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# Real-Time Facsimile (T.38) - audio/t38 MIME Sub-type Registration

## Status of This Memo



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## Abstract

This document defines the MIME sub-type audio/t38. The usage of this MIME type, which is intended for use within Session Description Protocol (SDP), is specified within ITU-T Recommendation T.38.

## Table of Contents

## 1. Introduction

ITU-T Recommendation T.38 [1] defines the Internet Facsimile Protocol (IFP) for carriage of facsimile data over IP networks. As one option, IFP packets may be carried within an RTP [3] stream, either as the only content within the media stream or switched with other audio payload types.

This memo provides rationale for using RTP as a transport for fax signaling and specifies the MIME type associated with said signaling.

## 2. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [4].

## 3. Mechanisms for Transporting T.38 over an IP Network

When T.38 was first approved in 1998, it allowed for the transport of T.38 via UDP (using UDP Transport Layer (UDPTL), rather than RTP) or TCP. As of the time of this publication, UDPTL is the predominant means for transporting T.38 data over an IP network. In support of that, RFC 3362 [11] was published in order to allow devices to signal their desire to use UDPTL to transport T.38.

A number of issues were raised with respect to the usage of UDPTL for the long-term, though. Specifically, there were concerns over the fact that UDPTL does not provide the same kind of statistics reporting as RTP Control Protocol (RTCP). Further, there are no procedures in place for encrypting and protecting the integrity of the UDPTL stream. While the latter could be addressed in UDPTL, doing so would require a lot of effort and would largely be a duplication of the security work already completed within the IETF; e.g., Secure RTP (SRTP) [10].

There are clear advantages in using RTP for T.38 today. For example, using RTP allows one to take advantage of the redundancy [12], header compression [13][14], and other RTP-related work within the IETF. Using RTP, as opposed to UDPTL, for transport provides better interoperability with a wider range of devices that know and understand RTP. This includes applications such as firewalls, Network Address Translation (NAT) devices, and gateways that bridge two IP networks, which generally support RTP before most other real-time media.

Lastly, since today most T.38 data is generated by gateways that bridge two Public Switched Telephone Network (PSTN) networks, it is quite natural to expect that the transition from audio to fax should happen within the same media stream. The reason is that the T.38 data is simply an alternative representation of information received on the PSTN circuit. If the T.38 data is encapsulated in RTP, the gateways can easily transition from audio to fax and back again and can simply use the payload type to indicate the type of media that it is currently transmitting.

With these considerations in mind, the ITU-T amended T.38 [1] to allow RTP to be used to transport T.38. With that, a new MIME registration (audio/t38) is needed to allow for T.38 to be switched along with audio within the same RTP session.

## 4. IANA Considerations

One new MIME type and associated RTP payload format has been registered, by the IANA as described below.

To: ietf-types@iana.org Subject: Registration of Standard MIME media type audio/t38

MIME media type name: audio

MIME subtype name: t38

Required parameters:

rate: The RTP timestamp clock rate, which SHOULD be 8000Hz. The clock frequency MAY be set to any value, but it SHOULD be set to the same value as that for any audio packets in the same RTP stream in order to avoid RTP timestamp rate switching.

T38FaxRateManagement: Indicates the fax rate management model as defined in T.38. Values may be "localTCF" or "transferredTCF". This parameter is defined in ITU-T Recommendation T.38.

Optional parameters:

T38FaxFillBitRemoval: Indicates the capability to remove and insert fill bits in Phase C (refer to [6]), non-ECM data to reduce bandwidth. This is a boolean parameter (inclusion = true, exclusion = false). This parameter is defined in ITU-T Recommendation T.38.

T38FaxTranscodingMMR: Indicates the ability to convert to/from MMR from/to the line format for increasing the compression of the data and reducing the bandwidth in the packet network. This is a boolean parameter (inclusion = true, exclusion = false). This parameter is defined in ITU-T Recommendation T.38.

T38FaxTranscodingJBIG: Indicates the ability to convert to/from JBIG to reduce bandwidth. This is a boolean parameter (inclusion = true, exclusion = false). This parameter is defined in ITU-T Recommendation T.38.

T38FaxVersion: This is the version number of ITU-T Rec. T.38. New versions shall be compatible with previous versions. Absence of this parameter indicates version 0. The version is expressed as an integer value. This parameter is defined in ITU-T Recommendation T.38.

T38FaxMaxBuffer: Indicates the maximum number of octets that can be stored on the remote device before an overflow condition occurs. It is the responsibility of the transmitting application to limit the transfer rate to prevent an overflow. The negotiated data rate should be used to determine the rate at which data is being removed from the buffer. Value is an integer. This parameter is defined in ITU-T Recommendation T.38.

T38FaxMaxDatagram: The maximum size of the payload within an RTP packet that can be accepted by the remote device. This is an integer value. This parameter is defined in ITU-T Recommendation T.38.

Encoding considerations:

The encoding of the IFP RTP packets is defined in ITU-T Recommendation T.38. This sub-type is not intended for use with e-mail.

Security considerations:

See Section 6 of RFC 4612.

Interoperability considerations:

ITU-T Recommendation T.38 defines the procedures, syntax, and parameters for the carriage of T.38 over RTP within the context of H.323 [8], SIP [9], and H.248 [7] systems.

Published specification:

ITU-T Recommendation T.38, "Procedures for real-time Group 3 facsimile communication over IP networks", September 2005

Applications which use this media type:

Real-time facsimile (fax)

Additional information:

Magic number(s): File extension(s): Macintosh File Type Code(s):

Person & email address to contact for further information:

Paul E. Jones paulej@packetizer.com

Intended usage: COMMON

Author/Change controller: Paul E. Jones

## 5. SDP Mapping of MIME Parameters

The MIME information described in Section 4 is utilized in SDP in order to establish T.38 media streams. Specifically:

- The MIME type ("audio") goes in SDP "m=" as the media name.
- The MIME subtype ("t38") goes in SDP "a=rtpmap" as the encoding name.
- The parameter "rate" also goes in "a=rtpmap" as clock rate.

The MIME type defines several required and optional parameters to qualify the operation of T.38; these are to be used as defined in RFC 3555 [5], Section 2. The parameters are provided as a semi-colon separated list of "parameter" or "parameter=value" pairs using the "a=fmtp" parameter defined in SDP [2]; the "parameter" form is used for boolean values, where presence equals "true" and absence "false".

Consider the following example, which describes a media stream that allows the transport of G.711 audio and T.38 fax information:

```
m=audio 6800 RTP/AVP 0 98 a=rtpmap:98 t38/8000 a=fmtp:98
T38FaxVersion=2;T38FaxRateManagement=transferredTCF
```

## 6. Security Considerations

T.38 is vulnerable to attacks that are common to other types of RTP and SRTP payloads. However, unlike audio, T.38 data may be manipulated in ways that are more obtrusive than audio. For example, rogue packets may cause transmission failure, and manipulated packets may alter terminal identity.

The security considerations discussed in the RTP specification and any applicable RTP profile (for example, [10]) are applicable to T.38. Regarding SRTP configuration, fax payloads SHOULD NOT use an HMAC-SHA1 authentication tag that is shorter than 80 bits.

## 7. Normative References

[1] ITU-T Recommendation T.38, "Procedures for real-time Group 3 facsimile communication over IP networks", September 2005.

[2] Handley, M. and V. Jacobson, "SDP: Session Description Protocol", RFC 2327, April 1998.

[3] Schulzrinne, H., Casner, S., Frederick, R., and V. Jacobson, "RTP: A Transport Protocol for Real-Time Applications", STD 64, RFC 3550, July 2003.

[4] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[5] Casner, S. and P. Hoschka, "MIME Type Registration of RTP Payload Formats", RFC 3555, July 2003.

[6] ITU-T Recommendation T.30, "Procedures for document facsimile transmission in the general switched telephone network", July 2003.

## 8. Informative References

[7] ITU-T Recommendation H.248, "Gateway Control Protocol", May 2002.

[8] ITU-T Recommendation H.323, "Packet-based multimedia communications systems", May 2003.

[9] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M., and E. Schooler, "SIP: Session Initiation Protocol", RFC 3261, June 2002.

[10] Baugher, M., McGrew, D., Naslund, M., Carrara, E., and K. Norrman, "The Secure Real-time Transport Protocol (SRTP)", RFC 3711, March 2004.

[11] Parsons, G., "Real-time Facsimile (T.38) - image/t38 MIME Sub-type Registration", RFC 3362, August 2002.

[12] Perkins, C., et al., "RTP Payload for Redundant Audio Data", RFC 2198, September 1997.

[13] Casner, S. and V. Jacobson, "Compressing IP/UDP/RTP Headers for Low-Speed Serial Links", RFC 2508, February 1999.

[14] Koren, T., Casner, S., Geevarghese, J., Thompson, B., and P. Ruddy, "Enhanced Compressed RTP (CRTP) for Links with High Delay, Packet Loss and Reordering", RFC 3545, July 2003.

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