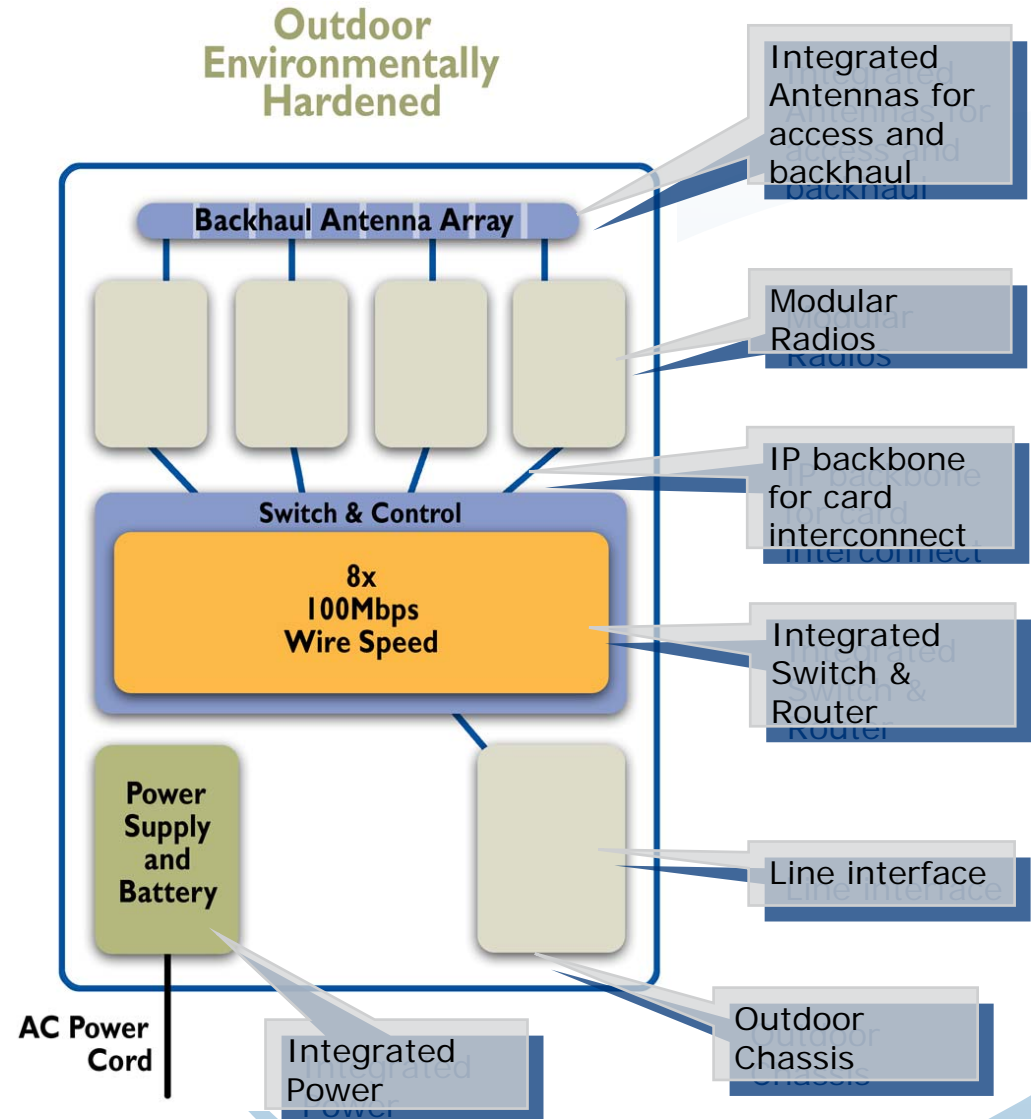


Success Criteria

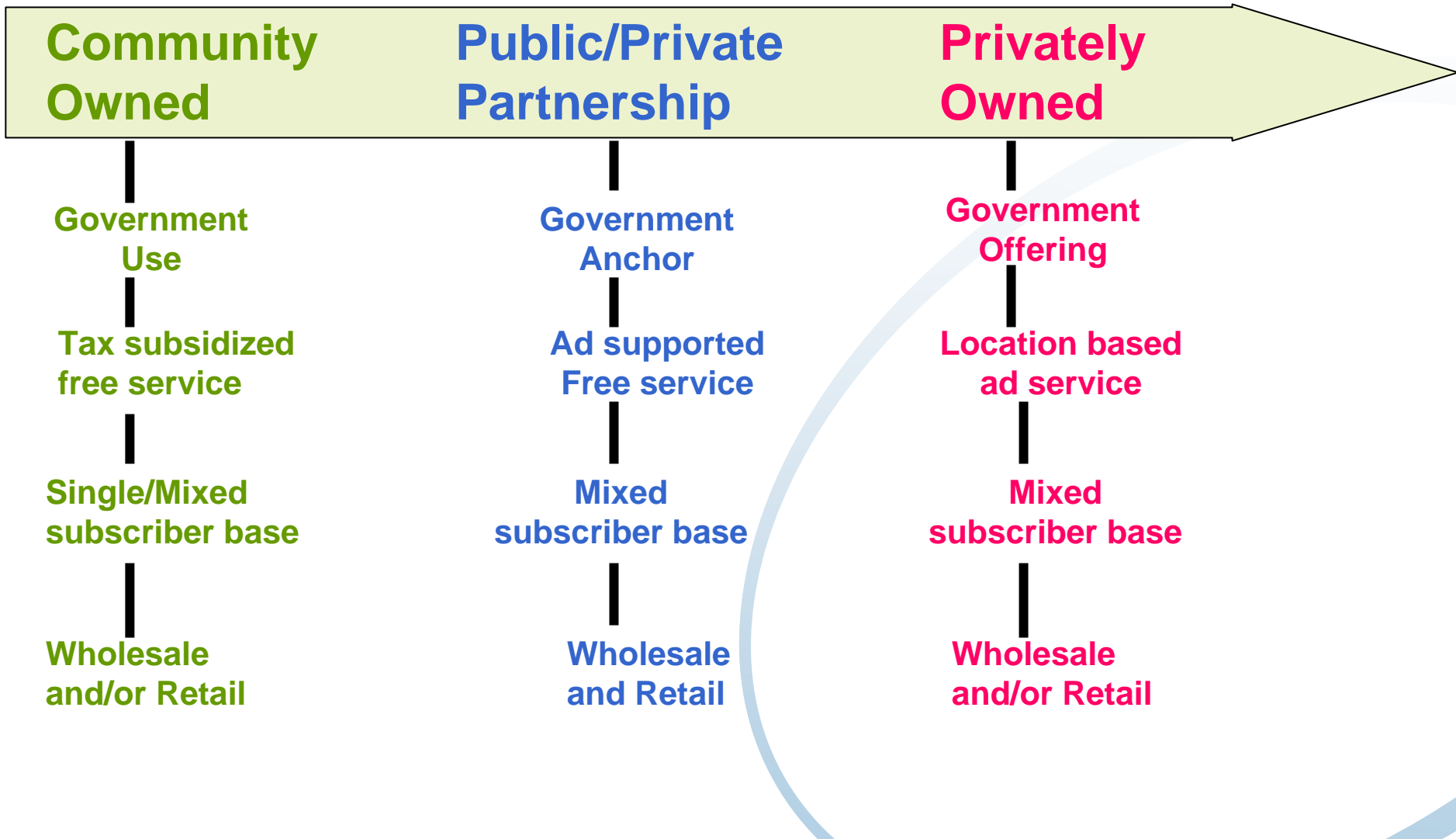
Municipal broadband Initiatives that will succeed, whether they utilize Wi-Fi, WiMAX, FTTH or a combination of appropriate technologies are those that are developed to **meet a set of realistic, prioritized business requirements and reflect an equitable balance of investment dollars, asset contributions, service level expectations and business commitments.** Those that don't won't.

Key Design Components


- **Modular universal radio and network interfaces**
- **Licensed and Unlicensed Frequencies**
- **Carrier Network Interfaces**
- **Sophisticated Layer 2/3 Switch Routers**
- **Carrier-Grade Reliability and Performance**
- **Standards compliant products**



A Business Model Continuum



Calculating Network Revenue Opportunity



ServiceMesh Network Revenue Calculator

Municipality Specifications

Location Name	<input type="text" value="San Mateo County"/>	<input type="text" value="300"/>	Service Coverage Area (Sq Miles)
Total Residents	<input type="text" value="700,000"/>	<input type="text" value="264,000"/>	Housing Units
Total Firms	<input type="text" value="67,000"/>	<input type="text" value="2,380,000"/>	Overnight Business Visitors
Total Jobs	<input type="text" value="411,000"/>		

To Edit - double click the data field

View Help Topics

Financials
Business Access
Residential
Government
Conventioners
eAdvertising
Meter Reading
Public Safety
Permitting
Transportation
City Savings

ISP Summary

Select multiple services to view their revenue impact.

Business and Residential Services	Annual Revenue, USD
<input checked="" type="checkbox"/> Local Business Access (SMB, non-DSL)	\$4,359,780
<input checked="" type="checkbox"/> Residential Access	\$1,159,488
<input checked="" type="checkbox"/> eAdvertising	\$7,109,766
<input checked="" type="checkbox"/> Conventioners	\$2,427,600
Total Revenue \$15,056,634	

Anchor Tenant Services	Annual Revenue, USD
<input checked="" type="checkbox"/> Government Employees	\$577,500
<input checked="" type="checkbox"/> Public Safety	\$1,276,875
<input checked="" type="checkbox"/> Mobile City Applications	\$400,260
Total Revenue \$2,254,635	

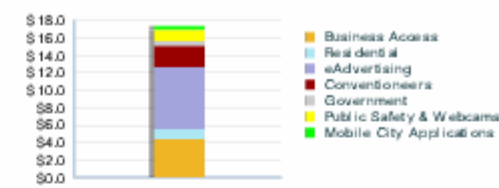
Year 1 Year 2 Year 3 Year 4 Year 5

Tool Version <http://www.feddata.gov>

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Revenue Segments (USD \$M)



Total Service Revenue: \$17,311,269

Service Providers Require a Balanced Portfolio of Revenue Sources

<h2>Subscriptions</h2> <ul style="list-style-type: none">• Consumer internet access• Government mobile worker connectivity• Business intranet access	<h2>Applications</h2> <ul style="list-style-type: none">• Automatic meter reading• Public safety/Video surveillance• Traffic management
<h2>Value-Added Services</h2> <ul style="list-style-type: none">• Content• Interactive gaming• Security	<h2>Advertising</h2> <ul style="list-style-type: none">• Pre/post authentication• Captive community or visitor portal• Ad banners/interstitials• Digital Signage

Service Providers must understand community structures and government concerns, and embrace partnerships for minimum risk entry strategy

How Can Municipal and Public Safety Applications Serve as a Model for WiMAX in the Public Sector?

Solutions Area	Applications Description	Benefit
Field Worker Support	<ul style="list-style-type: none"> • Messaging, information exchange • Remote database access • Remote reporting • High resolution mapping 	<ul style="list-style-type: none"> • Improve worker productivity/ call completion rates • Increase time in the field • Reduce cell phone usage
Public Safety	<ul style="list-style-type: none"> • Communications with command center and between workers • Remote database access • Incident management report filing 	<ul style="list-style-type: none"> • Optimize performance of agencies and emergency workers • Improve response team safety
Video Surveillance	<ul style="list-style-type: none"> • Smart system alerts for prevention • Mobile/in-vehicle surveillance • Video capture integrated with response management systems 	<ul style="list-style-type: none"> • Improve public safety and law enforcement officer safety • Increase criminal detection and apprehension
Remote Monitoring and Control	<ul style="list-style-type: none"> • Automatic meter reading (AMR) • Environmental quality monitoring • Vehicle tracking 	<ul style="list-style-type: none"> • Reduce costs • Increase efficiency and safety of public works
Transportation and Traffic Management	<ul style="list-style-type: none"> • Smart monitoring of city streets • Traffic signal control • Passenger information services 	<ul style="list-style-type: none"> • Improve road safety • Reduce traffic congestion • Emergency response

Where are the key international markets for metro Wi-Fi and public safety networks and why?

	Technology	Application Drivers
EMEA – Western Europe	WiFi hotspots, WiFi mesh, preWiMAX/WiMAX based or combinations	Public safety, crime control Urban congestion/traffic management, Economic development, Digital inclusion
EMEA – Eastern Europe, Middle East, Africa	WiFi hotspots, WiFi mesh, preWiMAX/WiMAX based or combinations	Need for communications infrastructure – often implemented in schools first, then extending out to businesses, residents Education, economic growth
APAC	WiFi Mesh, WiMAX	Digital inclusion, economic development (India, China) Public safety/emergency preparedness, public works (Taiwan) India – need to meet government mandate to implement communications infrastructure within specified time frame
CALA	WiFi, WiMAX backhaul, pure WiMAX	Need for communications infrastructure Digital Inclusion

Extending Broadband Wireless Connectivity to Public Transportation Services

Customer Contracts	Technology	Service Provider	Vendors
Southern Rail, UK Brighton/London	Wi-Fi, WiMAX	T-Mobile	Nomad Digital, Redline
GNER, UK	Wi-Fi, GSM, satellite	GNER	Icomera
Heathrow Express, UK	Wi-Fi, WiMAX, HSDPA	T-Mobile	Nomad Digital
Deutsche Bahn, Germany	Wi-Fi, UMTS	T-Mobile	NA
Oxford Tube, UK	WiFi, 3G	Stagecoach Group	Moovera Networks, Vodafone

In addition to passenger web access, opportunity for vehicle tracking, video security and other telemetry applications



Broadband **Anywhere** - Internet **Anywhere**

Local governments should partner with mobile broadband service provider to shape their mobile data/video voice service strategies to achieve mobile worker connectivity, government applications and citizen services



Thank You

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