



*Mission Critical
Seamless Mobility*



Mission Critical Interoperability

Is it More than an IP Network?

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Customer Solutions Architect
November 16, 2006

MEET THE TEAM

• Mobile Devices

- + Cool cell phones and accessories, plus the platforms and equipment needed to operate them.
- + Driving the convergence of devices with “the device formerly known as the cell phone.”

• Networks & Enterprise

- + Leaders in developing innovative seamless mobility solutions for enterprises, governments and service providers worldwide.
- + Our systems, products and network services are the backbone of seamless communication.

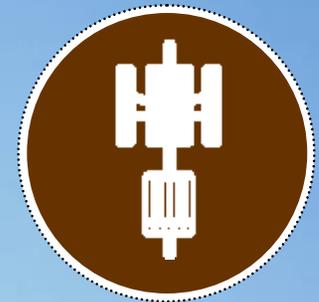
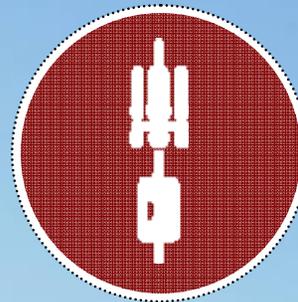
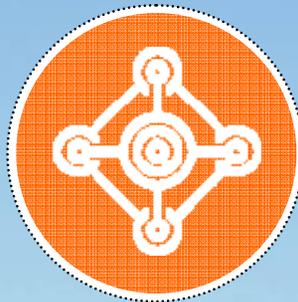
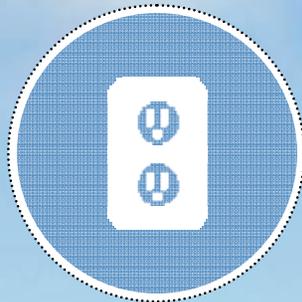
• Connected Home

- + Developing broadband services that seamlessly inform, connect and entertain.
- + Our products change how you experience everyday activities in your home.



Wireless Broadband Solutions

MOTOwi⁴



Backhaul

BPL

Mesh

Canopy

WiMAX

Point-to-point &
Point-to-
multipoint
high throughput

Extend
connections to
multi-tenant units
using powerline

Fixed and mobile,
area wide
coverage
solutions

Proven
broadband
wireless access
solution

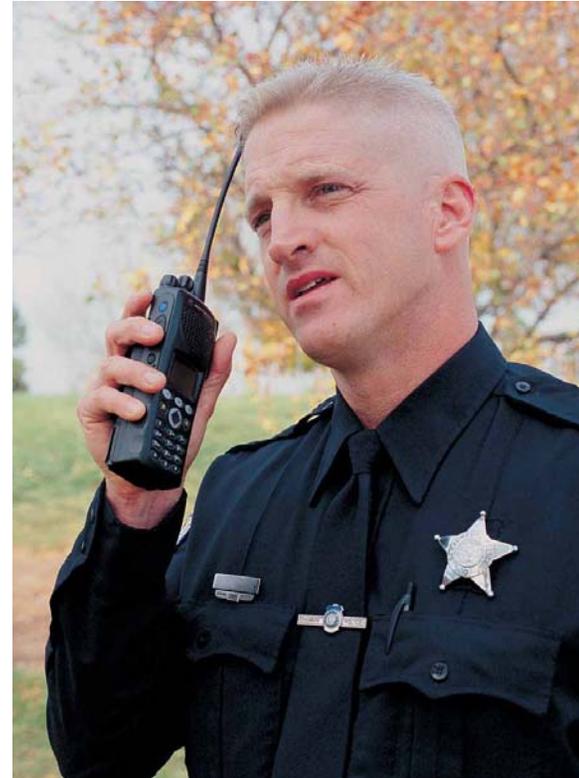
High-performing,
standards-based
broadband
wireless access



• Trends & Opportunities

- + Mobile broadband & data
- + Private & public integrated networks
- + Biometrics
- + Video Analytics
- + Homeland Security / National Defense
- + Interoperability

Interoperability Should Be Seamless



Goal: One radio talks to everyone



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Mission Critical Interoperability

Police



EMS

Fire

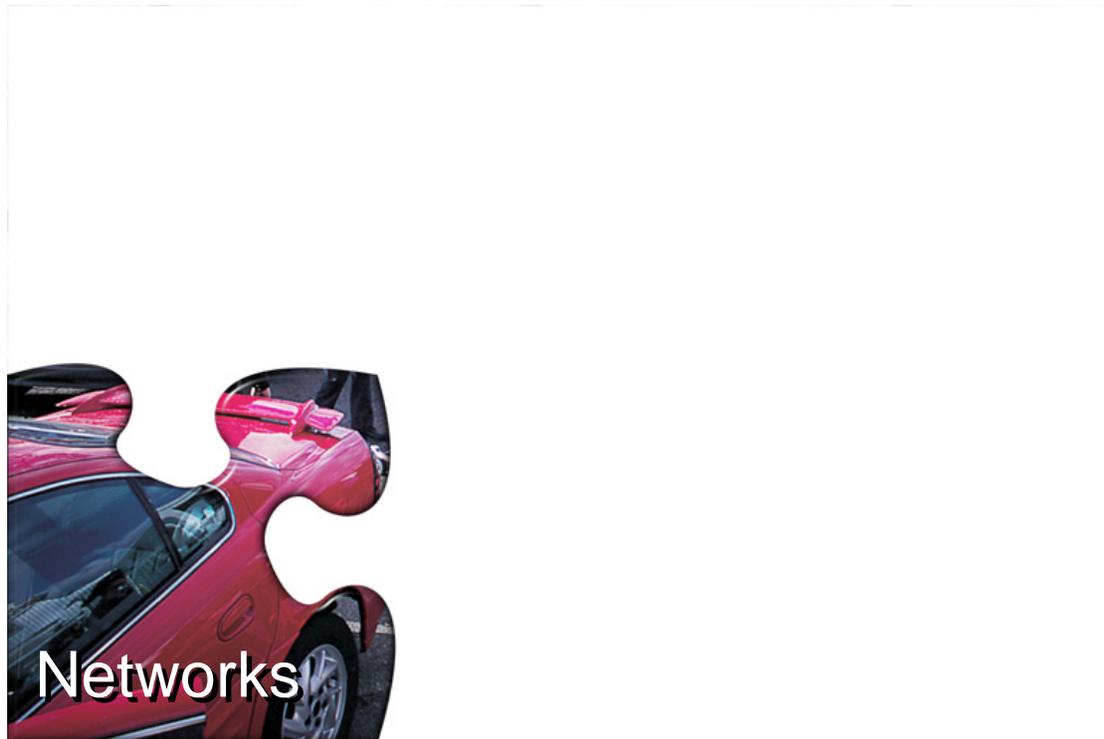
All responding agencies need interoperability



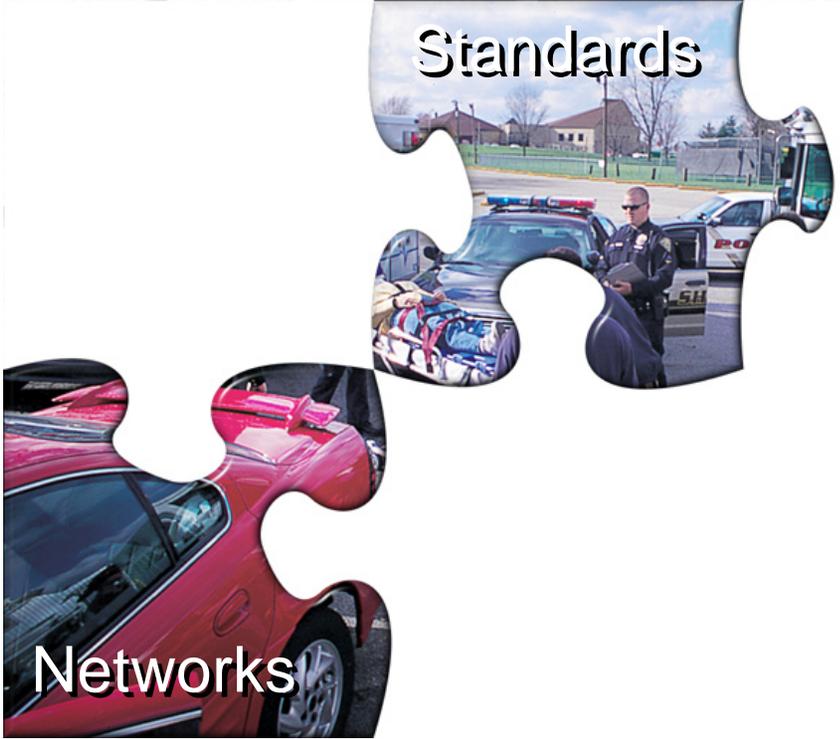
Pieces of the Interoperability Puzzle



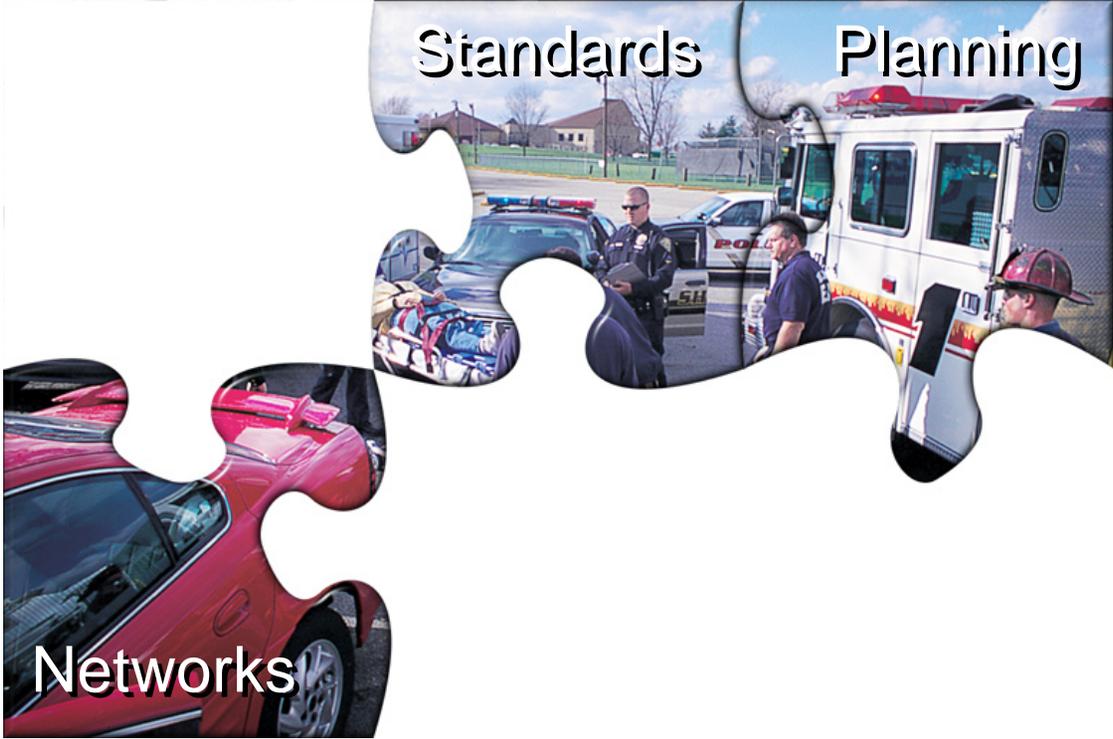
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Pieces of the Interoperability Puzzle



You need all the pieces for mission critical interoperability



Interoperability Should Be Seamless



Goal: One radio talks to everyone

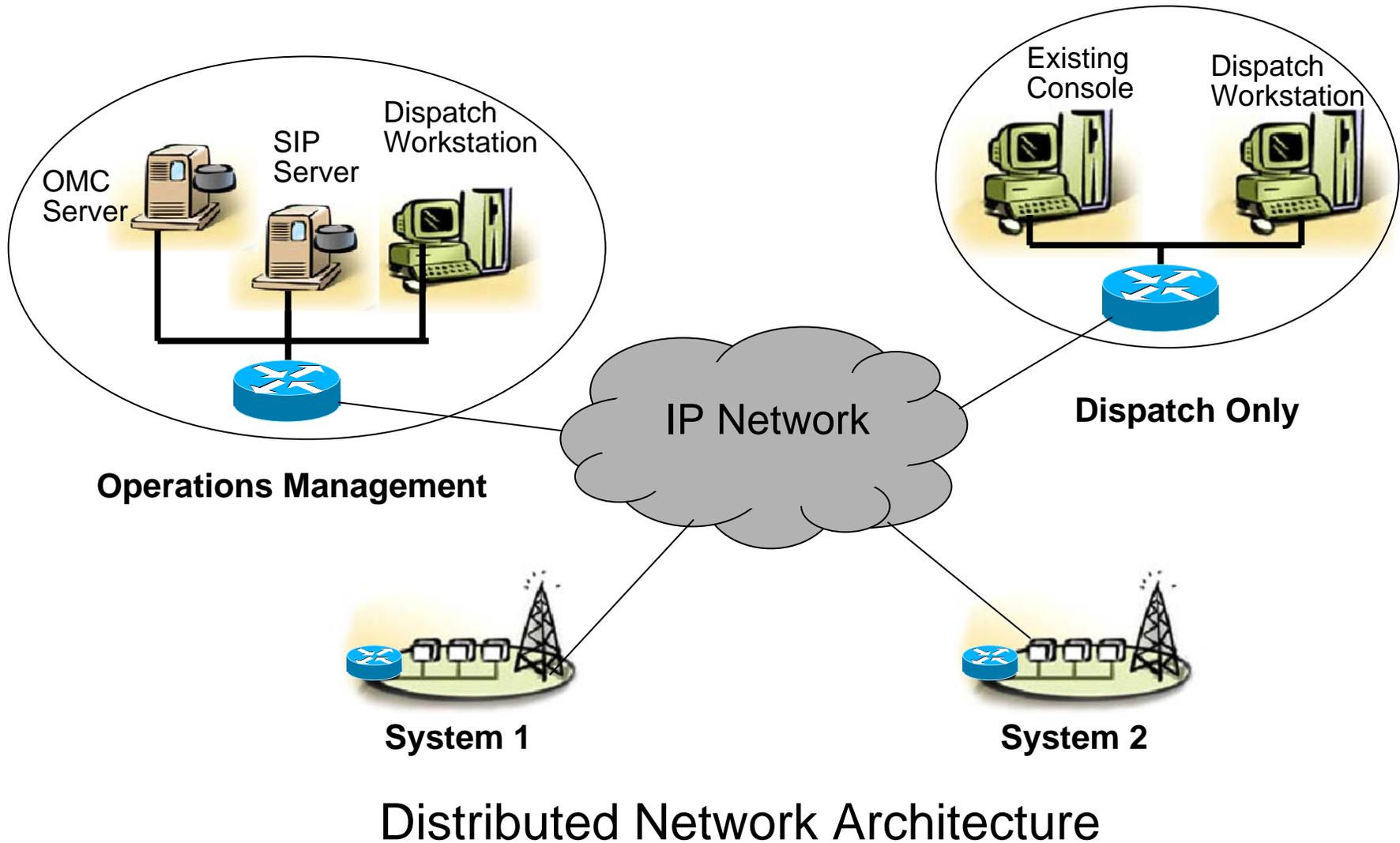


Six Degrees of Interoperability

	Method	Fit
LEVEL 6 Standards-Based Shared Systems	Standards-Based Shared Systems	Best Long-Term Solution
LEVEL 5 System-Specific Roaming	System-Specific Roaming	Full-featured, Wide Area
LEVEL 4 Gateway (Console Patch)	Gateway (Console Patch)	Short-Term System Modification
LEVEL 3 Mutual Aid Channels	Mutual Aid Channels	Simple Short-Term Solutions Easily deployed ↑ Time-consuming
LEVEL 2 Talkaround	Talkaround	
LEVEL 1 Swap Radios	Swap Radios	



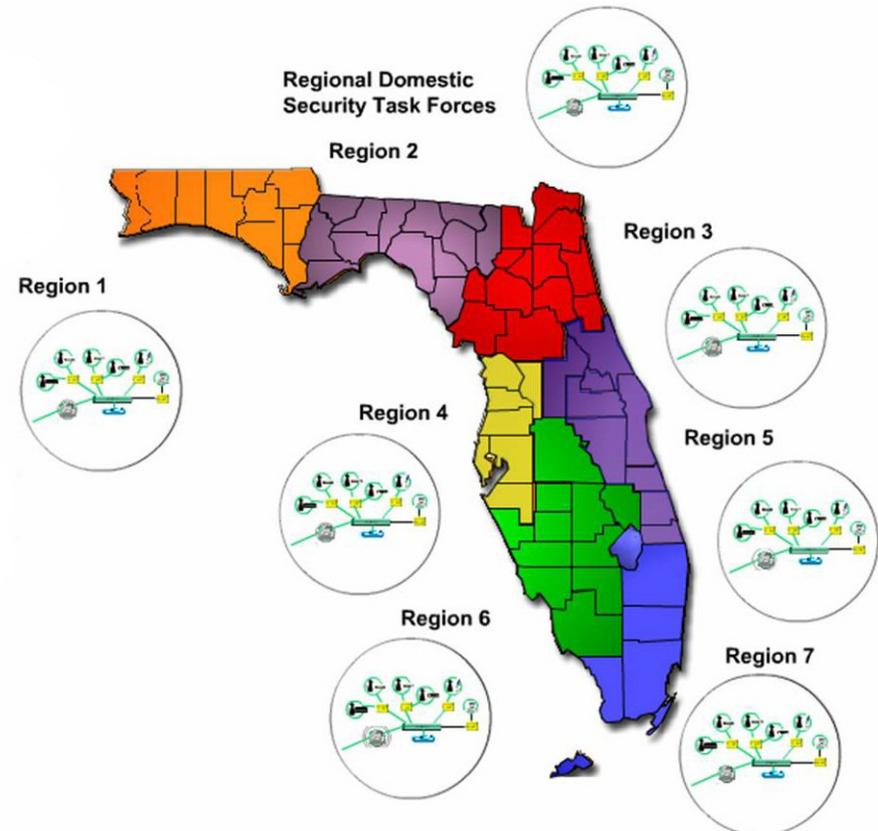
MOTOBRIIDGE Architecture Overview



State of Florida MOTOBRIDGE

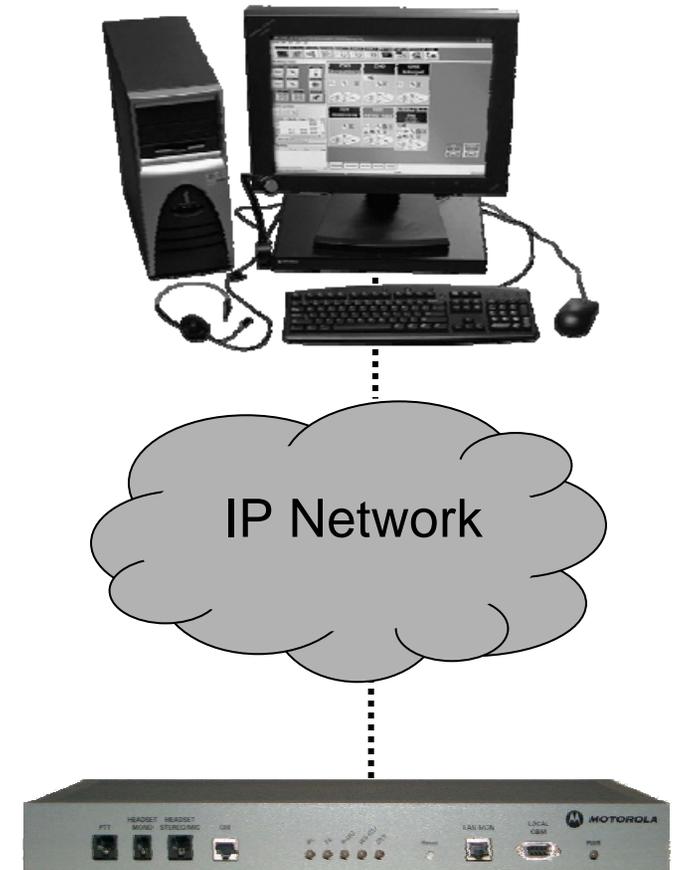
Network Description

- Phase 1 installed in 2004
- 229 MOTOBRIDGE dispatch positions throughout the State
- Over 800 resources and radio interfaces connected through the IP network

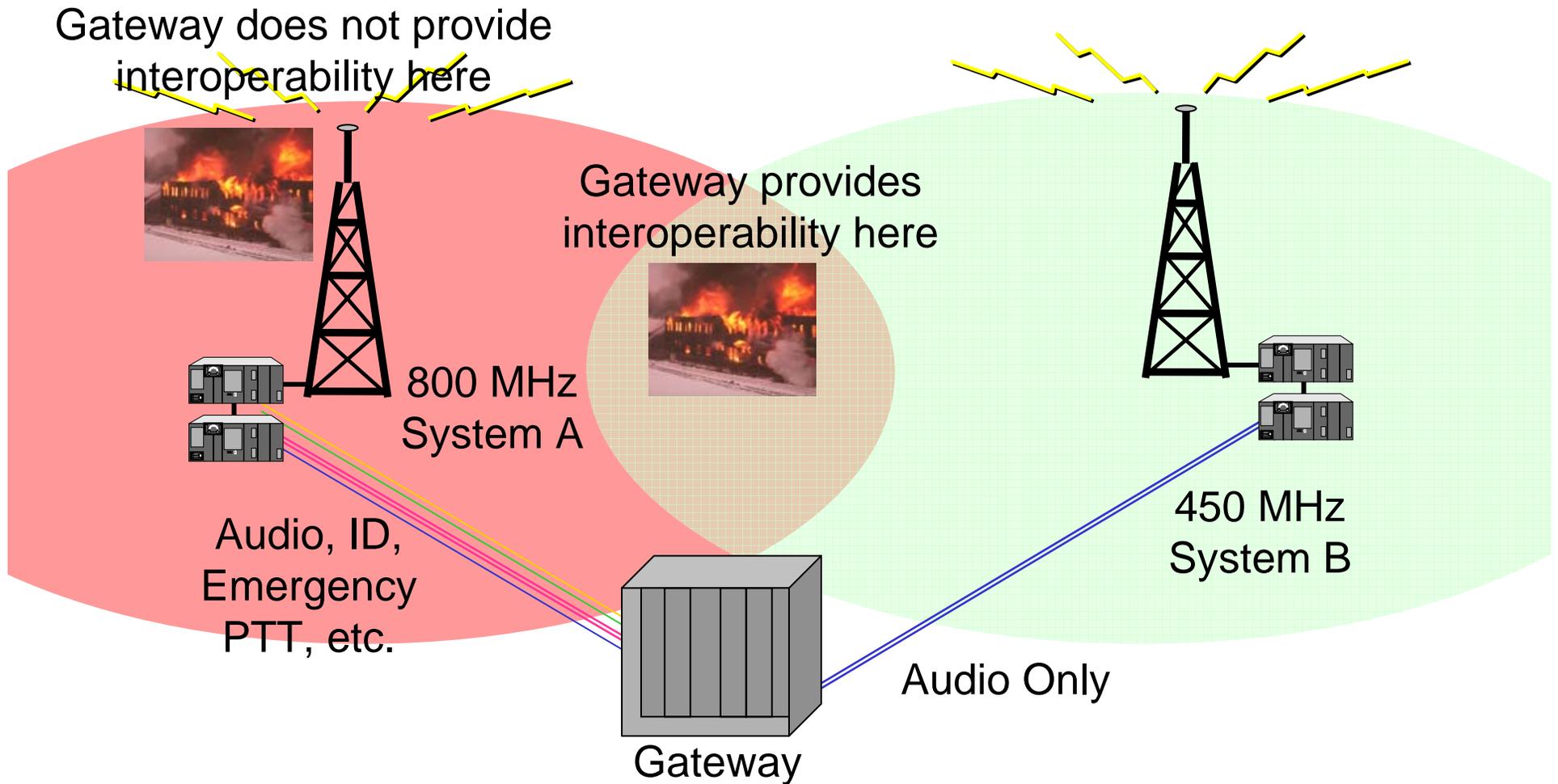


IP Gateway Advantages

- Better sounding audio
- Buffering of voice traffic
- Scalability
- Reliability
- Control from anywhere on the network
- Connectivity of dispatchers and first responders
- Works with any vendor's radio or system and has unique operational benefits when a MOTOBRIDGE is connected to a Motorola system



Level 4: Gateway -- Interface Box Requires Overlapping Coverage



Gateway Limitations

- Must be in network coverage area for interoperability
- Cannot fix existing operational issues
 - Interference
 - System overload
 - Poor coverage
- Gateways can increase system loading by patching busy systems together
- Adding new agencies requires on-the-fly modifications
- A standards-based IP gateway is still a gateway



Pieces of the Interoperability Puzzle

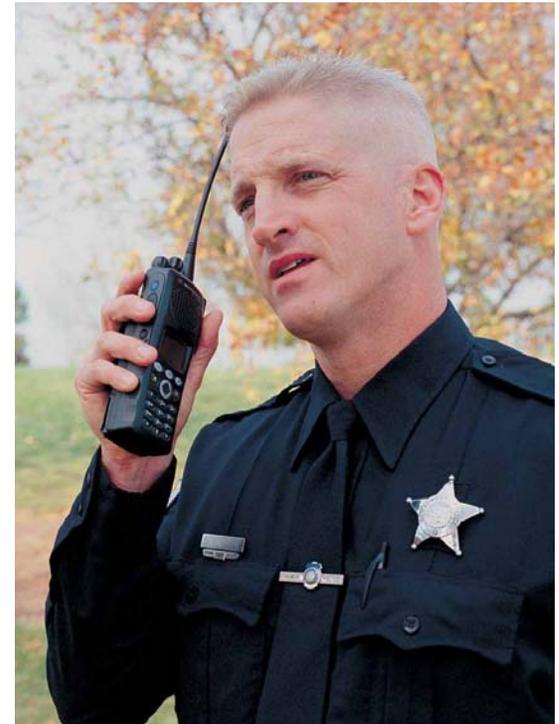


You need all the pieces for mission critical interoperability



Interoperability Enablers

- Spectrum
 - 700 MHz spectrum available in Arizona now
- Standards
 - P25 standards for over-the-air and network interfaces
 - Analog to SIP conversion includes legacy systems in IP interoperable networks



Interoperability Enablers

- **Networks**
 - Console patching, gateways, and ISSI enable interoperable communications
 - Management of wide-area networks is complex (ownership, upkeep, security)
- **Planning**
 - Inter-agency agreements and planning are key to successful interoperability
 - Politics can be more complex than regional IP transport networks
 - Communications procedures need to be defined



Interoperability Enablers

- Practice
 - Regular practice sessions required to remember procedures
 - Needed to reinforce roles, responsibilities and skills
 - Helps identify interoperability gaps
 - Should be used daily
- Control
 - Which agency has control for this incident?
 - Chain of command must be determined for multiple scenarios
 - Control may be different depending on type of event

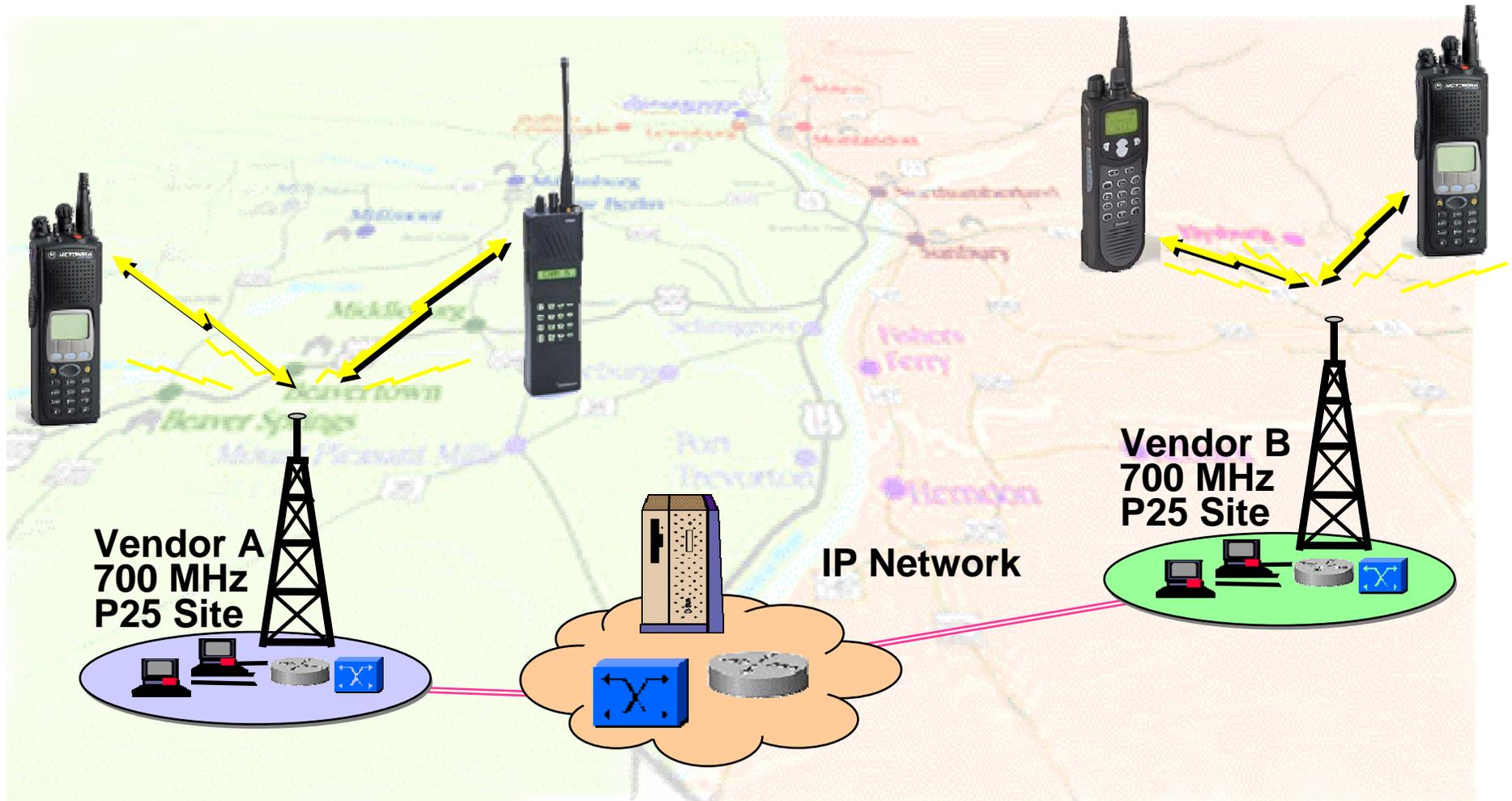


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Standards-Based Shared Systems



Level 6 Interoperability

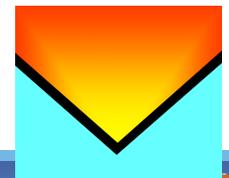
- All radios built to the standard talk to each other via infrastructure or talkaround (APCO Project 25)
- Links different vendor systems and frequency ranges
- Full-featured interoperability
- No console or gateway intervention required
- All advanced features are available to users



State of Arizona

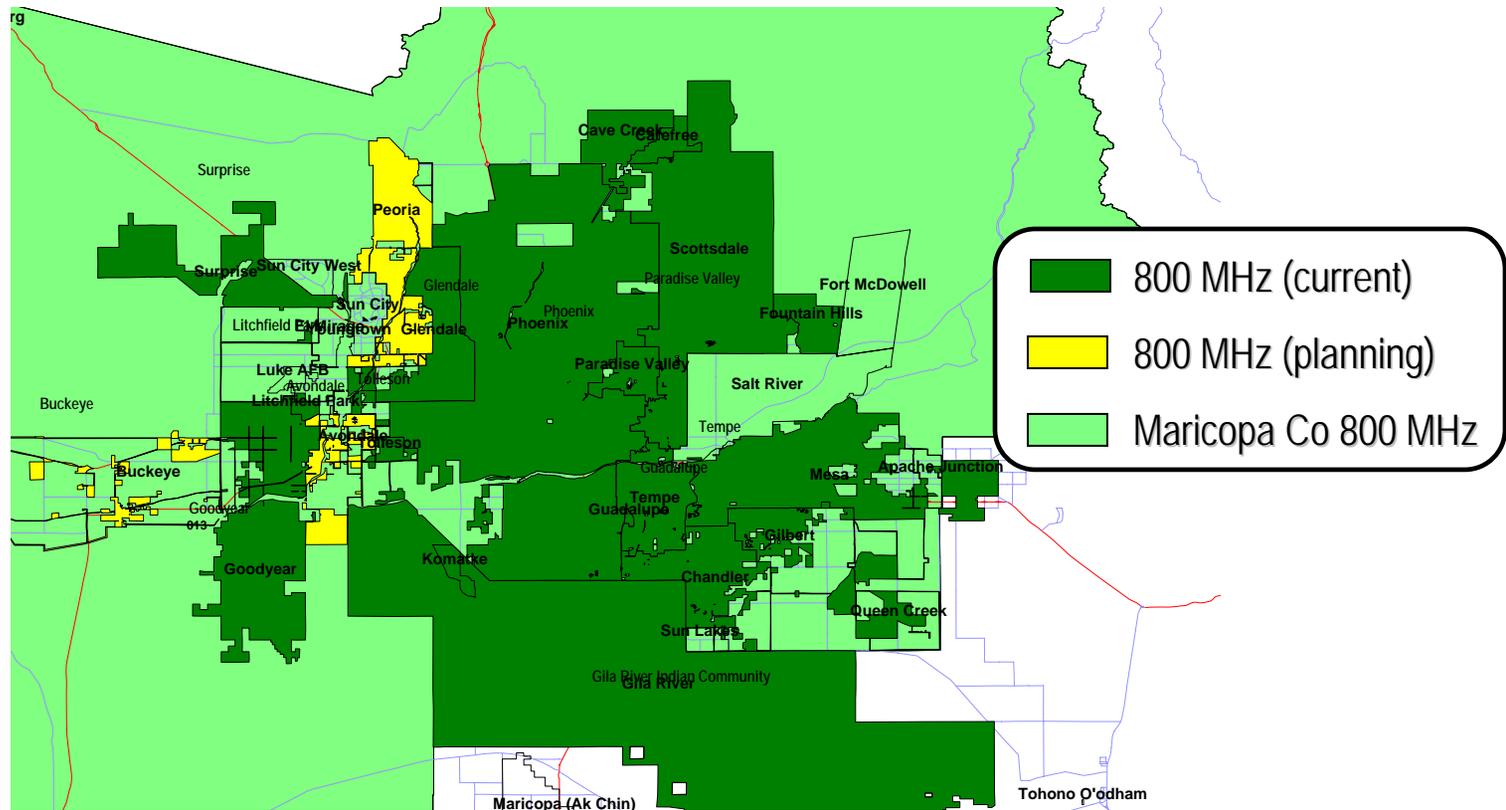


Expanding Interim Interoperability Concept



Maximize Spectrum-Compatible Resources

- 700 & 800 MHz are Network Compatible
- 800 MHz widely used in Metro Phoenix Area



Metro Agencies with Common Spectrum

Agencies with Police Protection at 800 MHz

Apache Junction
Carefree
Cave Creek
Chandler
Fountain Hills
Gila River Indian Community
Gilbert
Glendale
Goodyear
Guadalupe
Litchfield Park

Maricopa County
Mesa
Paradise Valley
Phoenix
Queen Creek
Scottsdale
Surprise
Tempe
Tolleson

Agencies planning 800 MHz

Avondale
Peoria
Buckeye

**20 Fire Departments
/ Districts

Other Agencies/Critical Infrastructure

Arizona DOT at 800MHz
APS at 800MHz
Arizona DPS at 450MHz



Concept Goals

- **Advance Arizona's 2006 Homeland Security Priorities**
 - **Expand regional collaboration**
 - **Strengthen interoperable communications capabilities**
- **State and DPS has 700MHz spectrum and could join PRWN/TOPAZ Regional System**
- **Develop capacity to support large scale events – 2008 Super Bowl**
- **Maximize Full Interoperability – on demand / on-the-belt / no manual intervention (Level 6-highest interoperability level)**
- **Opportunity to develop & refine procedures and protocols**



Concept Goals

- **Continuously available without reservation. Minimizes patches/gateways**
- **Protects existing city/county system capacity**
- **Support standards-based regional network**
- **Validate via 2007 TOPOFF Exercise (is it still scheduled for AZ?)**
- **Major Milestone for Governor – Interoperable Communication covering 60% of State's population**
- **We must start now**



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