

Radio over IP

A Manager's Guide to the Technology

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Wenatchee, WA

What's with all this RoIP Stuff?

- How to keep from being at the end of your RoIP
- Avoiding enough RoIP to hang yourself
- RoIP, VoIP this all makes me feel like a DoIP



What is RoIP?

- RoIP = Radio over Internet Protocol
- VoIP = Voice over Internet Protocol
- RoIP \neq VoIP but there are similarities
- More alphabet soup –
 - TCP/IP
 - UDP/IP

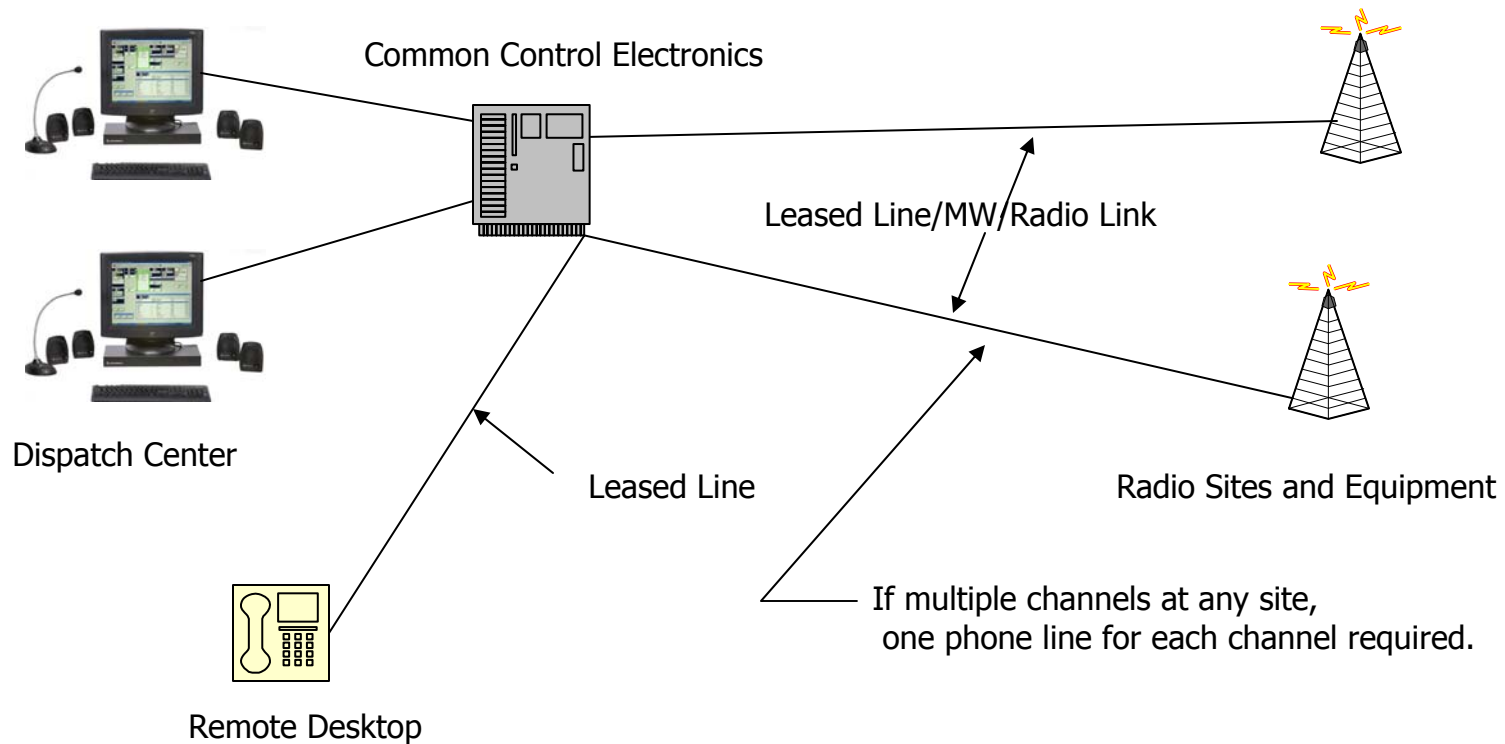


What is RoIP?

- It is a method of interconnecting consoles, radios, telephones, and other devices
- It is not transmitted over-the-air to the user radios
- RoIP ≠ P25
- Uses standard Internet Protocols (IP)
 - TCP/IP – Most reliable format because provides guaranteed delivery but not generally used for voice because of bandwidth
 - UDP/IP – Uses less bandwidth but may be less reliable because no guaranteed delivery
 - Uses many of the standards and protocols available in most data networks but not necessarily allowed by the network manager

Why RoIP?

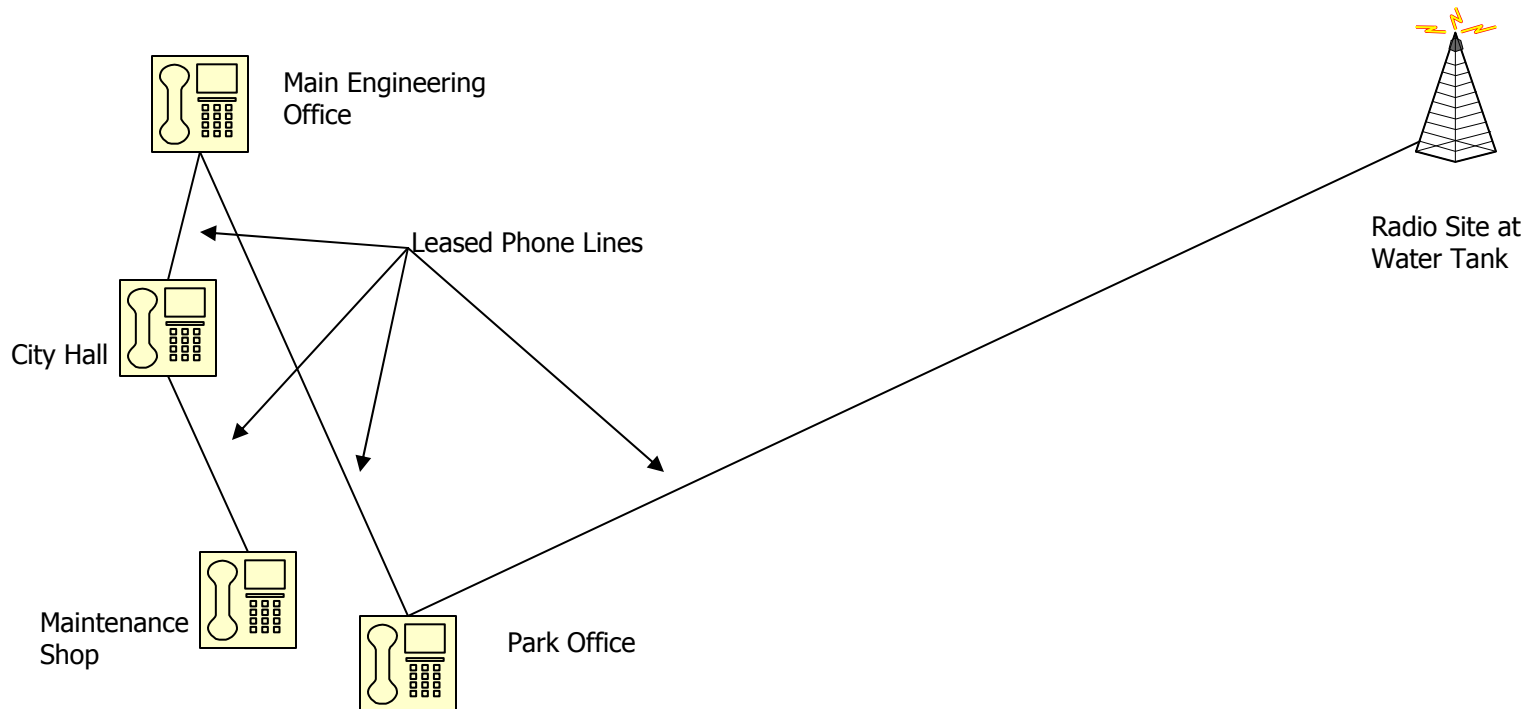
■ Typical radio network today



Why RoIP?

■ Another example

Public Works Radio System

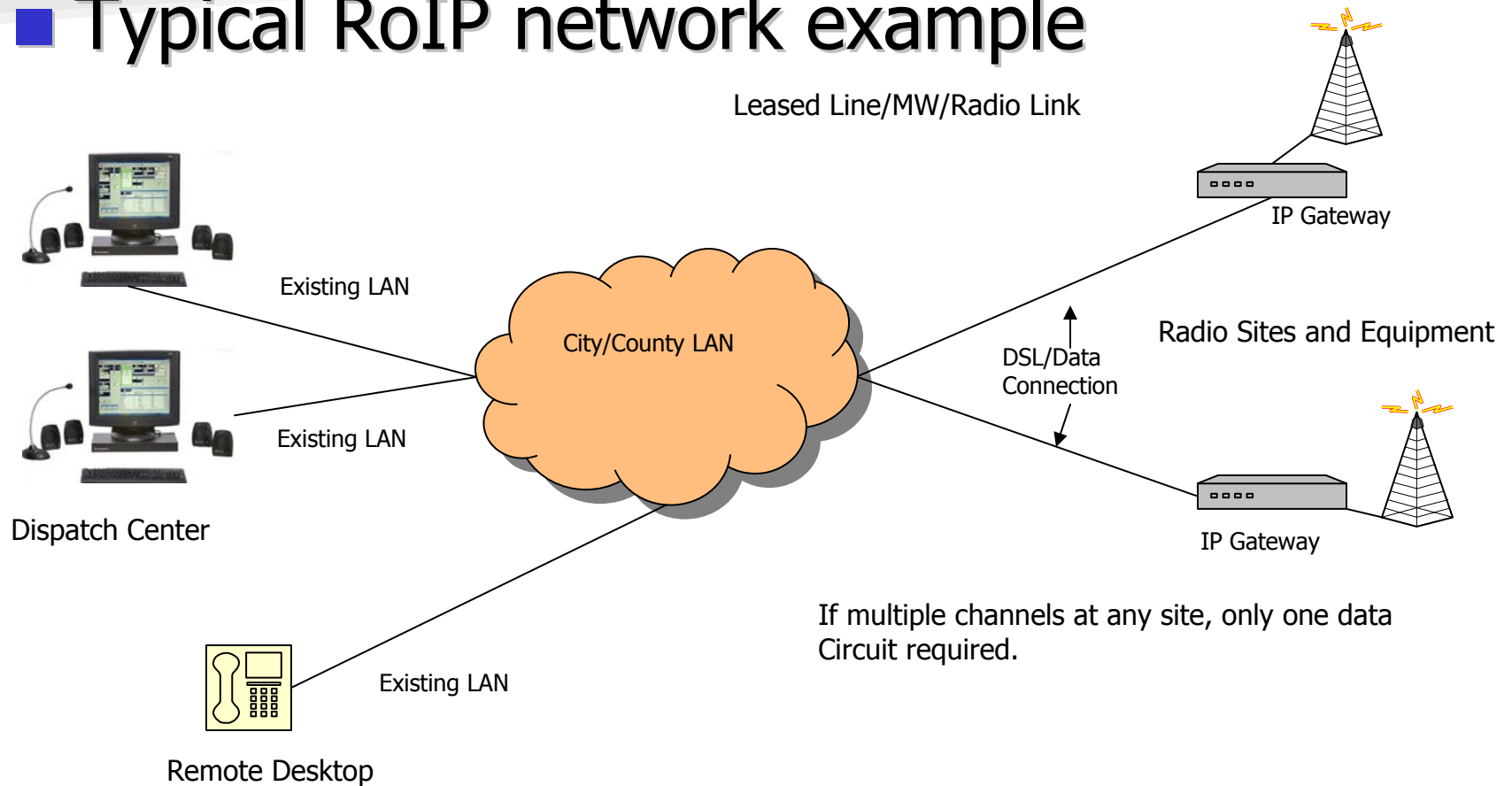


Why RoIP?

- What did those examples have in common?
 - Use of dedicated phone lines or other interconnection method for each site/channel
 - Use of dedicated phone lines to interconnect remote console positions
 - High on-going costs for dedicated facilities
 - Loss of one connection point could cause loss of communications
 - Dedicated facilities are expensive

Why RoIP?

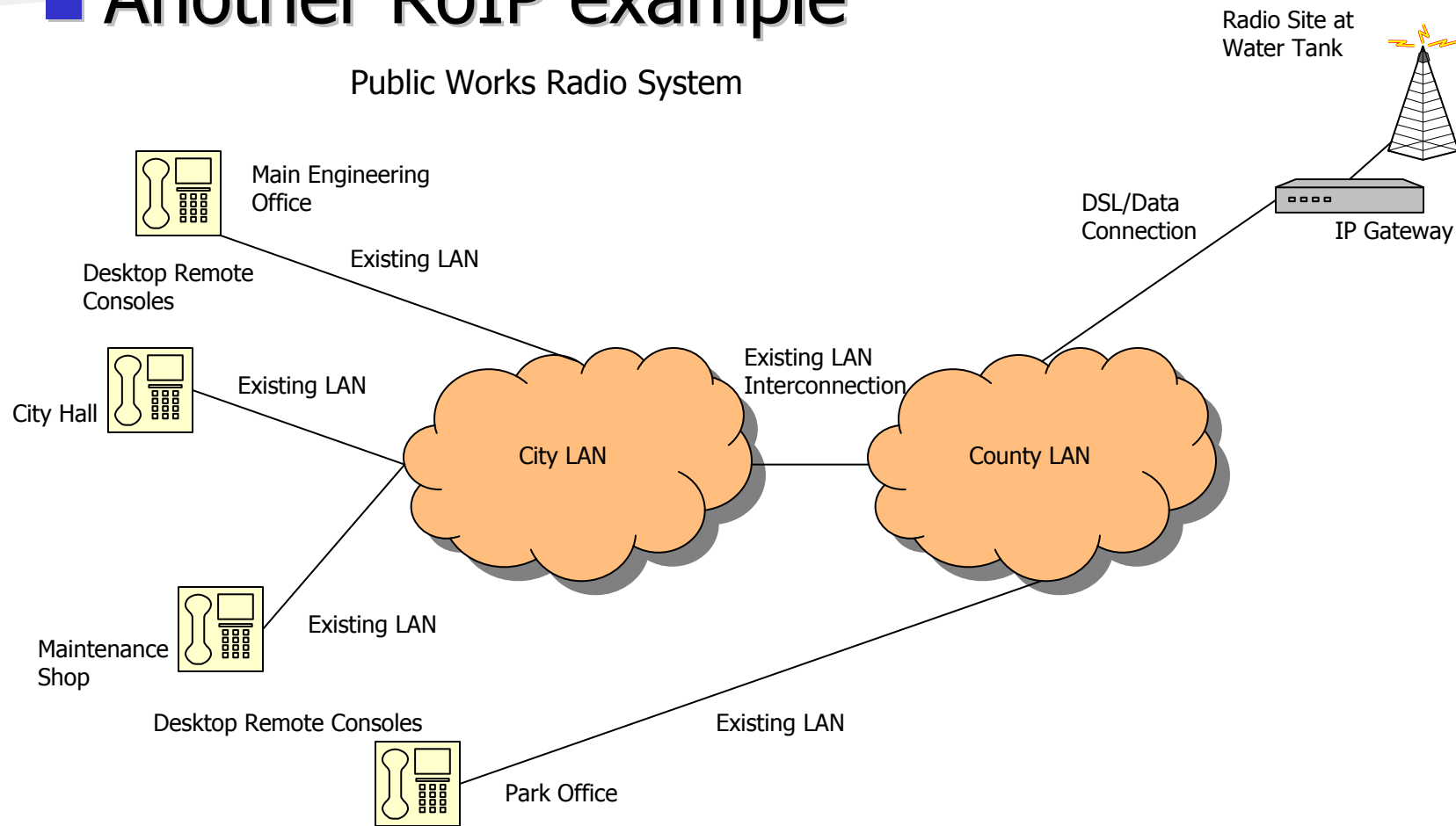
■ Typical RoIP network example



Why RoIP?

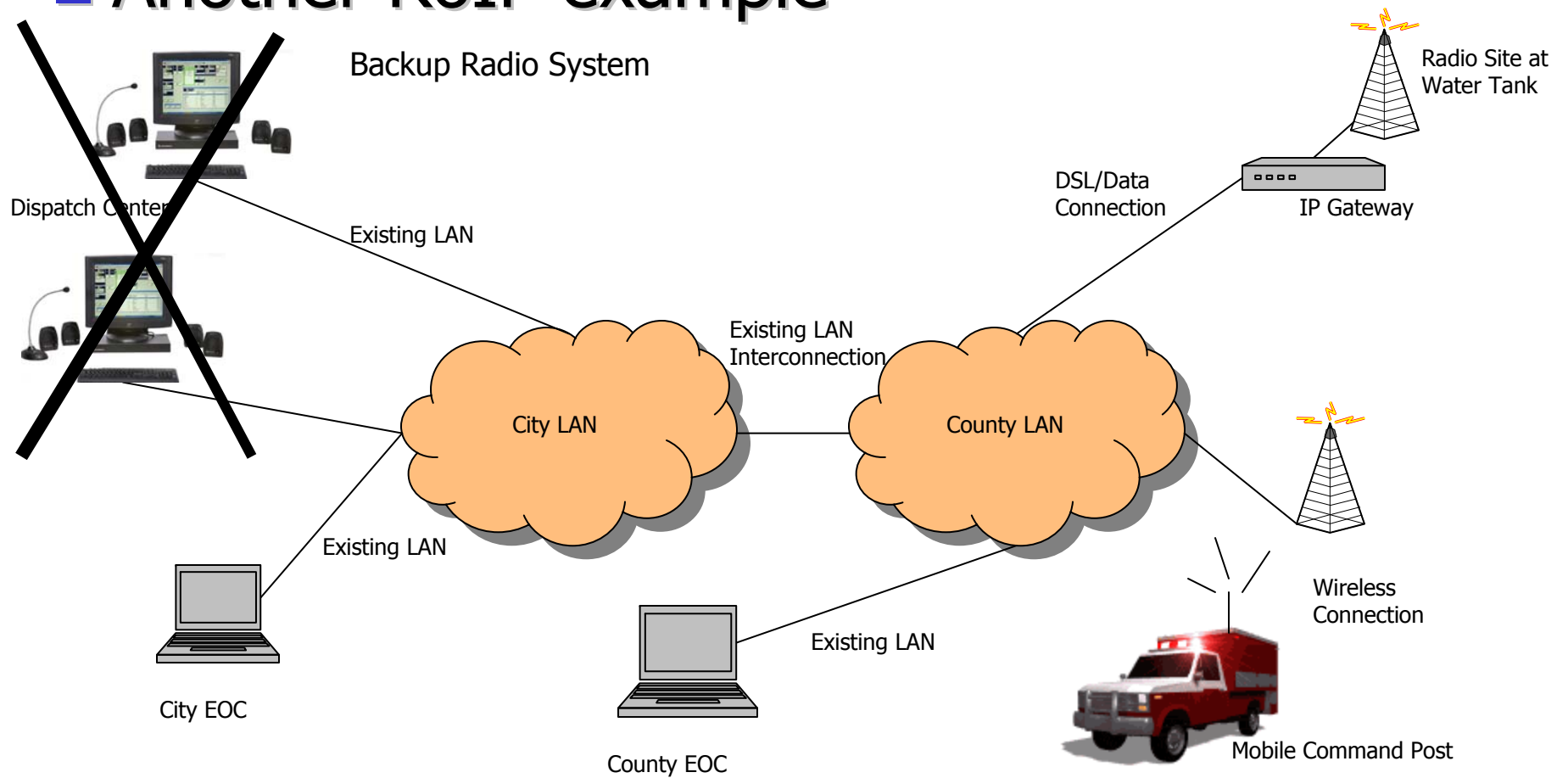
■ Another RoIP example

Public Works Radio System



Why RoIP?

■ Another RoIP example



The Promise of RoIP

- Reduces costs because existing data networks can be used
- Easy to use, interconnects many different brands of equipment
- Control consoles can be located anywhere there is a data network and a simple laptop can be used
- Reduces costs because standard computer hardware can be used
- Great for disaster recovery and back up because data networks are often more resilient than voice or dedicated facilities
- Reduces costs because one data circuit can handle multiple base stations
- Interconnects many different kinds of equipment such as cell phones, 2-way radio, Nextel phones, Internet Phones, VoIP phones, etc.
- Plug and Play

Reality of RoIP

- Just as with VoIP there are many network constraints
 - It is not just a matter of plugging in a base station, laptop, etc. into the network
 - There are significant network considerations depending on the complexity of the radio network
 - Requires Quality of Service to be enabled if you want reliable audio delivery
 - Special network configurations and features may need to be enabled
 - Network traffic can affect the radio network
 - Data networks are often not reliable
- RoIP is not standardized
 - While with VoIP there has been some standardization, with RoIP there are many proprietary solutions
 - Voice to digital process is generally standardized but there are several different approaches
 - Terminal and console equipment from different vendors will likely not play together

The Reality of RoIP

- Tone signaling and other special functions may not be supported
 - Telemetry
 - Paging
 - PTT ID
 - DTMF
 - Modem tones
 - Receiver voting status tone
- The “last mile” may not have network connectivity reducing some of the benefit of using RoIP
- This is a relatively new technology with lots of changes and many players that may not be in business 4-5 years from now

Reality of RoIP

- System maintenance can be more complex
 - Requires a mix of radio and data technologies and most likely two different service entities, Radio Shop and IT
 - Troubleshooting will require data networking skills
 - Network test equipment may be required
 - IT maintenance personnel may work to different standards than radio maintenance personnel
 - If system crosses network boundaries, multiple IT departments may become involved

Reality of RoIP

■ Good news

- Can be a very cost effective solution in some situations
- If limitations are not a problem, costs can be reduced
- This technology will eventually become the dominate method for radio system interconnection because most communications are moving to an IP type network
- Improvements in the interfaces are being made all the time
- Some issues are resolved if implemented on a dedicated data network but that raises costs

Interested in Deploying RoIP?

- Ask questions.....detailed questions
 - What types of signaling are used?
 - Whose networks will be transporting the data?
 - Who has implemented this equipment before? Can we talk to them?
 - Has the vendor/manufacturer been contacted about the exact interfaces to be implemented and affirmed they can handle those interfaces? Is this in writing?
 - Do you have the network requirements (e.g., addressing, multi-cast, port requirements, bandwidth, QoS) documented and does the network provider agree to provide those services?
 - Who will maintain the network and what is the response time?
 - How many software releases have there been over the last couple of years and did all equipment need to be upgraded?

Interested in Deploying RoIP

■ More Questions

- Is the system Vista compliant? Will it work in a mixed operating system environment?
- If implemented on other users PC's (e.g., public works, DEM, etc.), what maintenance issues are there if they upgrade or add additional software?
- Can the application co-exist with other applications? What does the vendor "guarantee?"
- How do we protect against viruses, etc. if we are connected to the "shared" network?
- Remember – Many initial VoIP installations failed or were much more expensive than initially thought because of lack of attention to detail and the reliance on vendor "Press Releases" for assurance the equipment would work.

Interested in Deploying RoIP

- Is there a need to record any of the transmissions? If so, how is it being done now?
- This is a new technology with lots of “gotcha’s” so deploy carefully
- May require on-going software update and computer maintenance costs
- It will be more difficult to maintain when it does break
- A packaged solution may be more expensive but also less risky

Questions?

Thank you!

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