Real-Time Text (RTT) in IMS

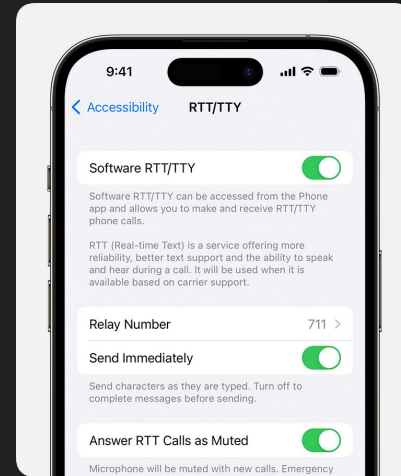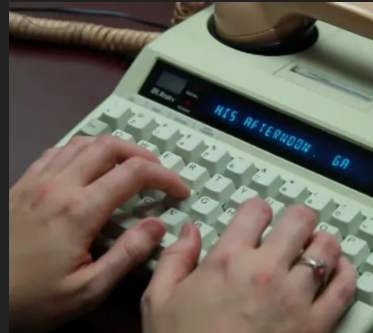Hossein Yavari
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What is RTT?

- a technology that allows text to be sent **immediately** as it is created, **during a phone call,**
- It uses VoIP technology to deliver texts,
- **No** need to press a "send" key as there generally is for SMS, chat, RCS or other types of texting,
- Recipient can read a message while the sender **types** it.

Why RTT?

- RTT is a universal text solution for deaf or hard of hearing users that replaces teletypewriter (TDD/TTY) technology,
- Eliminating the need to purchase specialized devices such as TTY machines,
- Intended for use by anyone who prefers to use text-based communications but in real time,

Real-time text (RTT)

Not visible
Allow incoming Real Time Text calls but hide the calling button ○

Visible during call
Show the Real Time Text button during a call ◉

Always visible
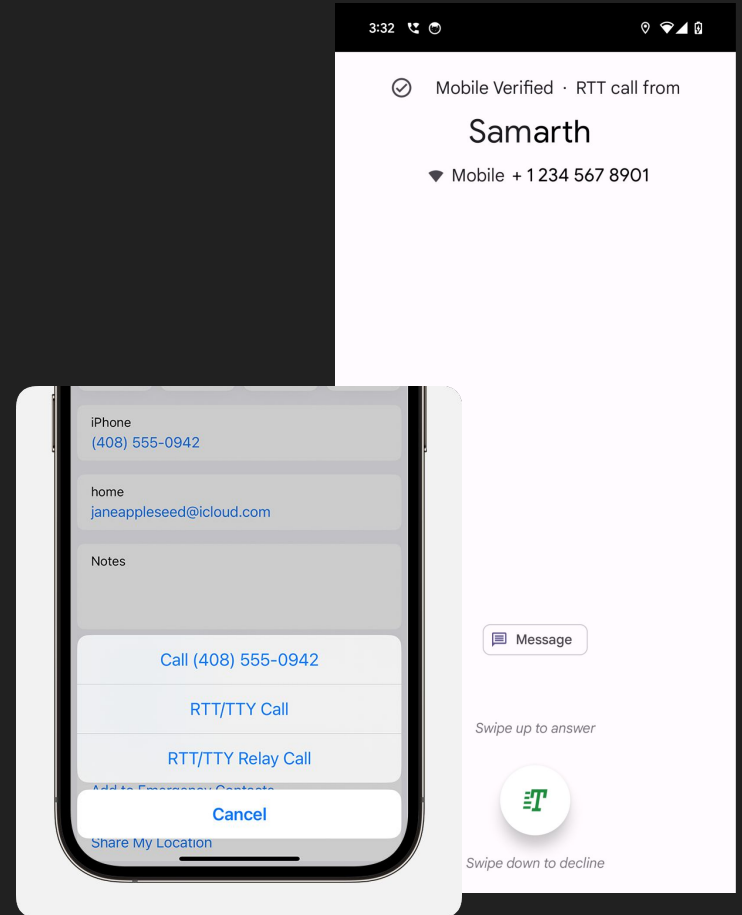Real Time Text button is available everywhere ○

What you need to know when using RTT:

- To use RTT, you need to be connected to LTE or 5G or have Wi-Fi Calling turned on.
- You can start using RTT whenever you're communicating with someone whose phone supports RTT or is connected to a TTY device. Some carriers don't support TTY.
- To see the RTT option for incoming and outgoing calls, set RTT call option to Always Visible.
- RTT includes audio, so mute the call if you don't need or want to share the audio.
- RTT calls use voice minutes. Check your rate plan for details.

The on-screen Real-Time Text (RTT) keyboard is an alternative to external TTY keyboards. As you text during a RTT call, the person you are talking with can see you type your message in real time. Learn more

9:41

‹ Accessibility   RTT/TTY

Software RTT/TTY ⬤

Software RTT/TTY can be accessed from the Phone app and allows you to make and receive RTT/TTY phone calls.

RTT (Real-time Text) is a service offering more reliability, better text support and the ability to speak and hear during a call. It will be used when it is available based on carrier support.

Relay Number   711 ›

Send Immediately ⬤

Send characters as they are typed. Turn off to complete messages before sending.

Answer RTT Calls as Muted ⬤

Microphone will be muted with new calls. Emergency

Why RTT? (Cont.)

- In **emergency** situations where it is unsafe to have a voice call to 911, but operator can hear background noise,
- Utilizing the full international **character set**, unlike TTY, which does not allow symbols, emojis and other language characters.

Text Methods Differences

Topic	TTY	SMS Text-to-911	Native Real-Time Text
Latency	Real-Time over Voice Network	Store and Forward Control Signal/Channel Service	**Real Time over Voice Network**
Connectivity	Originating Service Provider to SR or LNG	TCC to SR, TCC to ESInet/NGCS or TCC to PSAP	Originating Service Provider to ESInet/NGCS, ESInet/NGCS to the PSAP
Routing	Same as Voice calls	By TCC using cell or Commercial Location Based Services	Same as any NG call
Protocol	TTY/Baudot (TIA-825a) over standard voice call	Delivery mechanisms from TCC Provider: •Convert to TTY •Web Interface (HTTPS) •MSRP	Delivery Mechanism from NG911 SSP via RTT/RTP (RFC 4103)
Character Set	Limited Character Set	Full Character Set	Full Character Set

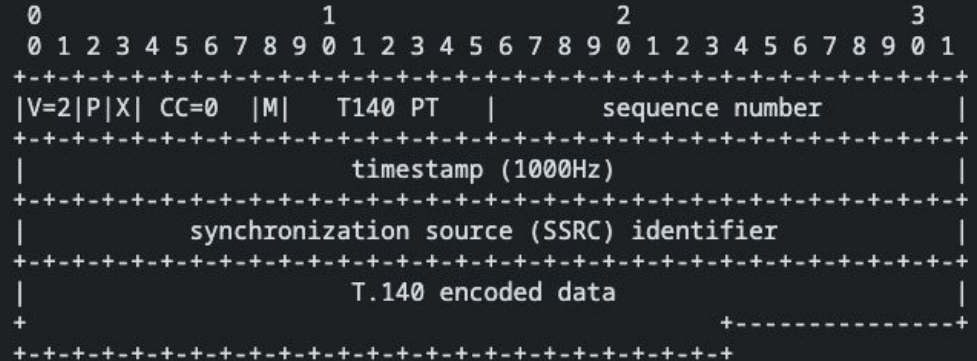source:: eena.org

RTT Protocols

- ITU-T T.140
- RFC 4103 (RTP payload for Text Communication), which has been updated with RFC 9071 to support multi-party realtime text calls defined in RTP-Mixer Formatting of Multiparty Real-Time Text.
- RFC 3261 (Session Initiation Protocol, SIP)

How RTT Works?

- SIP INVITE from the user includes an SDP that describes RTP text alongside other attributes for RTP voice.
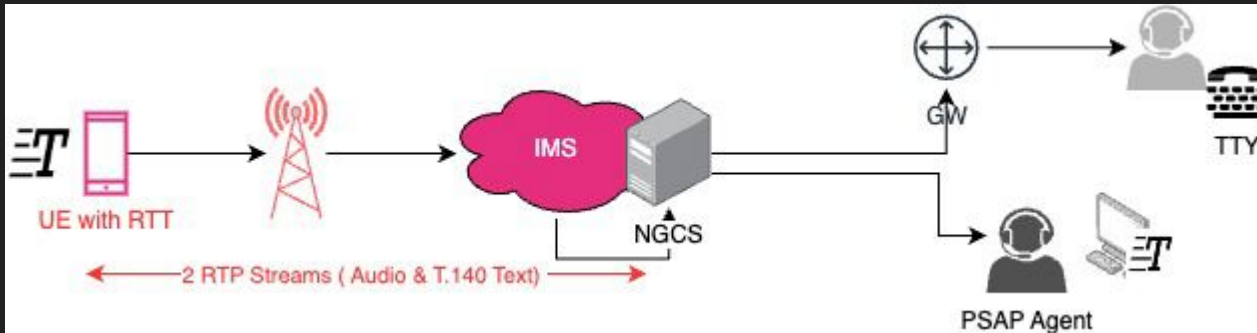- For example this SDP describes text transport on port 11000:

```
m=text 11000 RTP/AVP 98
a=rtpmap:98 t140/1000
```

- The RTP Packet for T.140:
-

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|V=2|P|X| CC=0  |M|   T140 PT   |          sequence number      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      timestamp (1000Hz)                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            synchronization source (SSRC) identifier          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      T.140 encoded data                       |
+                                         +---------------+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
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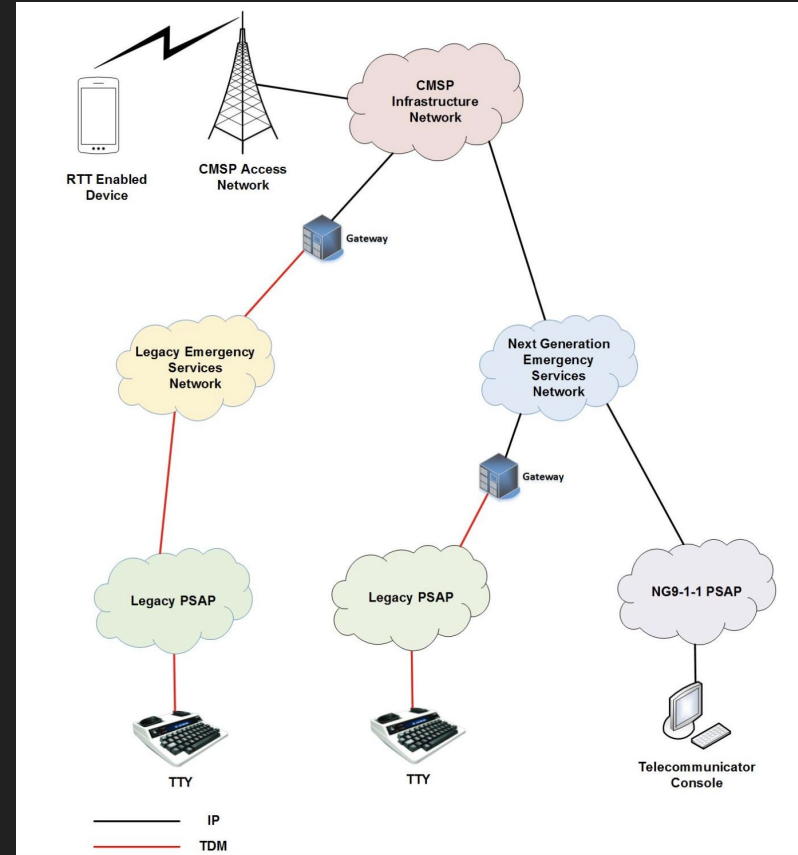
RTT for NG9-1-1 / IMS

- RTT emergency call is initiated with the same set of dialed digits that the mobile device would use to initiate a voice emergency call (e.g., 911, 112)
- So after SoS registration, UE sends SoS INVITE that SDP includes t140 info as well.

RTT for NG9-1-1 / IMS (Cont.)

- When the NGCS receives the incoming RTT emergency call from the IMS, it routes the call to PSAP.
- If the identified PSAP is a legacy PSAP, an RTT-TTY interworking function will be utilized to establish communications with the TTY device located at the PSAP.

Sample NG911 Handling RTT call

source:: eena.org

References

- https://eena.org/knowledge-hub/documents/rtt-and-tc-implementation-in-europe/
- https://support.apple.com/en-ca/guide/iphone/iph3e2e47fe/ios
- https://datatracker.ietf.org/doc/html/rfc4103