

# Telecom RERC Outputs of Interest in Emergency Systems Planning

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# 4 Needs for Real-time text (RTT)

# 4 needs for Real-time text

## 1. Captioned Telephony

- Cannot be met with messaging

## 2. Emergency calls

- Need 911 operator to see communication as it is being typed
- Especially important for slow typists
- Also good for interrupted transmissions (help my boyfriend.....)

## 3. Intense or important conversations / discussions

## 4. More natural real-time conversations

- Some prefer RTT as seen from RIM study (for some or all communication)
- Some people will always prefer messaging
- Also avoid people hanging up who expect conversation to flow (e.g text relay example)

**RTT is NEVER intended to replace messaging** -- but rather a parallel to voice functionality; for conversations.

# Different Standards for Different Protocols/Environments

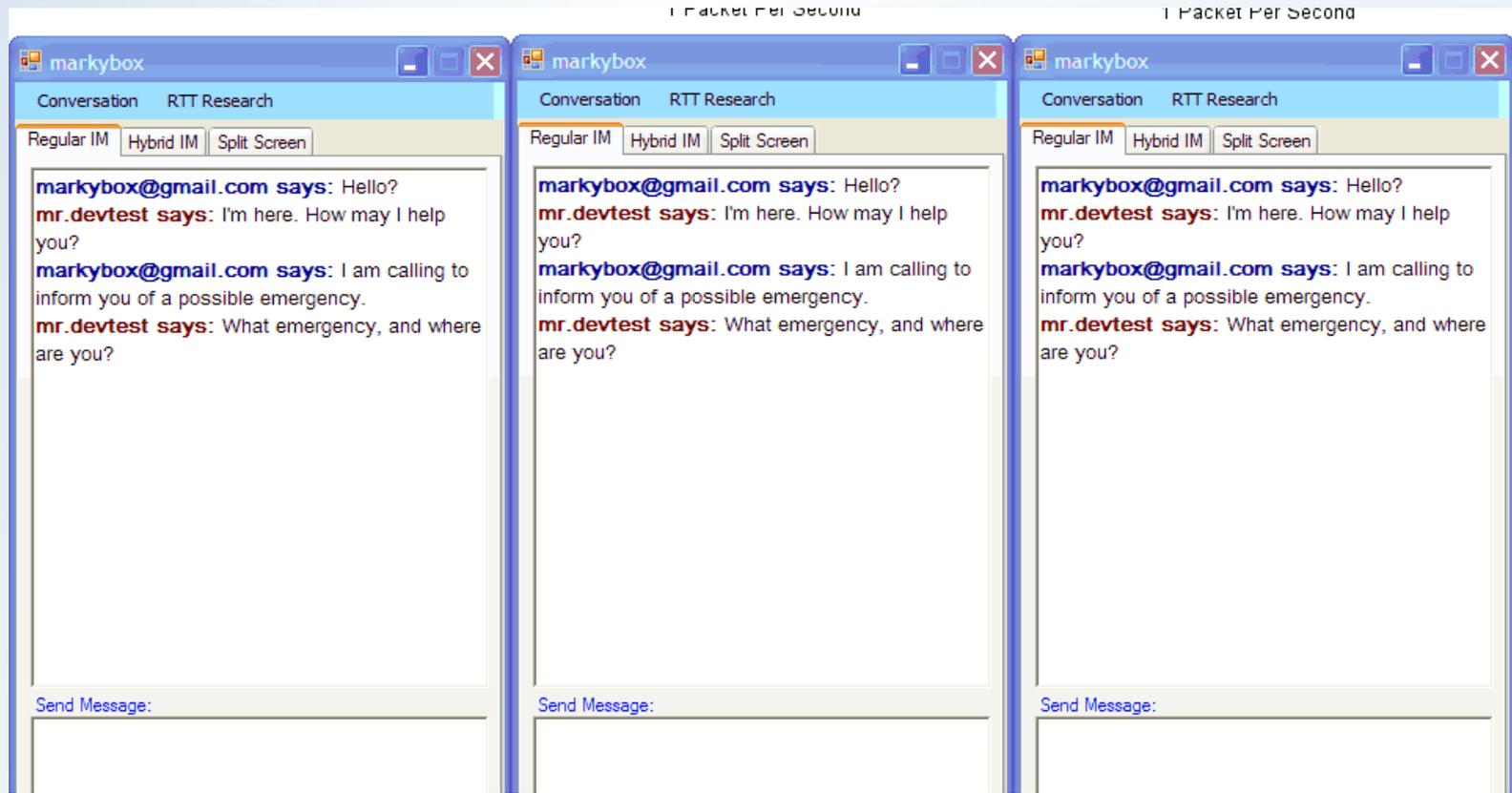
# Different Standards for RTT on different protocols/environments

## ■ Examples

- **PSTN** -- TIA 825a (TTY) (In USA) Many many commercial implementations. With implementations in many different technologies.
- **IMS/SIP** -- RFC 4103 Many inter-operational commercial implementations. With multiple implementations in different technologies.
- **AIM** -- AIM-RTT Built into all of the Windows AIM clients
- **XMPP/JABBER** -- XEP-0301 Now an experimental specification of the XMPP group (the first stage in the standards process). With multiple implementations in different technologies up or up soon.

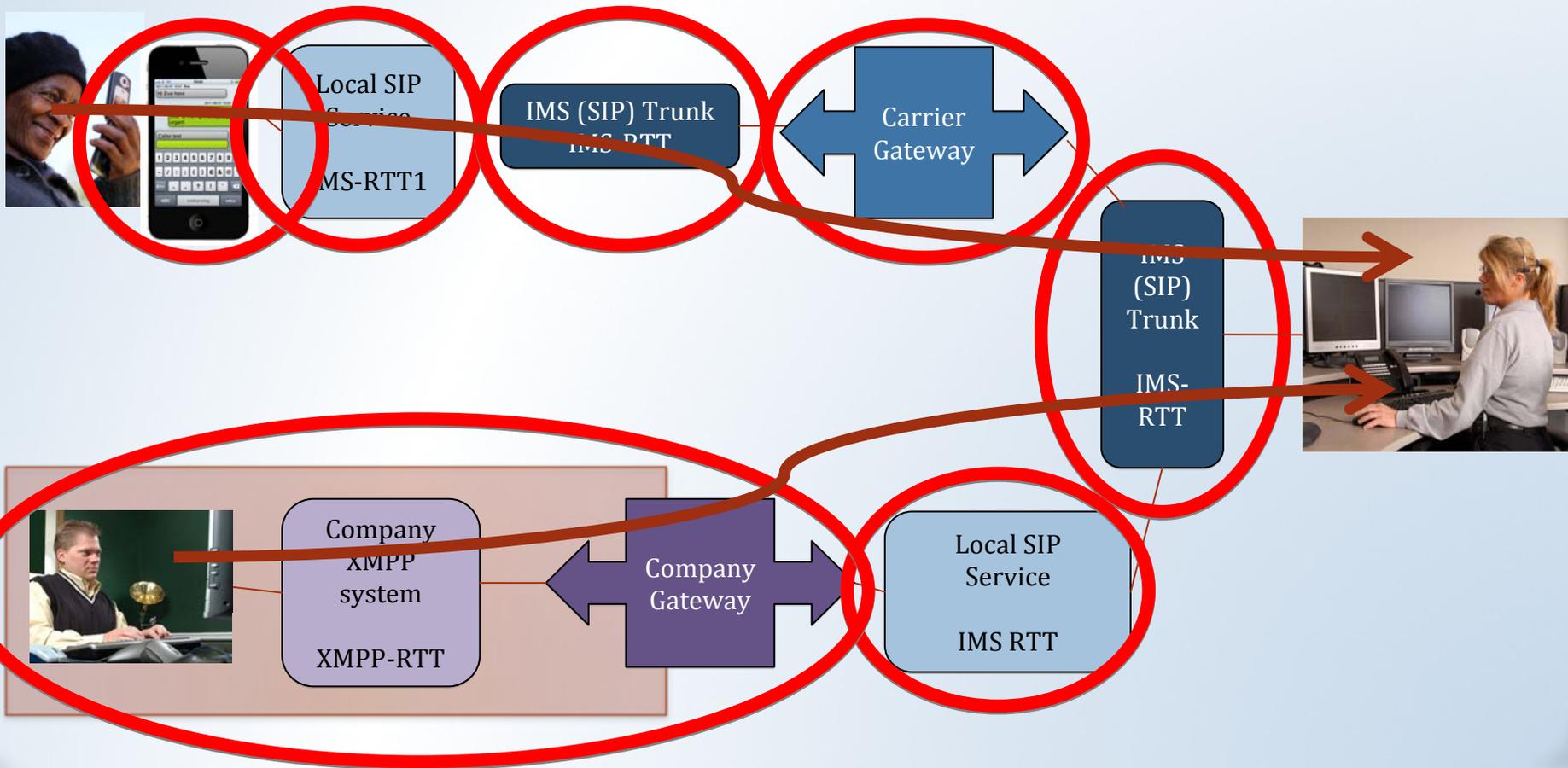
# Demo of XMPP RTT

Showing Sentence, chunk and smoothed RTT



# The (Critical) Importance of End to End Interoperability

# Interoperability needs to be End to end



# What is needed for End-to-End Interoperability

- All components (phones, trunks, repeaters, gateways) on any one system need to ALL support the RTT technology for that system (protocol/environment) (e.g. PSTN or SIP/IMS or XMPP/JABBER)
- Where that system connects to any other system– the RTT needs to be translated into the “RTT Standard” for the other system.

Otherwise text cannot travel end-to-end.

# Why do we need to specify a *single* standard for each protocol/environment?

- If we require that systems interoperate (which they must for the text to get through) but ***do not*** specify an RTT standard that all (on that protocol/environment) must support –
  - *then a company building a new product has no idea what standard(s) their product must work with*
    - *especially since their product must work with other products that are under development at other companies.*
  - *If different companies can support different standards, and change them with new designs, then no-one will know which other protocols they must work with.*

# Only 3 options

## (and only one is practical)

1. All companies must make their products work with all RTT formats
  - (this is both economically and technically impossible. How do you make your product today work with a format that comes out tomorrow?)
2. Everyone must use the same specified RTT format
  - (this is technically not possible (for all) when companies are using different technologies for their VoIP.)
3. Everyone *on the same protocol/environment* (e.g. PSTN or IMS/SIP or XMPP/JABBER ) must support the same RTT format (the one that is specified for that protocol)  
-- AND --  
gateways between protocols/environments must translate between the standard RTT formats for the two sides of the gateway.
  - This provides the most flexibility while ensuring end-to-end interop.

# Who Specifies the Format for each Protocol/Environment?

We suggest:

**1. The “owner” of each protocol/environment** specify the RTT format for that protocol/env.

- For Cisco enterprise VoIP systems - Cisco specifies
  - And every company making products to work in their enterprise systems would support that format for RTT.
- For Avaya enterprise VoIP systems – Avaya specifies
- For Skype – Skype specifies
- For XMPP – the XMPP Standards Foundation specifies

**2. For Public Networks** (e.g PSTN, IMS ) the FCC Specifies

- RTT on PSTN – the FCC has specified TIA 825a - and all must support it
- RTT on SIP/IMS – the FCC should specify the format all must support when connecting to it. If IMS specifies one then this should be the one that the FCC mandates.

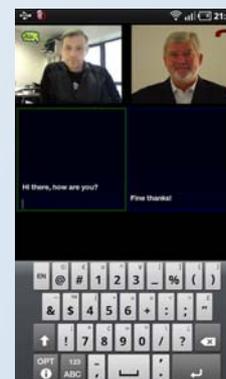
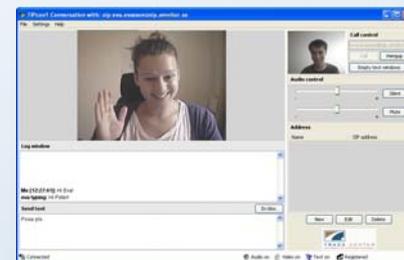
# If one format is required – how can we ever migrate to a new format in the future.

- Migration to a new format can happen in the same way we normally migrate to new technologies in voice etc.
  1. Everyone supports the old (current) format.
  2. As a new format (for that platform) comes out that has significant advantages (say bandwidth), companies can start building it in along side the old.
  3. When two phones connect that both support the new format – they can use it instead of the old. But they all still support the old so there is always a match to older phones and to companies not yet implementing the new format.
  4. When all companies support both formats in all equipment (and the old has washed out of circulation, then the old format can be dropped and the transition is made.
    - When there is only a small amount of the old – the transition can be hastened by replacing them all at once with devices that support the new format, as part of the transition.

RTT Implementations today

# RERC Open Source Implementations of RFC-4103 RTT for SIP

1. Tipcon1 open source Java Total Conversation
2. Linphone open source RTT addition
3. Android Total Conversation
4. iPhone RTT
5. Asterisk server for gateways that supports RTT
6. Asterisk TTY / SIP RTT gateway



# Other/ Commercial Implementations of RFC-4103 RTT in SIP

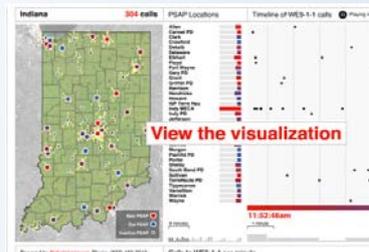
7. AuPix PC Total conversation
8. AuPix Android Total conversation
9. Omnitor PC Total conversation
10. Omnitor Android Total conversation
11. Ives Web Total conversation
12. Tenacity PC Total conversation
13. Aegis project wireless Java middleware
14. Omnitor/Leadtek Total conversation
15. Sbntech/TM-9000 Total Conversation
16. Fanstel RTT IP-phone
17. Nokia mobile RTT
18. Fontventa multipart total conversation
19. 4CT Mobile RTT with SIP/RTT gateway

**(All have been tested for interoperability)**



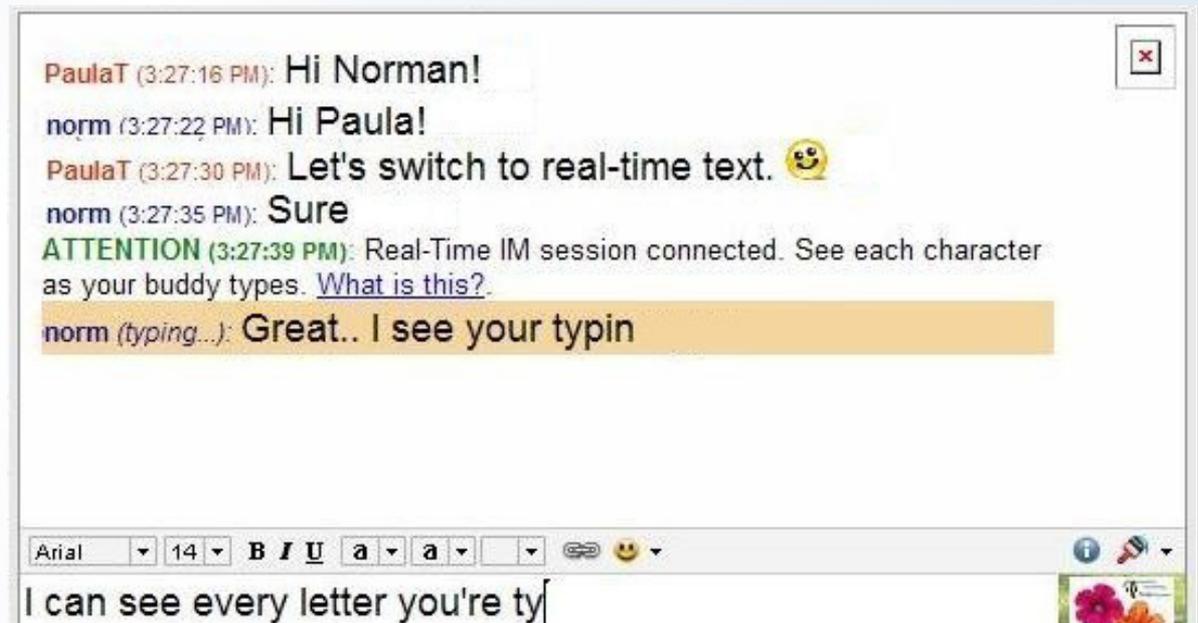
# RTT Implementations in XMPP/JABBER

- XEP-0301 XMPP-RTT is a new specification in development
- Some implementations include
  - Mark Rejhon Real-Jabber
  - Indigital
  - Trace RERC – (Easy 1 Communicator)



# RTT Implementation in AIM

- Proprietary Implementation of RTT in AIM for Windows.



# Short term Mobile Text to 911

# 4G Americas Metrics for Comparison of Short term Mobile Text to 911

- **\* Real-time communication**
- **End user location determination**
- **Reliability**
- **\* Security**
- **Maintaining association between end user and PSAP call taker when end user is mobile**
- **Pre-registration with emergency services required?**
- **Impact to PSAP systems**
- **Impact to wireless operators networks**
- **Impact to end user**
- **Migration impact to end user for transition to long term**

# RERC Metrics for Short Term

- **Uses the same techniques that people use daily**
- **Work throughout the nation including rural**
- **One number works nationally**
- **Not require special technologies or training at local 911 centers**
- **Not require significant (or any) network changes**
- **Not require significant change or cost to phone Manufacturers**
- **Not require special training of users**
- **Supports 911 centers who want to set up direct text communication**
- **Provide GPS or other location data to 911 center**
- **Works with phones that do not have GPS or other location system**
- **Simple to understand and use**
- **Feasible to use without support from electronic phonebook**
- **Work on low-cost phones**
- **Confirmed reception of each message**
- **Multiple simultaneous calls at PSAP**
- **Simple Phase-over to auto 911 distribution when NG 911 rolls out.**
- **Funding mechanism**
- **Works with all PSAPs**
- **Suitable for deaf users using non-standard English?**
- **Deployable in 12 months in U.S.**
- **Support simultaneous Text and Voice (Voice carry over) ( 10x faster for those who can speak and essential for those who cannot type well or at all)**

# Enhanced Central All-Text Routing/Relay Service for Emergency Mobile Text Users

- Quicker to deploy
- Lower cost to operate
- Provides 911 access everywhere in country on day 1
- Doesn't require any special equipment at each PSAP
- It doesn't require any special equipment at LECs
- Works for all 911 centers (even if they use PSTN, even if their TTY not working)
- No training or special skills required of PSAPs
- Consistent behavior for travelers wherever they are
- Funding mechanism already in place (national relay)

# Any Text

- Works with SMS
- Can also support Email, IM, RTT or any other text formats
- If particular local 911 centers can (and want to) support any of these forms of text – the text can be automatically routed to them instantly.

# How it would work

- Users send message using SMS, email, Real-Time Text (RTT) or any popular IM program.
- Special addresses would exist for each text medium.
  - For example 911SMS, [911@email.gov](mailto:911@email.gov),
  - (see below for option to have simple 911 work for all)
- All forms of text are automatically acknowledged so user knows message got through.
- Special code is sent back which causes “best effort” location to be sent to the Central All-Text (CAT) Center.
- CAT center software uses standard database to automatically locate proper 911 center for that location.
- Database of “Centers wanting to support text communicators directly” is consulted and if this local center is one of these and supports this type of text – then the message is instantly sent to that center along with location information and the text conversation is transferred to them.
- Otherwise the center is called on their regular voice phone line and the CAT center acts like an ordinary text relay service between the user and the 911 operator.

# Simplification

- With the cooperation of major text communication programs the following features can be added that would greatly simplify the use of this system.
  1. The programs (SMS, email, etc) would automatically translate a simple 911 into the proper longer string for the CAT center (e.g 911SMS, or [911@911.gov](mailto:911@911.gov) etc)
  2. The programs would automatically use best effort to determine their location and send that information in a compressed character encoded format as part of the first SMS (or immediately after).
  3. The programs would alert the user if there was no acknowledgement received – and resend the message.
  4. Programs would automatically open up a parallel voice channel.

# Transition to NG911

- As individual 911 centers come online with NG911, the messages that come in to CAT in a form the NG911 Center can support would automatically be routed directly to the NG911 Center.
- If and where networks auto-route them – they would go directly and CAT would no longer see them at all.
- Text formats that are not supported by NG911 could continue to come in to CAT until users are migrated to NG911 supported formats.
- All this is transparent to users – they can continue to do what comes natural and it would work.

# Funding

- ORIGINALLY it was thought that this center could be treated like any other relay center and funded from Relay funds –for registered people who qualify for relay.
- With the government decision to support text for all people, funding would have to come from some other source.
- This approach would however allow faster deployment than any other approach, which is very important.
- This approach is not owned by any company or entity but is only proposed for consideration and to demonstrate that a solution may exist that could deploy fast, and that would not involve any significant changes in networks, carriers, or PSAPs.

# Thank You

The contents of this presentation were developed in part with funding from the National Institute on Disability and Rehabilitation Research, U.S. Department of Education, grant number H133E080022. However, those contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.