



**Federal Communications Commission**  
National Broadband Plan – Spectrum workshop

Washington, DC

September 17, 2009

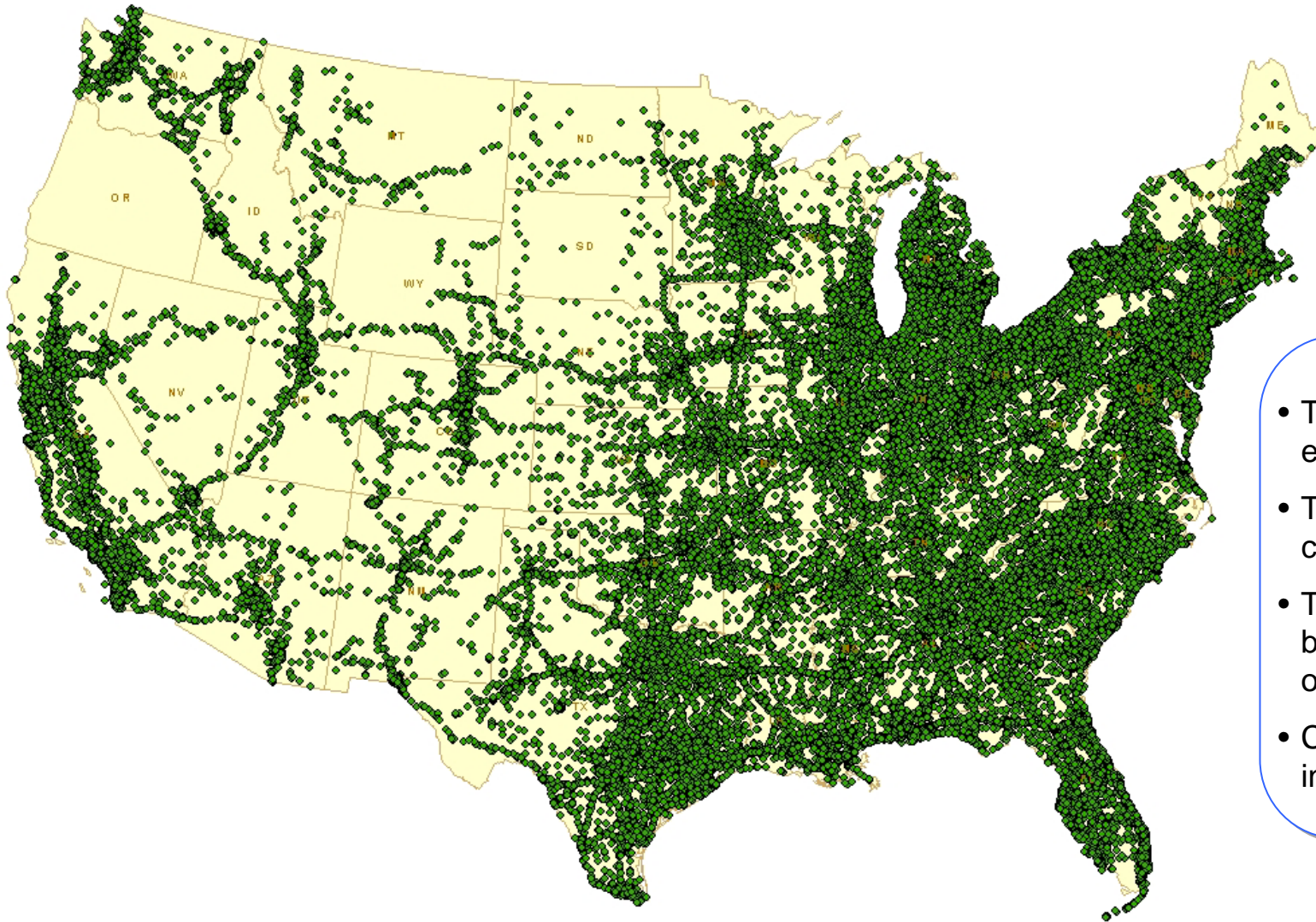


FiberTower

*Middle mile transport, for  
ubiquitous high speed access*



# National Tower Relationships

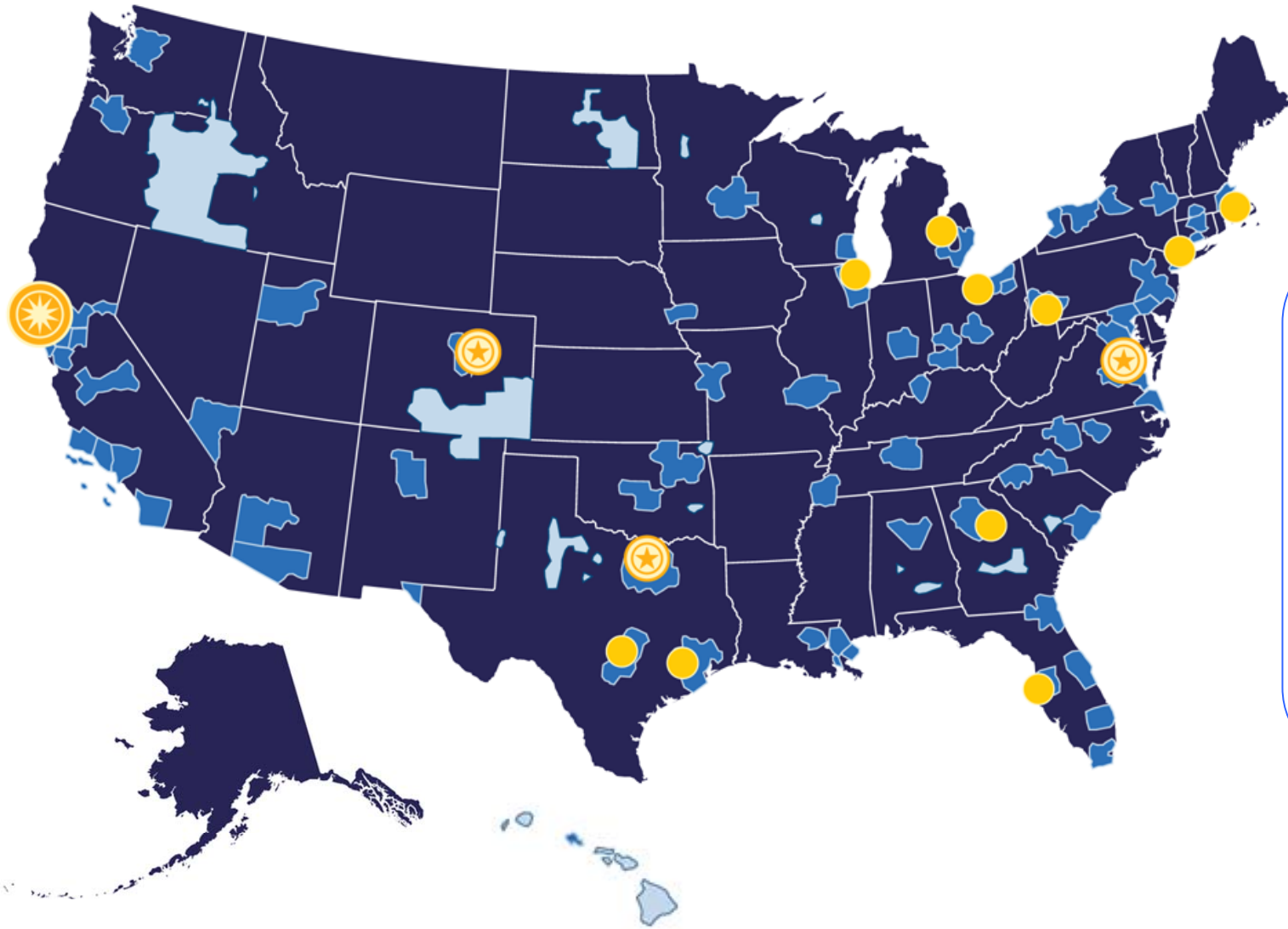


- Tower locations are key to enabling broadband access
- Towers support ~ 50% of all cell sites today
- Towers are quickly becoming the central offices of the future
- Crown Castle is a strategic investor in FiberTower

▶ FiberTower has agreements representing 100,000 towers



# National Footprint



## Legend & Summary

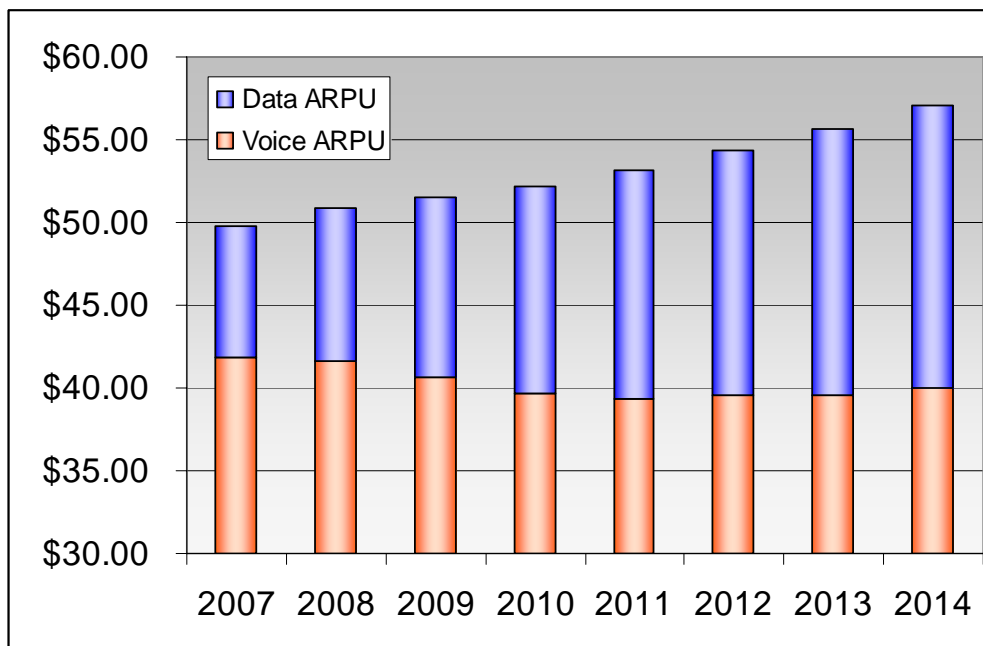
- 39 GHz – National Scope
- 24 GHz – Top 77 Markets
- Significant spectrum use nationally
- 13 Markets with HFW networks
- HQ & NOC – San Francisco
- 3 Regional offices

▶ High capacity, national spectrum for rapid deployment of middle mile solutions

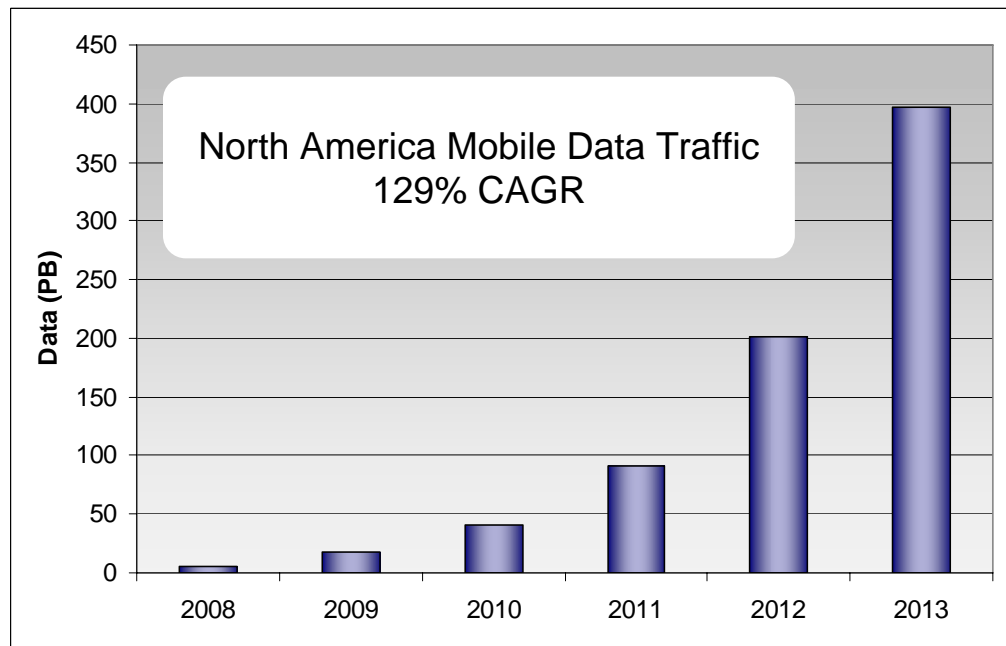


# Data Uptake – How big of a problem is this?

- 2008: 1.3 Exabytes ( $10^{18}$ ) transferred from mobile devices (*source: ABI research*)
- May 2009 : US Wireless Data Revenues expected to be \$42B (*source: Washington Post*)
- 2014: Estimated 1.6 Exabytes transferred per month (*source: Cisco Systems*)
- Video streaming will grow at a CAGR of 62% between 2008 and 2014 (*source : ABI research*)
- Smartphone sales are expected to increase 95% to more than 300M by 2013 (*source: Juniper Research*)



Source: Visant Strategies

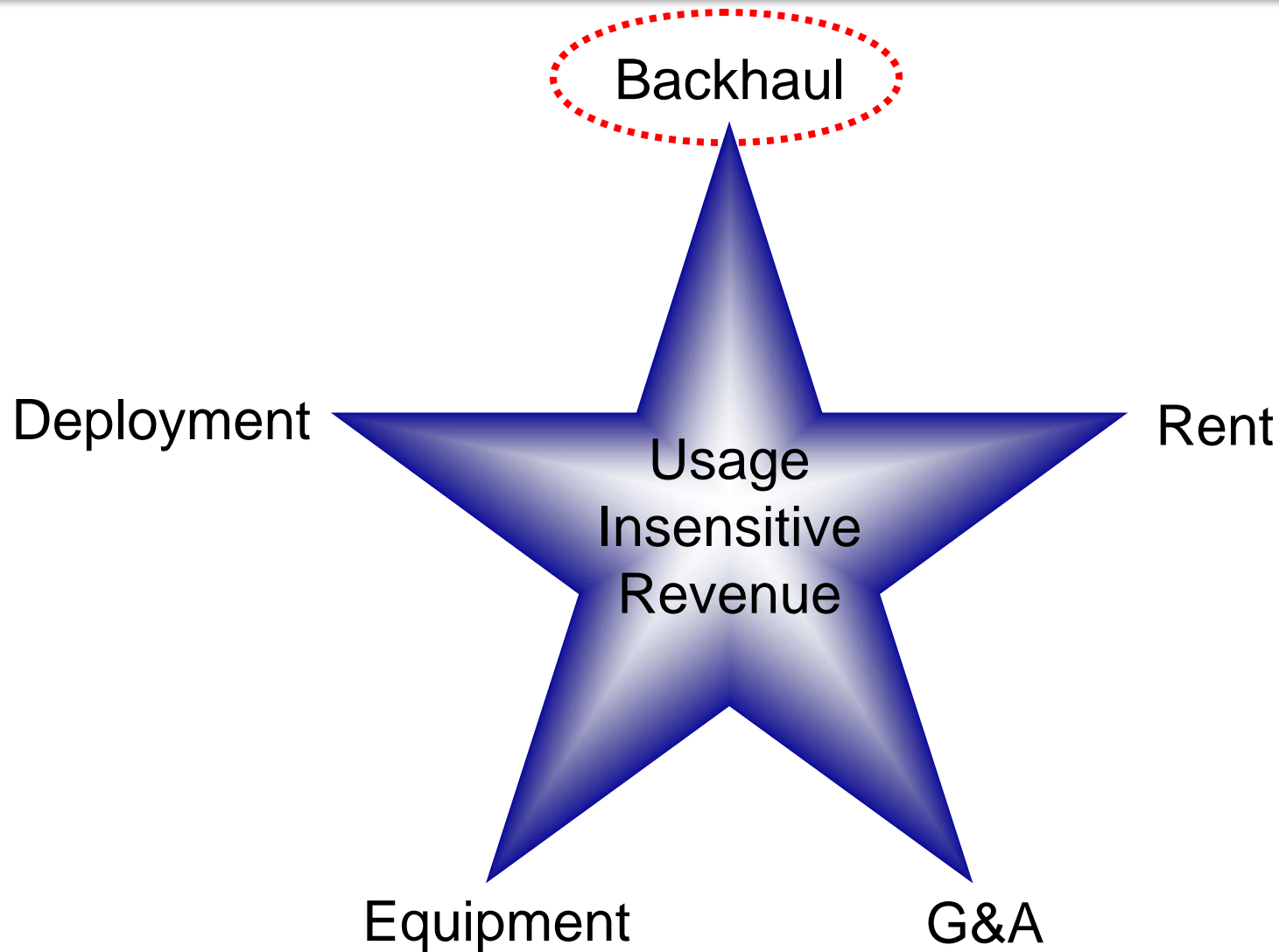


Source: Cisco Systems

▶ Data must be dealt with today, including upstream traffic needs



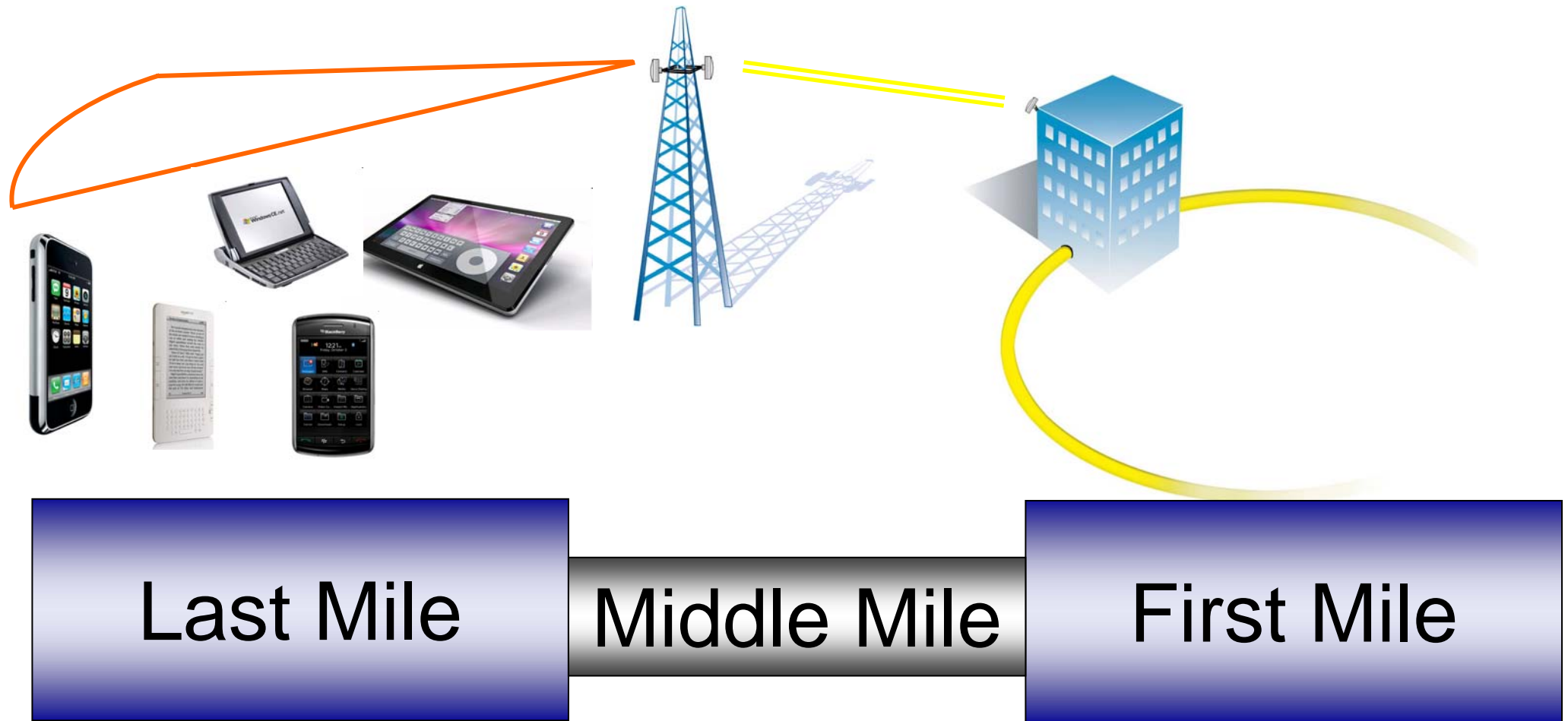
# Universal High Speed Access



► Ubiquitous cost effective middle mile backhaul is critical



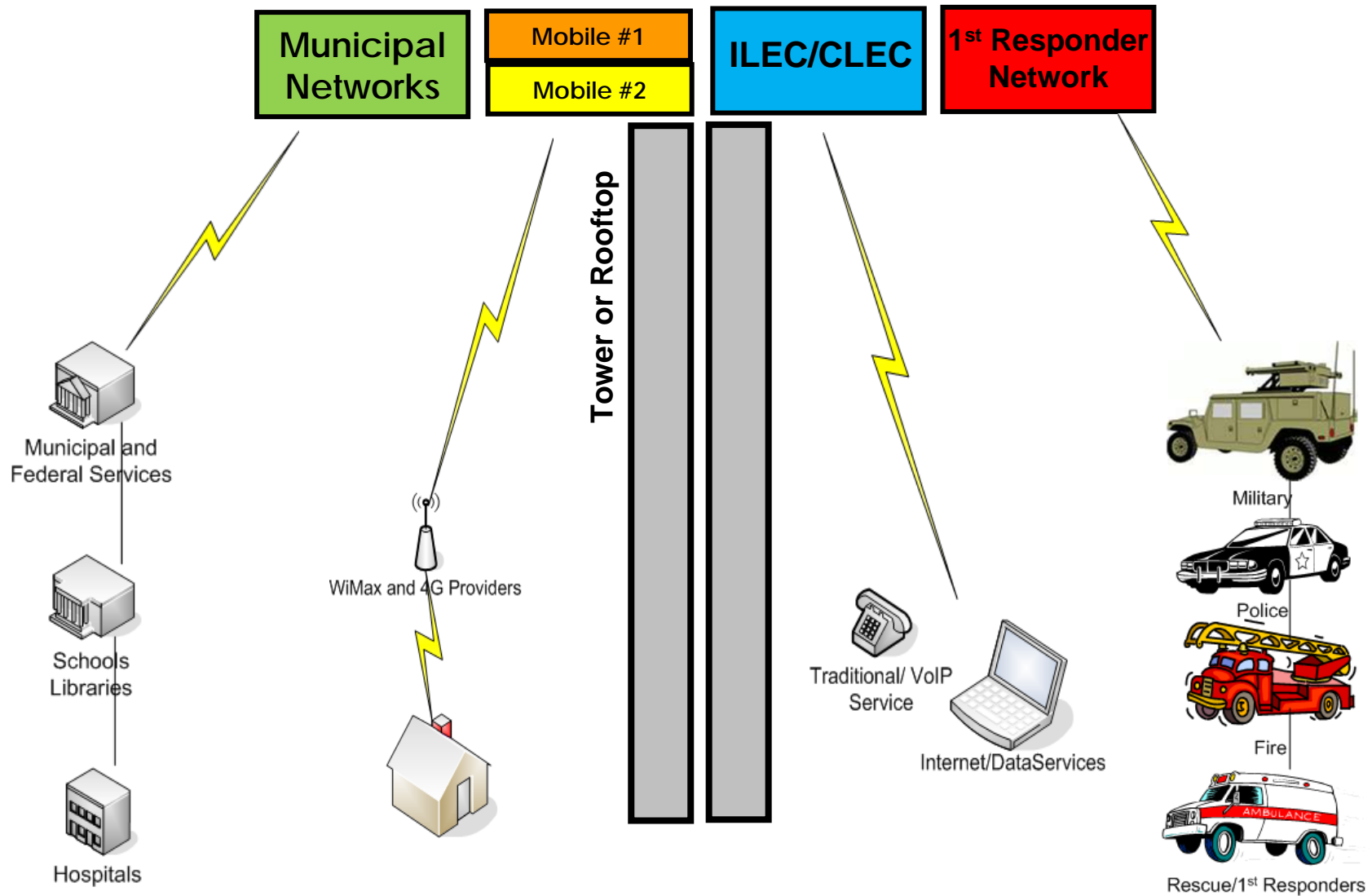
# Backhaul Bottleneck



▶ Middle Mile is the key to enabling high speed access to consumers



# MuniFrame® Multi-use Infrastructure

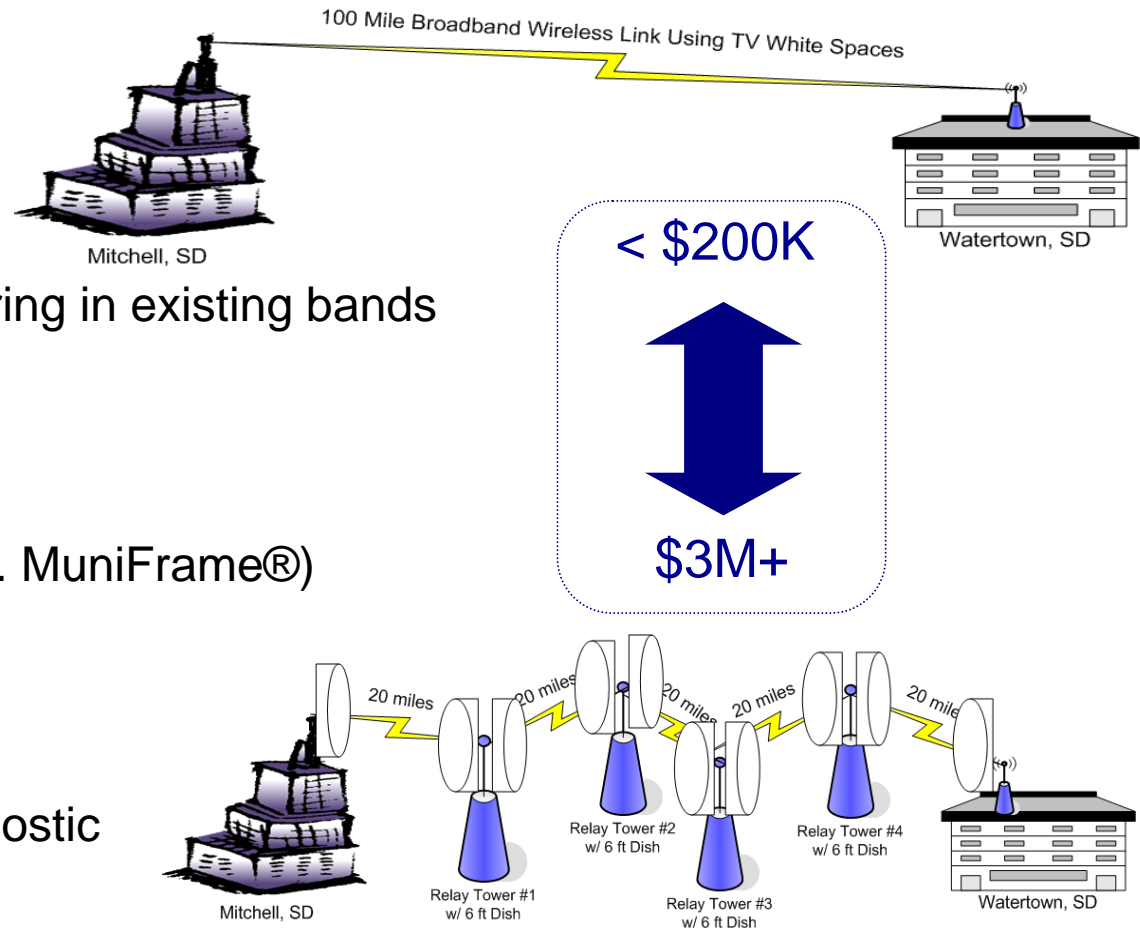


▶ Shared Infrastructure networks are spectrally and economically efficient



# Enabling the Middle Mile

- Release spectrum, specifically for backhaul / middle mile
  - e.g. link licensed TV White Spaces
  - “Further & fatter”
  - Cost effective deployments
- Promote creativity, innovation and sharing in existing bands
- Continue to promote spectrum usage
  - e.g. Bit per Hertz efficiencies
- Encourage Multiple Use Platforms (e.g. MuniFrame®)
- Ease network deployments
  - OTARD
  - Easements should be medium agnostic
- Facilitating competition is crucial



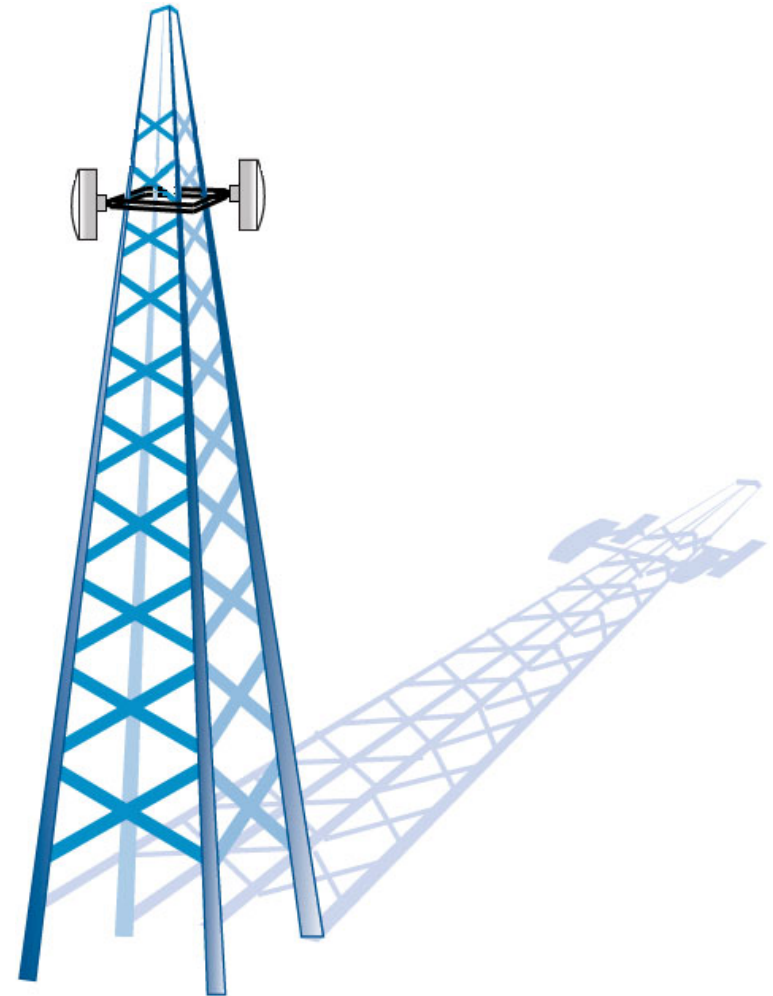
▶ Innovation, creativity, and simplicity are keys to enabling the middle mile





# Summary

- Shared infrastructure, middle mile, multiple use platforms are the key to enabling efficient broadband access nationally
- Releasing spectrum earmarked for backhaul ensures desired use
- The industry is truly at the data inflection point today.
- Facilitating cost - effective competition is crucial for industry success



# Appendix



FiberTower



# FiberTower at a Glance

## Company Snapshot

- NASDAQ Listed: FTWR
- Approximately 150 Employees
- First site live: March 2003
- National Licensed Spectrum
- 13 Existing U.S. Markets

## Network Services

- Low Capacity: T1
- Mid Capacity: nxT1, Ethernet
- High Capacity: DS-3, OC-n, Ethernet
- Wavelengths: Inter and Intra metro
- TDM to Ethernet Migration

## Financial Highlights – Q2 2009

- Annual Revenue \$62.3M
- Yr/Yr Revenue Growth 31%
- Field EBITDA positive July 2008
- Cash & Equivalents \$90M
- Total Assets \$622M

## Network Metrics @ Q2 2009

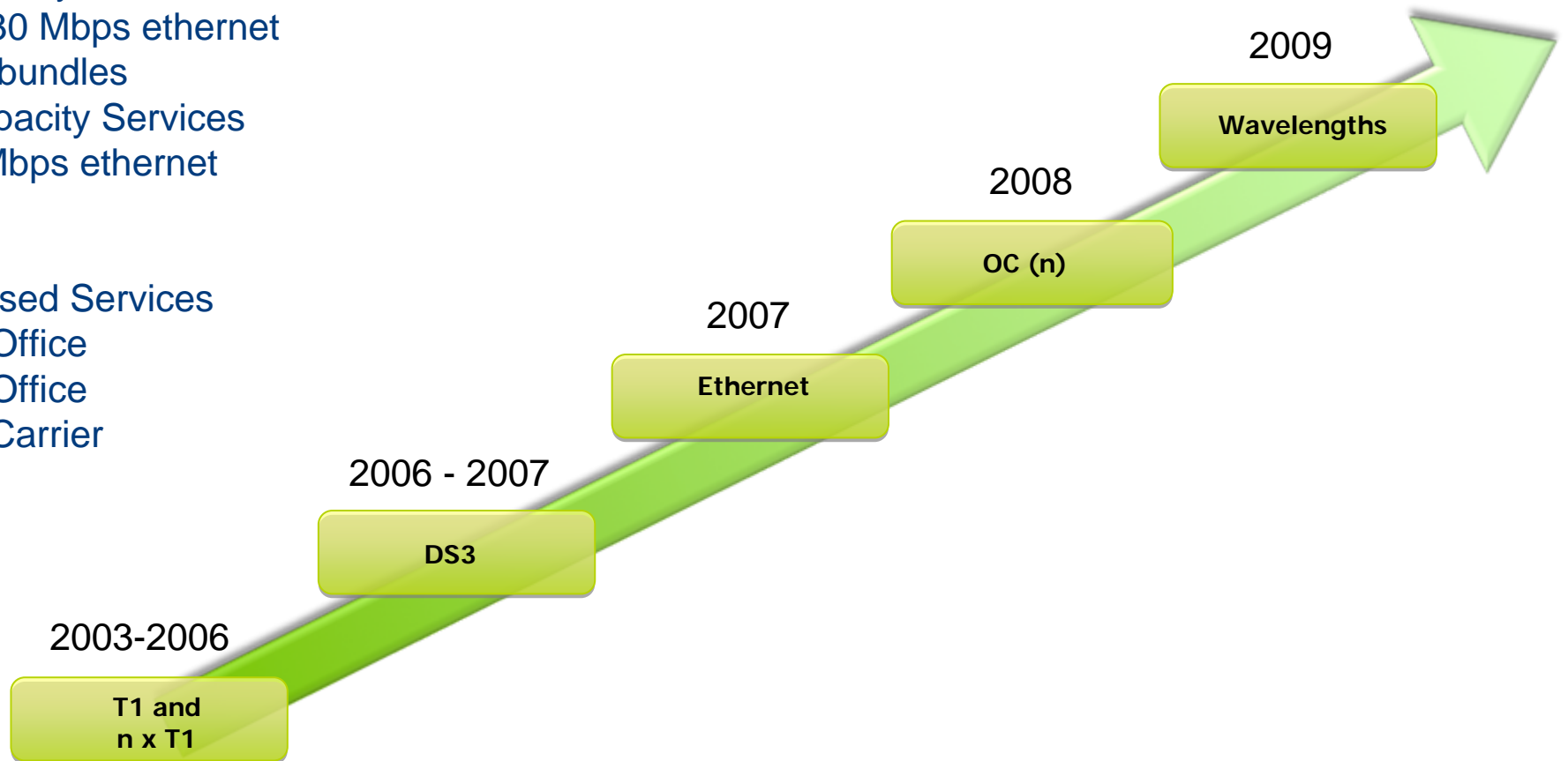
- Deployed Cell Sites > 6,300
- Live Markets 13
- Live LEC regions > 15
- Network Route Miles > 12,800
- Fiber Partners > 20

▶ Facilities based hybrid fiber wireless cellular backhaul for over 6 years



# Service Offerings

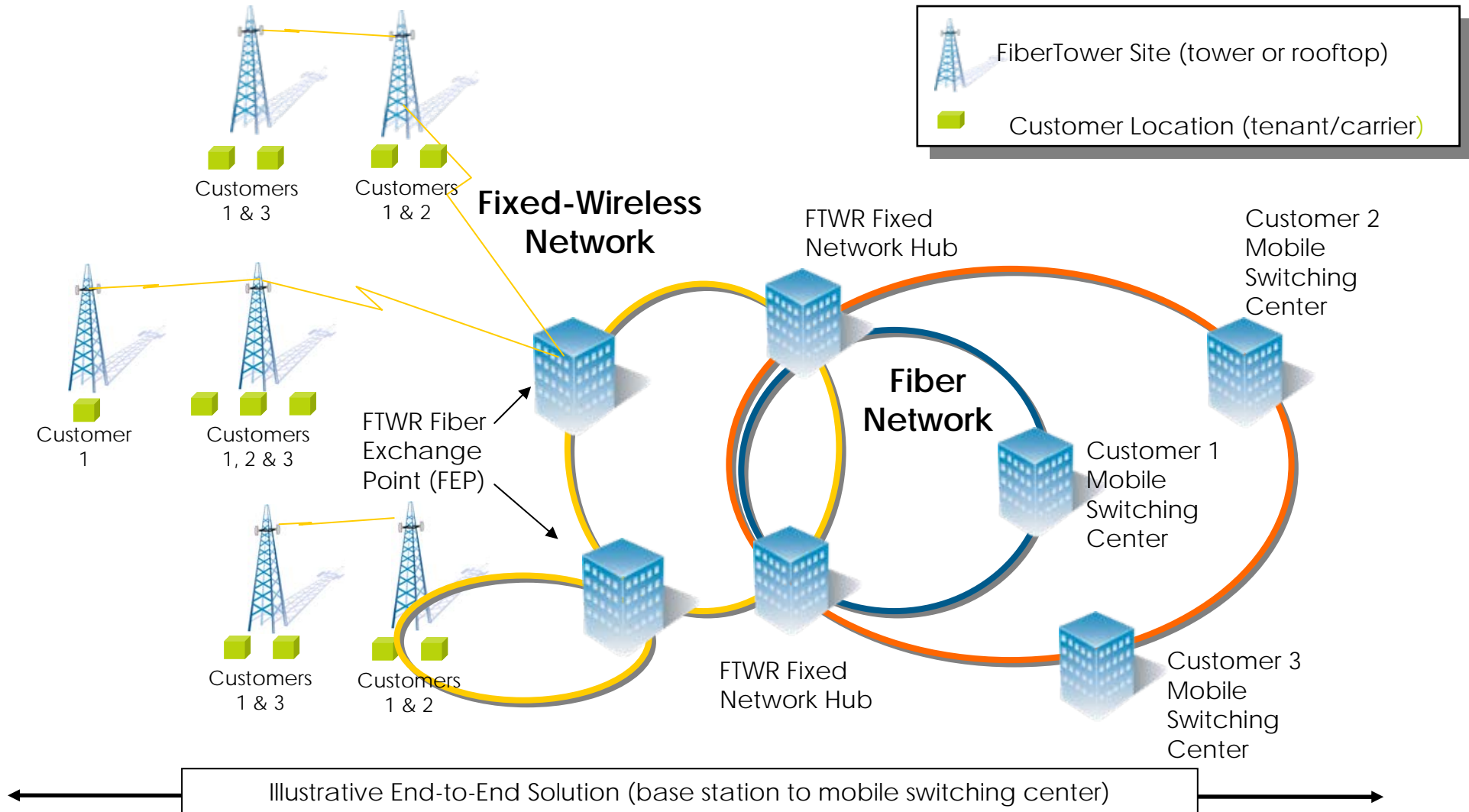
- National Scope Pricing
- Mid Capacity Services
  - 10 – 30 Mbps ethernet
  - nxT1 bundles
- High Capacity Services
  - 50+ Mbps ethernet
  - DS-3
  - OC-3
- Fiber Based Services
  - Intra Office
  - Inter Office
  - Inter Carrier



▶ Expanded portfolio to address the growing needs of carrier customers



# Network Architecture



▶ Facilities based, Hybrid Fiber – Wireless Network, 100% licensed



# Spectrum Usage – What's Available

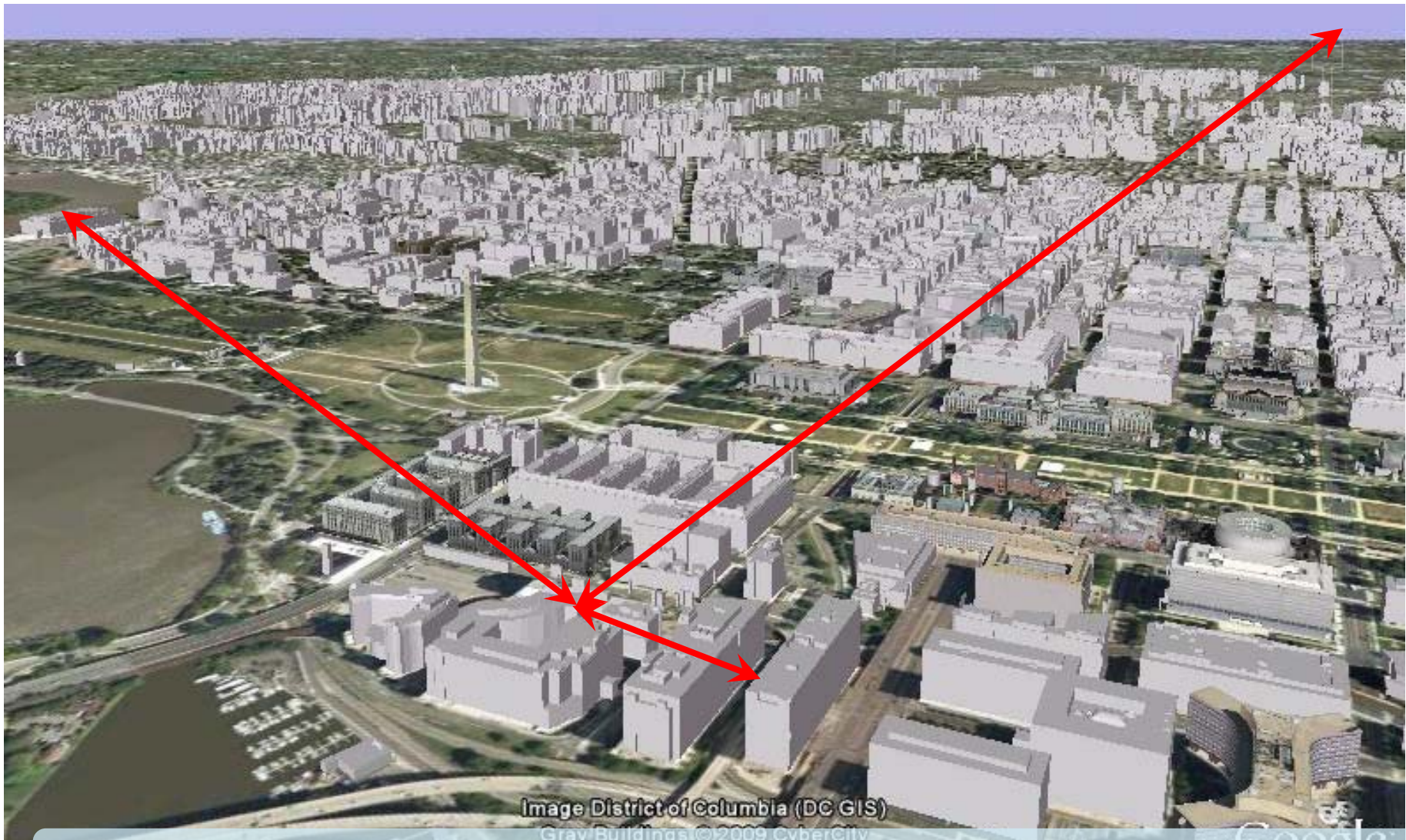
Frequencies	Typical Path Length	Maximum Channel Bandwidth	Maximum Channel Capacity (typical)	Minimum Dish Diameter	Typical Weight, including mount
400 – 700 MHz (in Progress)	30 - 75+ Miles	6 MHz	50 Mbps	< 2 Ft	< 20 lbs
4 GHz	20+ Miles	20 MHz	DS-3+	8 Ft	500 lbs
6.1 GHz	20+ Miles	30 MHz	OC-3	6 Ft	360 lbs
6.7 GHz	20+ Miles	10 MHz	DS-3	6 Ft	360 lbs
10 GHz	10 Miles	5 MHz	16 x T1	2 Ft	33 lbs
11 GHz	8 Miles	40 MHz	OC-3	2 Ft	33 lbs
18 GHz	4 Miles	80 MHz	OC-3, OC-3+	2 Ft	33 lbs
23 GHz	2 Miles	50 MHz	OC-3	1 Ft	21 lbs
24 / 39 GHz	1.5 Miles	700 MHz	1 Gbps	N/A	< 20 lbs



# BAS TV White Spaces Fixed link (WPNI810) – 80.5 miles



# Wireless connectivity



▶ Licensed wireless links can be used for primary, diversity and quick turn-ups





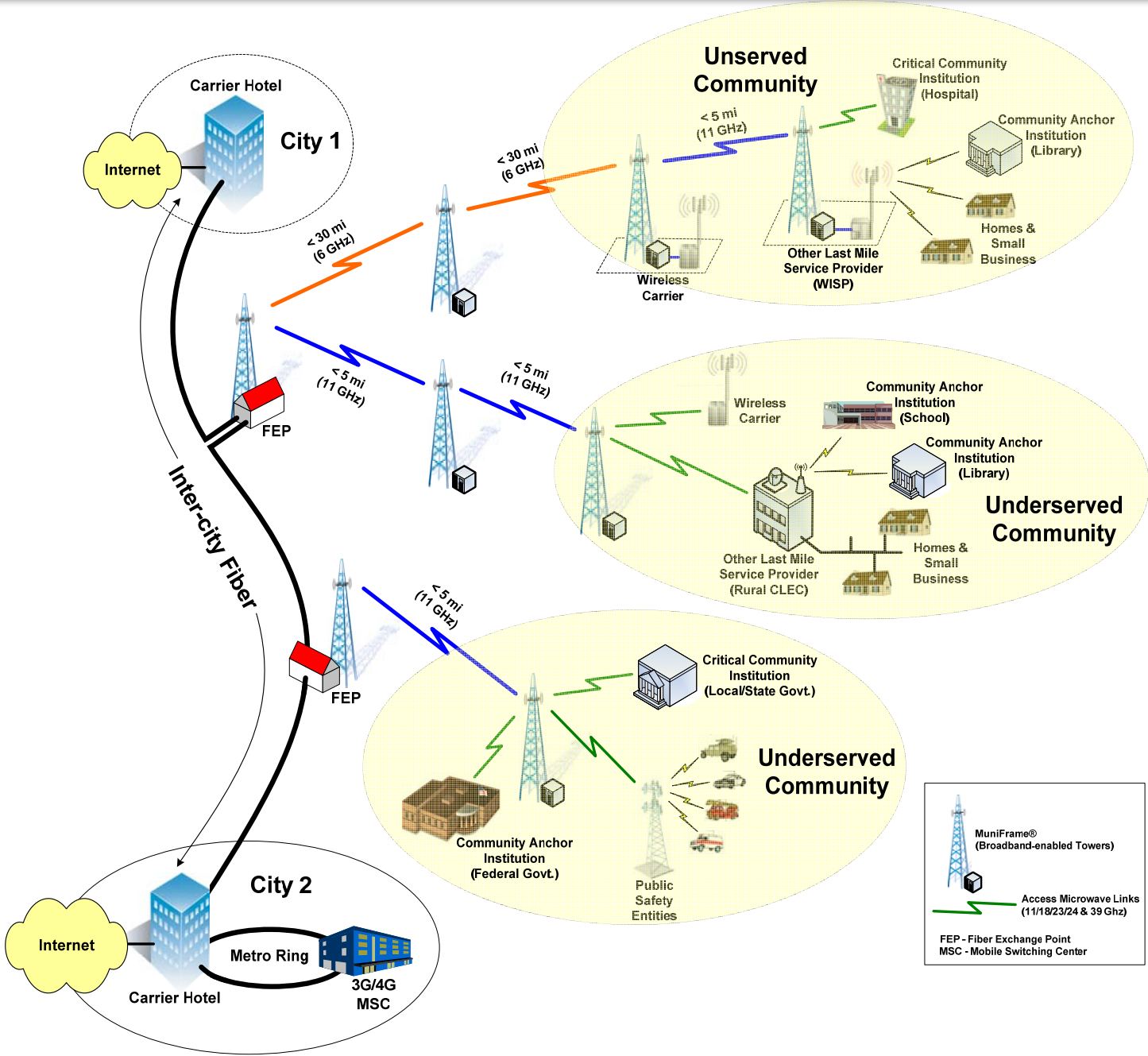
# Backhaul Technology Alternatives

	<b>Copper/xDSL (e.g., VDSL2)</b>	<b>Fiber (PTP, ring or GPON)</b>	<b>Microwave</b>	<b>Hybrid Fiber- Microwave</b>
Capacity	Up to 100 Mb/s, depending on # of pairs used, quality and distance	>>1 Gb/s	Up to 1 Gb/s, depending on distance and topology	Up to 1 Gb/s, depending on distance and topology
Coverage	Limited and variable based on quality and availability of plant	Economically limited to ~1000' from fiber backbone	Tradeoff between capacity and coverage	Very good (>70%)
Cost	Low incremental cost, where viable	Economically limited to ~1000' from fiber backbone	Moderate and relatively fixed	Ability to optimize for particular scenario
Quality	Variable, depending on quality of plant	High (99.99%)	High (99.999% per link)	High (>99.99%)
TDM + Ethernet Support	Yes (using separate pairs or pseudo wire)	Yes	Yes	Yes

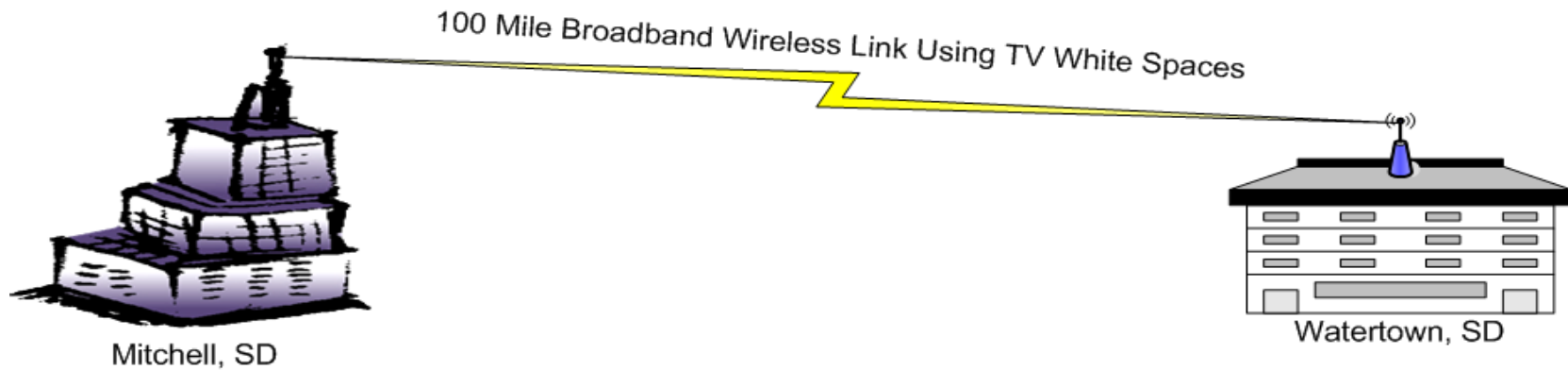
▶ Microwave deployment costs are not distance dependant



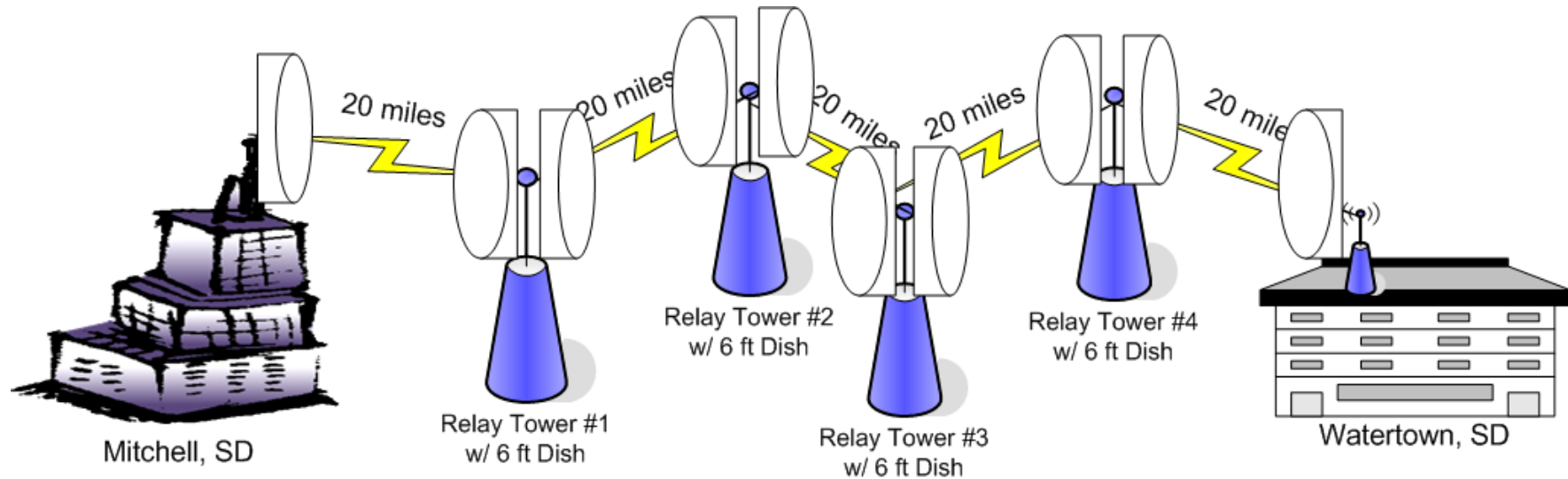
# Middle Mile Architecture Overview



# 100 Mile broadband connection cost comparison



100 Miles using TV White Spaces (450-698 MHz): Small lightweight grill-style antenna fits on building/tower. Cost <\$100,000-\$200,000



6 GHz or 3.65 GHz . Total cost: >\$3million. Fiber Optic costs even more!

