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EAAC
TTY Transition

Report on
EAAC TTY transition
11 January 2013
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TTY Transition charter and background

- The TTY Transition group worked with TTY related goals of the main EAAC charter.
- ***EAAC Provision: Deadlines by which interconnected and non-interconnected VoIP service providers and manufacturers shall achieve the actions . . . where achievable, and for the possible phase out of current-generation TTY technology to the extent that this technology is replaced with more effective and efficient technologies and methods to enable access to 9-1-1 emergency services by individuals with disabilities.***
- The EAAC submitted a set of recommendations in December 2011 used as starting point and framework for the TTY Transition group.

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TTY transition EEAC background

- **Recommendation P6.1: No TTY Phase-Out Deadline for PSAP:** The EAAC recommends against imposing any deadline for phasing out TTY **at the PSAPs** until the analog phone system (PSTN) no longer exists, either as the backbone or as peripheral analog legs, unless ALL legs trap and convert TTY to IP real-time text and maintain VCO capability.

- **Recommendation T6.3: Baudot (TTY) Support:** The EAAC recommends that Baudot (TTY) be supported by all PSAPs with VCO and HCO capabilities until there are no more TTYs in use – or until there is a gateway between every TTY user and the PSAP, that converts TTY into the proper real-time text format for VoIP systems supported by the PSAPs including support for VCO/HCO functionality. …

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TTY transition EEAC background

- **Recommendation T2.2: Removal of TTY Requirement:** The EAAC recommends that the FCC remove the requirement for TTY (analog real-time text) support for new IP-based consumer devices that implement IP-based text communications that include, at a minimum, real time text [*in the same call*] or, in an LTE environment, IMS Multimedia Telephony that includes real-time text [*in the same call*]. The text must be possible to use in parallel with voice on the same call so that VCO equivalence is maintained.

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TTY Transition work plan

- The TTY transition group agreed to produce a report providing insight and advice on critial factors regarding TTY transition.
- The report was approved by the subgroup on 6 December 2012.
- Further comments from the EAAC has resulted in new drafts
- Draft is available in EAAC Wiki, in section for TTY Transition.
- http://eaac-recommendations.wikispaces.com/TTY+Transition
- Final report is now proposed for approval

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TTY Transition report structure

- Goals and background
- Extracts from EAAC Survey about user needs in text and voice communication with 9-1-1
- The current situation of TTY and other accessible communication.
- Reasons to leave TTY, keep TTY, create TTY replacement
- Transmission problems and remedies for TTY in modern networks
- Functional goals of a TTY replacement
- Technologies ready for TTY replacement for user-user and 9-1-1 calling.
- Interoperability between TTY and TTY replacement
- Mainstream vs Accessible solutions. Can the gap be closed?
- Policy overview. Change and synchronization needed.
- Recommendations
- Influenced entities
- Timeline

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Extracts from the EAAC survey about text and voice 9-1-1 calling

- Q13. 22% of not-only-voice users used TTY for the 9-1-1 call.
- **Q14. 25% had reasons to call 9-1-1 but could not complete. 30% failed, 70% had no means! SCARING!**
- Q16. Real-time text was most favoured text method by 45%.
- Q25. 40% wanted text both ways. 19% want text one way and voice the other. 22% want captioned voice.
- Q21. Wireless solutions favoured. Wireline still important.
- Q29. Text and voice both ways is wanted.

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The current TTY situation

- The TTY enables a limited functionality for intermixed voice and limited real-time text, integrated in the telephone network.
  - Slower than rapid typing, limited character set, only alternating text and audio,
  - No popular wireless solution
- Some important features are not yet provided by any other widespread solution in USA.
- Estimation 100 000 users in USA. (deducted from relay statistics)
  - 20 000 9-1-1 calls per year
  - 18 M calls per year user – user and relay.
  - 36% of text relay calls are TTY
- Communication problems in VoIP networks
- Conclusion: The features are desired, but the implementation has limitations.
- **There is room for a replacement in modern technologies.**

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Reasons to keep or abandon TTY

- Reasons for users to keep the TTY
  - It allows intermixed voice and text. Important for Hard-of-hearing, speech-disabled, 9-1-1 etc.
  - The only direct link to 9-1-1
  - Robust, always ready
  - User has not bothered to look for other solutions
  - ....
- Reasons for users to abandon TTY
  - Limited mobility
  - Limited speed, limited character set, limited simultaneity.
  - Fewer people use it.
  - Videophones replaced it.
  - Unreliable in VoIP connections
  - Many alternatives are available even if not providing same functionality.
  - ...

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Transmission problems

- Problems if attaching TTY to VoIP network.
  - Sensitive to packet loss. Already 0.12% loss creates 1% character loss.
- Coding and audio handling
  - Makes TTY tones unclear and can cause corruption and loss
- Echo cancellers optimized for voice
  - May malfunction in precence of TTY tones and cause corruption and loss
- Problem level not known.
  - More research may be needed. Or accept the fact and replace.
- Technologies exist for making IP transport of TTY reliable through IP, but they are very little implemented and do not improve the TTY.
- This makes it desirable with a good replacement in IP networks

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Requirements on a TTY replacement

- Smooth and rapid real-time text communication
- Simultaneous voice and real-time text in same call
- Full character set.
- Wireless and fixed
- Robust transmission
- Use existing standards for rapid deployment
- User-user, relay, ng9-1-1
- Multi-party calls
- TTY interoperability
- Interoperable with videophones with text
- Implemented in modern technology environments.
- Accessibility features: alerting, visual tone indication, screen reader...

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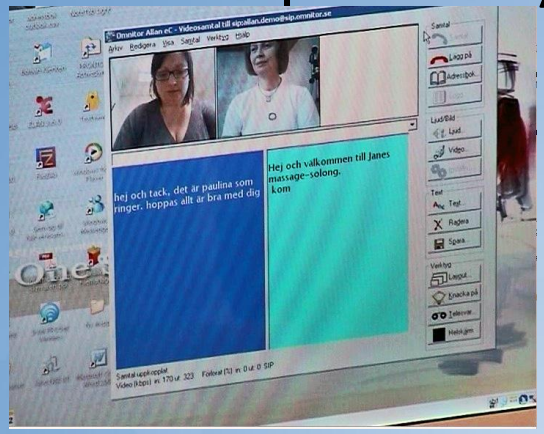
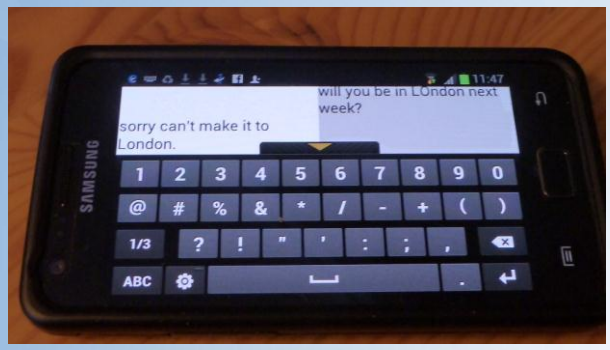
The TTY replacement may come in different shapes.
It is functionality and interoperability that counts.





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Proposed main technology

- Depending on call control environment
- First choice: Use same as specified for ng-9-1-1 access in RFC 6443 and NENA i3 technical specification
- Native SIP (often used for VoIP)
  - Common audio codecs, e.g. G.711
  - T.140 / RFC 4103 RTP based real-time text
- Wireless and IMS , LTE and VOLTE
  - GSMA PRD IR.62 including Annex B.
    - (using the same real-time text standard as for Native SIP)

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Implementation in other technologies than SIP and IMS

- Providers in other call control environments may use any real-time text transport specification available for the environment.
- They need to convert to SIP and RFC 4103 and audio in order to provide ng-9-1-1 access and interoperability.
- One protocol even mentioned as a possible extension on the NG-9-1-1 support is XMPP
  - Work in progress to create a standard for real-time text based on XMPP.
- Another recent area of importance is web based communication rtcweb.
- Huge work to have one more protocol than SIP all way in to the PSAP. More likely that it needs to be converted to SIP also in the future.

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Access to NG9-1-1

- The recommended main protocol for the TTY replacement is already specified for use in NG9-1-1 by NENA and IETF.
- Successfully tested in NENA ICE5 test.
- Implementors of NG9-1-1 systems just need to remember:
  - Make true real-time text operation
  - Combine with voice in the same call
  - Combine with video
  - Transfer, recording, multi-party etc. for all media.
  - Wise guidance for selection of text method in callback
  - Wise guidance for differences between TTY, TTY replacement and messaging.

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Interoperability
TTY – TTY replacement

- Conversion between TTY and TTY replacement is no big technology challenge. Easily done in gateways and multifunction terminals
- But to get it into the call path where needed is a challenge.
- The report provides proposals and recommendations, all with some pros and cons.
- FCC is asked to make the conclusion on what to implement.

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The mainstream – accessibility gap

- Mainstream text services are attractive because they reach many users.
- Accessible text services are attractive because they provide suitable functionality.
- At best, mainstream services should provide TTY replacement functionality.

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Making TTY replacement a mainstream feature

- Base TTY replacement on mainstream technology
- EAAC has indications that it will gain mainstream popularity
- Make it attractive to mainstream users
- Trial it with mainstream users.
- Launch it within mainstream providers' services.
- But do not give up on accessibility features.

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Regulation support

- If possible, synchronize with Section 255/508 refresh by Access Board NOW. They define mandatory features of communication products and services.
- What is required of communication products is also what should be supported by ng9-1-1.

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Regulation support

- Relax PSTN TTY connection requirement for products implementing TTY Replacement.
- But maintain the interoperability requirement if feasible interoperability approach is agreed.

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Entities influenced

- TRS providers
- TTY producers
- Standards organizations
- Telecom Equipment Distribution Program
- National DeafBlind Equipment Distribution Program
- NENA
- PSAPs
- NG9-1-1
- Mobile manufacturers
- Carriers
- FCC
- DOJ
- Accessibility advocacy groups

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Timeline

- Settle what TTY Replacement is and start deployment within 18 - 24 months.
- Do not set a fixed deadline for TTY phase-out if not major communication problems appear during PSTN close down.
- Aim at having all new users on TTY replacement after 7 years.

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Conclusions and Recommendations

a. TTY decreases with 10% per year. Still used for 20 000 emergency calls per year.
b. Some TTYs kept only for 9-1-1 calls. Users are left without well functional solutions.
c. TTY provides intermix of voice and limited real-time text. Important mix.
d. Consistent implementation of a modern TTY replacement is required.
e. Use the protocols included in NG9-1-1 and IETF RFC 6443 as base.
f. For wireless IMS, use GSMA PRD ir.92 with Annex B. Same base as e.)
g. Other technology environments may define own protocols if they provide interoperability with e).
h. For interoperability with current TTY, interworking units are needed. Interworking is easy, but getting them included in the call path where needed is tricky. Problem left to FCC for decision.

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Conclusions and Recommendations

i. In NG9-1-1, conversion from TTY to replacement should take place outside the ESInet. Letting TTY tones go to the PSAP workstations causes eternal problems.
j. Coordinate with Access Board who just now revise Sections 255 and 508 and also define a TTY replacement.
k. Regulation requiring pass through of TTY tones and attachment of TTY can be relaxed for handsets and systems implementing the TTY replacement.
l. TRS rules need updating for protocols and interface with NG9-1-1.
m. TEDP equipment distribution programs should be involved in TTY replacement
n. NDBEDP deafblind equipment distribution program should be involved
o. A combination with video should be deployed and used by VRS

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Conclusions and Recommendations

p) Messaging system providers should also provide NG9-1-1 interoperability. They should also be encouraged to provide real-time text mode and audio inclusion.

q) Move regulation and implementation in the interconnected and non-interconnected VoIP area from TTY to TTY replacement.

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Proposal

- Approve the TTY transition report.
- Be prepared to contribute to decision material and implementation

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TTY Transition

http://eaac-recommendations.wikispaces.com/TTY+Transition

EAAC TTY Transition group

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