



Public Safety Wireless Mesh Networks 4.9 GHz

Martin Levetin
Sr. VP Sales and Marketing
www.StrixSystems.com
Martin.Levetin@StrixSystems.com

- ✦ **Manufacturer of Carrier Class, High Capacity WiFi Equipment**
 - ✦ **Multi-radio platform: (2.4, 5.8, 4.9, etc.)**
- ✦ **Founded in April 2000**
 - ✦ 2,000+ customers spread across 40+ countries
 - ✦ Largest world-wide wireless deployments
- ✦ **Headquartered in Santa Clara, California**
 - ✦ Sales offices in the U.S., Brazil, EMEA, China, Japan, South East Asia, Korea & India
 - ✦ R & D : California Bay Area, Ahmedabad (India), London (UK)
- ✦ **Award Winning Architecture**
 - ✦ More than 12 international patents
 - ✦ First deployed, fully integrated (2.4, 5.8, 4.9) network



Strix Deployments

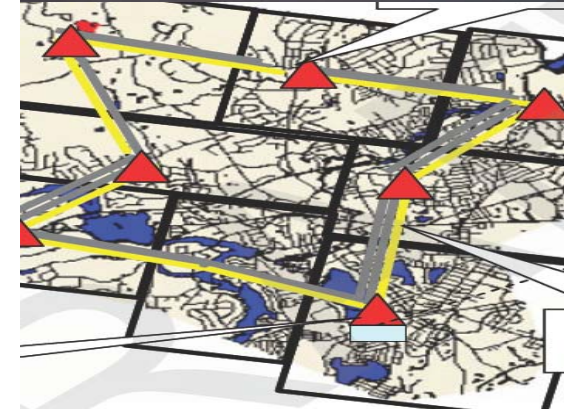
Public Safety	Municipal / Industrial	Service Provider	Transportation / Enterprise
			
<p>Brookline, MA* (4.9 GHz) Framingham, MA* Beech Grove, IN* Pocatello, ID* Clarendon Hills, IL* Abington, VA* Pittsburgh, CA Beijing, China Christchurch Airport Netherlands Airport Indonesia State Gov't Mesquite, TX US Navy, GITMO Pendleton, OR Darwin, AU</p>	<p>Rotterdam, NL Valencia Water, CA Santa Clarita, CA Sand Springs, OK</p> <p>Port of Rotterdam Union Pacific Honda Guangzhou, China Falkirk Mine, OK Oakly Mine, AU Kumba Iron Ore, Kenya Yilan Coal Mine, China Boeing Aircraft* Oil Rigs in Gulf Ergon Refinery, US Newfield Exploration, OK</p>	<p>Galaxy Internet Services Kenya Data Networks Telecom Malaysia Spidigo, India SFR, FR Korea Telecom panOULU, Finland China Mobile Hopkinsville Electric Rotterdam, Netherlands KCCS, WICOM, Japan* Austin Utilities One Community, OH* Citymesh, Belgium</p>	<p>NCTD Coaster Korean Highway Korean Monorail China Rail System Dutch Rail Shanghai Subway Japan Yokohama Tower Mount Butler Ski Resort ISC Motor Sports Summit POS, WOF Feld Entertainment Lazy Days RV Super Center Red Oak ISD</p>

✧ Framingham, MA

- ✧ Area 26 sq mi, Population 65, 000
- ✧ Suburb of Boston, MA

• Business Case

- ✧ Combined municipal use and public safety
 - ✧ Fixed and mobile data by DPW, Police, Fire
 - ✧ Video surveillance of selected neighborhoods and assets
 - ✧ Monitoring of water and sewer facilities
- ✧ Strix multi-radio mesh. high-power 4.9GHz, 2.4 and 5.8 GHz
- ✧ 500 nodes deployed in 12 square mi area to date.



✦ Pocatello, Idaho

- ✦ Area 27 sq mi, Population 55, 000
- ✦ Gateway to the Northwest, trade and transportation junction
- ✦ Previously no broadband connectivity

✦ Business Case

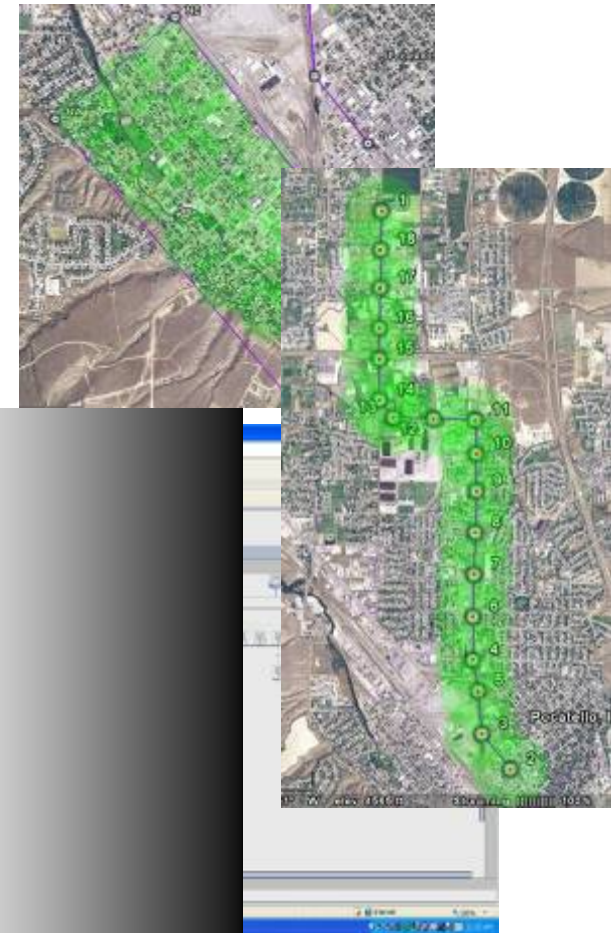
- ✦ Combined public safety and municipal use, mobile and portable, incorporates Strix high-power 4.9GHz and 2.4 GHz
- ✦ Police and municipal users remotely access reports, remote video surveillance, CAD system, anti-virus updates, software application updates, field reporting upload, database synchronization, mass file transfer, wireless video, incident scene communications and interoperable data communications
- ✦ Benefits greater Pocatello region with secure, resilient, interoperable, high-performance, multi-purpose wireless mesh network.



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- ✦ Number of units
 - ✦ 80 Strix OWS units in major routes, some neighborhoods
- ✦ Total injection points
 - ✦ 3 total - Strix 5GHz and Dragonwave 23 GHz
- ✦ Users
 - ✦ 4.9 GHz mobile access for police and fire (30 to 40)
 - ✦ 2.4 GHz public works and other municipal divisions
- ✦ Applications
 - ✦ CAD/CAM
 - ✦ Field Report management system
 - ✦ Criminal database queries and mug shots
 - ✦ Surveillance
 - ✦ Field communications
- ✦ Network Operator
 - ✦ City of Pocatello and Pocatello PD
- ✦ Systems Integrator for Deployment
 - ✦ Federal Signal, University Park, IL



✦ **Pittsburg, California**

- ✦ Area 17 sq mi, Population 62,511
- ✦ Pittsburg, California is a city located in eastern Contra Costa County, California
- ✦ City desired to take control over street crimes utilize system for undercover operations

✦ **Business Case**

- ✦ Funded through public safety and homeland security grants for Video Surveillance and remote data access to monitor intersections, parks, harbors etc.
- ✦ Headquarters views events “live” for police department to respond fast, dispatch officers, special weapons and tactics (SWAT) coordinating response efforts with other agencies as needed.
- ✦ Hundreds of incidents, violent and non-violent, captured enabling police to follow and apprehend suspects involved in theft, assault, aggravated assault, child abductions, drug deals, homicide.
- ✦ First application of military-grade infrared night vision/detection cameras on a wireless mesh network.



✦ Darwin Australia

- ✦ Australia's First Multicast Mesh Wireless Network
- ✦ Strix OWS mesh solution with High Redundancy, Self Healing, Multi-Subnet Architecture for multiple routes for video data streams



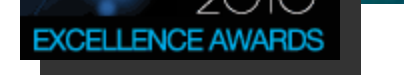
✦ Business Case

- ✦ Managing 109 Multicast CCTV cameras in the demanding climate & operational challenges
- ✦ Government funded project to equip Police to monitor and reduce anti-social behavior on the streets
- ✦ PTZ CCTV cameras – deployed at “hotspots”, Mass passenger transport systems, bus interchanges popular congregation points at Casuarina, Palmerston and Darwin
- ✦ Lightning protection (3000 strikes a day during monsoon) for the antenna and the equipment & Heat shield over the radio unit to protects from vandalism



✦ Business Benefits

- ✦ Wireless network deployed in December 2009, successfully transports hundreds of gigabytes of video data each day without disruptions or outages

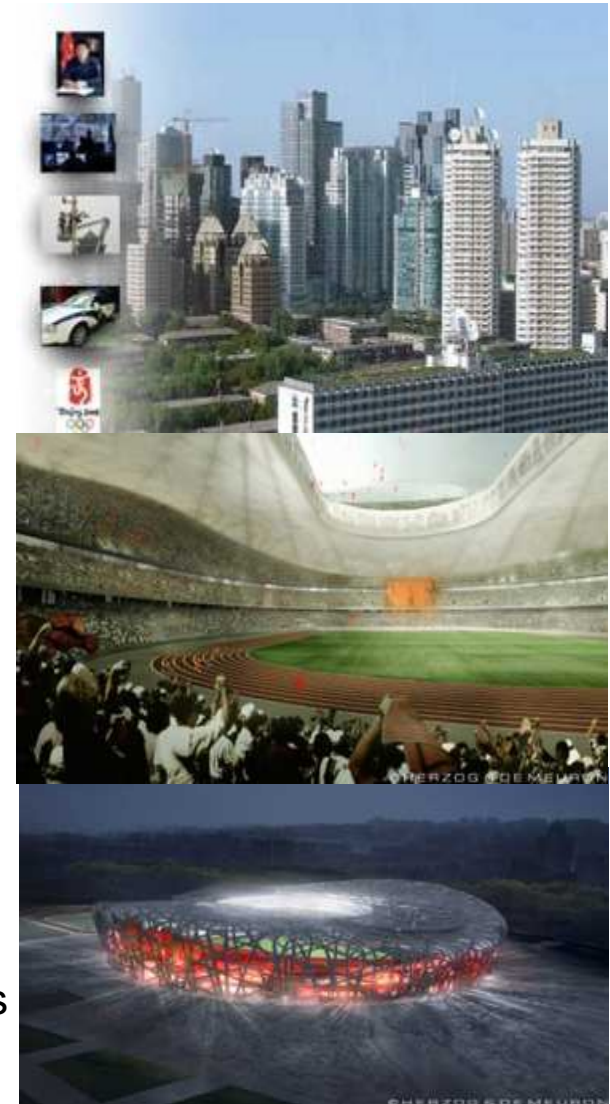


✧ Beijing Olympics

- ✧ Strix OWS and IWS provides mesh networking throughout the Xicheng district, which has a population of 800,000
- ✧ City-wide Strix deployment for the Bureau, which is responsible for many aspects of public security, including crime, security violations, anti-terrorism activities, and emergency command communications
- ✧ The first phase was started in September 2005, the Public Security Bureau deployed Strix mesh nodes along all main roads
- ✧ Strategic buildings in the Xicheng district's most critical areas, and in mobile command vehicles.

✧ Business Case:

- ✧ Government department funded
- ✧ Strategically enables high-speed, high quality remote and mobile access for police and e-government services
- ✧ Cameras deployed for video surveillance which can be access from any point on the network



✧ WLAN Highway Project

- ✧ Korean Highway Corp., testing by TTA standards organization.
- ✧ Business Case
 - ✧ Kyungbu highway initially 31 kilometer stretch between Pangyo and Osan.
 - ✧ Key criteria to achieve continuous 8 Mbps end-to-end streaming of video, VoIP and multimedia at 100 km/hour
 - ✧ Strix OWS wireless mesh nodes were installed every 1 km with an average 3 or 4 hops from wired backhaul and mobile mesh nodes were installed in vehicles



“We have not seen such a large area deployment of wireless mesh network with WLAN technology in the world.”

Muni-Public Safety Architecture

✦ Deployments

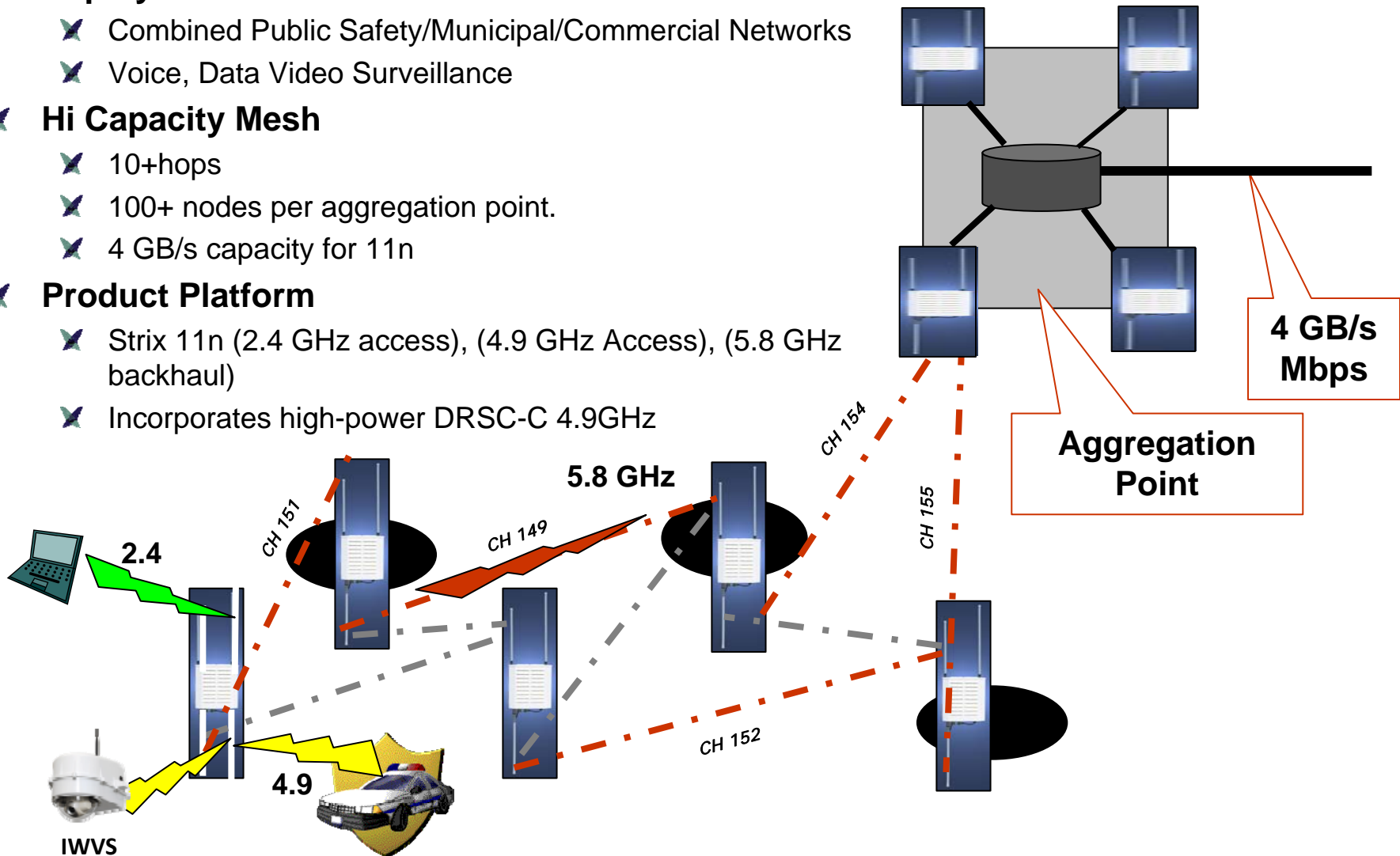
- ✦ Combined Public Safety/Municipal/Commercial Networks
- ✦ Voice, Data Video Surveillance

✦ Hi Capacity Mesh

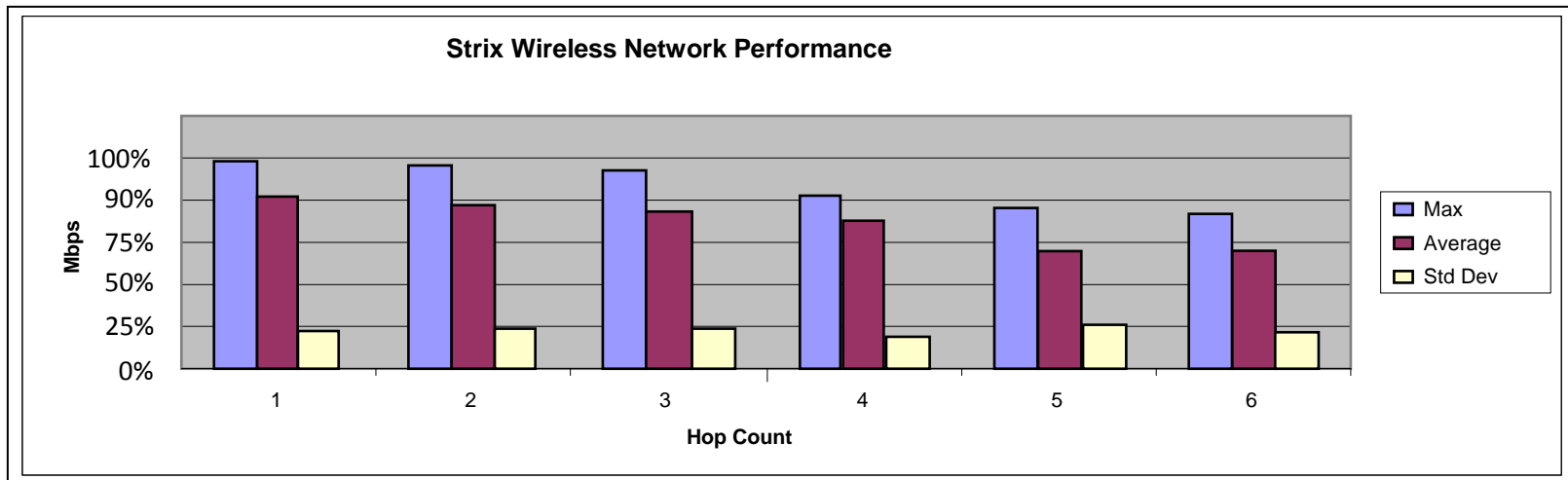
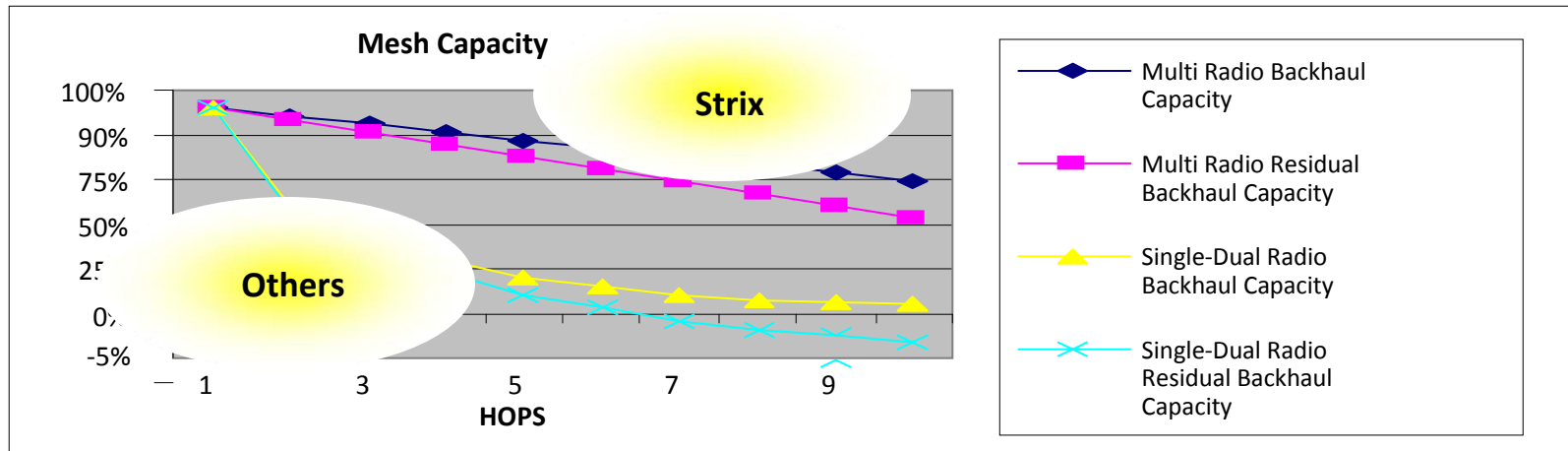
- ✦ 10+hops
- ✦ 100+ nodes per aggregation point.
- ✦ 4 GB/s capacity for 11n

✦ Product Platform

- ✦ Strix 11n (2.4 GHz access), (4.9 GHz Access), (5.8 GHz backhaul)
- ✦ Incorporates high-power DRSC-C 4.9GHz



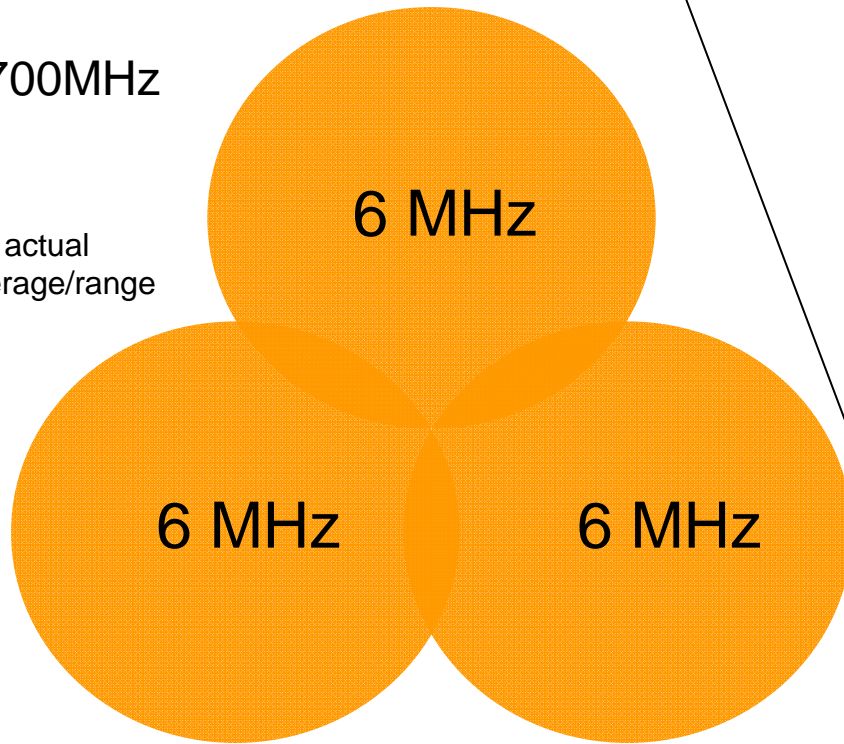
Carries Traffic over 10 Hops – Real World Deployments



* Not actual coverage/range

700MHz

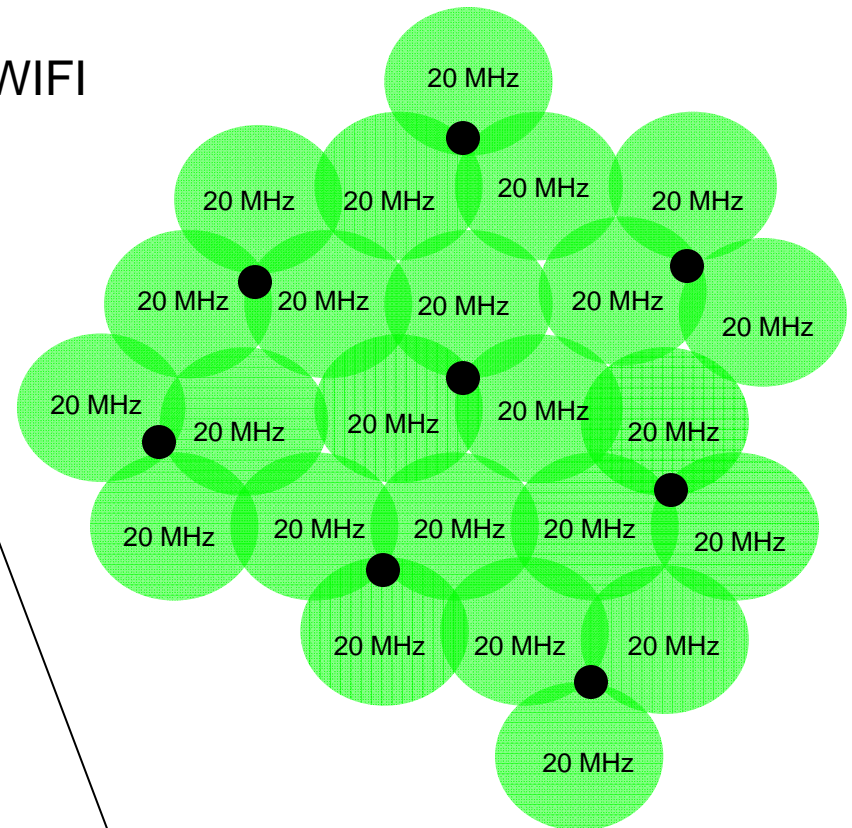
•Not actual coverage/range



This Assuming Best case of 24 MHz available

Reality is that 4 MHz available for Public Safety Broadband also considering “guard band”

WIFI



WiFi ~20 MHz per channel

WiFi offers 802.11g w/60 MHz, 802.11a w/200 MHz and 4.9 GHz w/50 MHz

Coverage and Capacity

