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Rec T.38 Implementors' Guide

(25 March 2011)

SERIES T: TERMINALS FOR TELEMATIC SERVICES
Facsimile – Group 3 protocols

Implementors Guide for ITU-T T.38 (Procedures for real-time Group 3 facsimile communication over IP network)

Summary

This document contains clarifications on the procedures, definitions and intentions pertaining to Recommendation ITU-T T.38.

This new Implementors' Guide contains all updates submitted up to and including those at Study Group 16 meeting in Geneva, 14–25 March, 2011.

This new Implementors' Guide was approved by ITU-T Study Group 16 on 25 March 2011 (TD 337/Plen).

Change Log

Initial version: March 2011

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<h1 style="text-align: center">Implementors' Guide for
Recommendation T.38</h1>

1   Scope

This guide resolves defects in the following categories:

–   technical errors, such as omissions and inconsistencies

–   ambiguities

In addition, the Implementors' Guide may include explanatory text found necessary as a result of interpretation difficulties apparent from the defect reports.

This Guide will not address proposed additions, deletions, or modifications to the Recommendations that are not strictly related to implementation difficulties in the above categories. Proposals for new features should be made through contributions to the ITU-T.

2   Introduction

This Implementors Guide is a compilation of reported defects for all versions of the Rec. ITU-T T.38 of Recommendations. In this edition of the Guide, reported defects identified as of 2011-03 are given for ITU-T T.38 (2010).

The Guide must be read in conjunction with the Recommendation ITU-T T.38 to serve as an additional source of information for implementors. The changes, clarifications and corrections defined herein are expected to be included in future versions of the affected Recommendations.

3   Defect Resolution Procedure

Upon discovering technical defects with any components of the texts covered by this Implementors Guide,, please provide a written description directly to the editors of the affected Recommendation(s) with a copy to the respective Rapporteur (See contacts above on page ii). The template for a defect report is located at the end of this Guide. Return contact information should also be supplied so a dialogue can be established to resolve the matter and an appropriate reply to the defect report can be conveyed. This defect resolution process is open to any interested party. Formal membership in the ITU is not required to participate in this process.

4   References

–   Recommendation ITU-T T.38 (2010) *Procedures for real-time Group 3 facsimile communication over IP network*

5   Nomenclature

In addition to traditional revision marks, the following marks and symbols are used to indicate to the reader how changes to the text of a Recommendation should be applied:

Symbol	Description
[Begin Correction]	Identifies the start of revision marked text based on extractions from the published Recommendations affected by the correction being described.
[End Correction]	Identifies the end of revision marked text based on extractions from the published Recommendations affected by the correction being described.
...	Indicates that the portion of the Recommendation between the text appearing before and after this symbol has remained unaffected by the correction being described and has been omitted for brevity.
--- SPECIAL INSTRUCTIONS --- {instructions}	Indicates a set of special editing instructions to be followed.

6   Technical and Editorial Corrections

6.1 Corrections in clause E.2.1.3 "Media channels"

[Begin Proposal]

E.2.1.3 Media channels

T.38 facsimile packets are sent on a separate TCP/UDP port from H.248 message transport. A minimal implementation of this annex requires a TCP, UDP or SCTP port for call signalling (H.248 message) transport and either a UDP port or a TCP port for T.38 facsimile information.

[End Proposed Correction]

6.2 Corrections in Table D.1

[Begin Proposal]

Table D.1 – T.38 SDP parameter definitions

No	Parameter Name	Definition
1	**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.

No	Parameter Name	Definition
2	**T38MaxBitRate**	Indicates the maximum fax transmission rate supported by the endpoint and shall not be used to negotiate actual transmission speeds. (Note 1)
3	**T38FaxFillBitRemoval**	Indicates the capability to remove and insert fill bits in Phase C (refer to ITU-T Rec. T.30), non-ECM data to reduce bandwidth. This is a boolean parameter (inclusion = true, exclusion = false).
4	**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).
5	**T38FaxTranscodingJBIG**	Indicates the ability to convert to/from JBIG to reduce bandwidth. This is a boolean parameter (inclusion = true, exclusion = false).
6	**T38FaxRateManagement**	Indicates the fax rate management model as defined in T.38. Values may be "localTCF" or "transferredTCF".
7	**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.
8	**T38FaxMaxDatagram**	The maximum size of the payload that can be accepted by the remote device. This is an integer value.
9	**T38FaxMaxIFP**	This parameter signals the maximum IFP frame size the offering endpoint is capable of accepting.
10	**T38FaxUdpEC**	Indicates any desired error correction scheme, either FEC or redundancy or none. Valid options are "t38UDPFEC", "t38UDPRedundancy" and "t38UDPNoEC". This parameter shall only be present when using UDPTL as the transport for T.38.
11	**T38FaxUdpECDepth**	If the parameter is specified, the '*minred*' value indicates that the offering endpoint wishes to receive at least that many redundancy frames per UDPTL datagram, if the answering endpoint chooses to use t38UDPRedundancy as the error correction mode, or that the offering endpoint wishes to receive at least that many FEC frames per UDPTL datagram, if the answering endpoint chooses to use t38UDPFEC as the error correction mode. Additionally, if '*maxred*' is specified, it indicates that the offering endpoint wishes to receive no more than that many redundancy frames or FEC frames per UDPTL datagram.
12	**T38FaxUdpFECMaxSpan**	Indicates that offering endpoint may not be able to properly process FEC frames that span more than the specified number of IFP frames.
13	**T38VendorInfo**	Indicates the manufacturer of the endpoint.

14	**T38ModemType**	Indicates modem capability supported by the T.38 endpoint.
		Valid options are
		    "t38G3FaxOnly" (0) and
		    "t38G3AndV34G3" (1).
		Note: if not provided the implied value of this parameter is "t38G3FaxOnly".

[End Proposed Correction]

6.3 Corrections in Table H.2

[Begin Proposal]

Table H.2 – T.38 SDP parameter (Semantics according to SDP RFC 3264 capability negotiation protocol) –
(1) Negotiated IP transport = UDPTL/UDP

No	Name	Syntax (SDP)	Semantic (SIP/SDP) Ref.: Clause D.2.3.5	Mandatory/ Optional?	Type and Unit	(Provisioned) Default Value
1	Version	**T38FaxVersion**	Parameter is negotiated. The entity answering the offer *shall return* the same or a lower version number.	Recommended (NOTE 8). If omitted then default value.	INTEGER (0..255), [-]	0
2	Maximum Bitrate	**T38MaxBitRate**	Parameter is declarative and the answer is independent of the offer. The parameter simply indicates the maximum transmission bit rate supported by the endpoint.	Recommended (NOTE 9). If omitted then default value.	INTEGER $(0..2^{16}-1)$, [bit/s] (NOTE 6)	14 400 (NOTE 1)
3	Fill Bit Removal	**T38FaxFillBitRemoval**	Parameter is negotiated. If the answering entity does not support this capability or if the capability was not in the offer, this parameter shall not be present in the answer.	Optional. If omitted then default value.	BOOLEAN, [-]	FALSE
4	MMR Transcoding	**T38FaxTranscodingMMR**	Parameter is negotiated. If the answering entity does not support this capability or if the capability was not in the offer, this parameter shall not be present in the answer.	Optional. If omitted then default value.	BOOLEAN, [-]	FALSE
5	JBIG Transcoding	**T38FaxTranscodingJBIG**	Parameter is negotiated. If the answering entity does not support this capability or if the capability was not in the offer, this parameter shall not be present in the answer.	Optional. If omitted then default value.	BOOLEAN, [-]	FALSE

No	Name	Syntax (SDP)	Semantic (SIP/SDP) Ref.: Clause D.2.3.5	Mandatory/ Optional?	Type and Unit	(Provisioned) Default Value
6	Data Rate Management Method	**T38FaxRateManagement**	Parameter is declarative and the answer must contain the same value.	Mandatory. If omitted then default value.	ENUMERATION, [-]	'transferredTCF' (NOTE 4)
7	Maximum Buffer Size	**T38FaxMaxBuffer**	Parameter is declarative and the answer is independent of the offer. This parameter simply signals the buffer space available on the offering endpoint and the answering endpoint. The answering endpoint may have more or less buffer space than the offering endpoint. Each endpoint should be considerate of the available buffer space on the opposite endpoint.	Optional. If omitted then default value.	INTEGER $(0..2^{16}-1)$, [bytes]	1800 (NOTE 2)
8	Maximum Datagram Size	**T38FaxMaxDatagram**	Parameter is declarative and the answer is independent of the offer. This parameter signals the largest acceptable datagram for the offering endpoint and the answering endpoint (i.e., the maximum size of the xyz payload). The answering endpoint may accept a larger or smaller datagram than the offering endpoint. Each endpoint should be considerate of the maximum datagram size of the opposite endpoint.	Optional. If omitted then default value.	INTEGER $(0..2^{16}-1)$, [bytes]	150 (NOTE 3)

No	Name	Syntax (SDP)	Semantic (SIP/SDP) Ref.: Clause D.2.3.5	Mandatory/ Optional?	Type and Unit	(Provisioned) Default Value
9	Maximum IFP Size	**T38FaxMaxIFP**	Parameter is declarative and the answer is independent of the offer. This parameter signals the maximum IFP frame size the offering endpoint is capable of accepting.	Optional. If omitted then default value. . If T38FaxMaxIFP is included in an offer, then inclusion of this parameter is Mandatory in that offer.	INTEGER $(0..2^{16}-1)$, [bytes]	40 (NOTE 3) (NOTE 7)
10	Error Correction	**T38FaxUdpEC**	Parameter is negotiated only when using UDPTL as the transport. If the answering endpoint supports the offered error correction mode, then it shall return the same value in the answer, otherwise the T38FaxUdpEC parameter shall not be present in the answer.	Optional. If omitted then default value.	ENUMERATION, [-]	't38UDPRedundancy' (NOTE 5)

No	Name	Syntax (SDP)	Semantic (SIP/SDP) Ref.: Clause D.2.3.5	Mandatory/ Optional?	Type and Unit	(Provisioned) Default Value
11	Error Correction Depth	**T38FaxUdpECDepth**	Parameter is declarative and the answer is independent of the offer, and is relevant only when using UDPTL as the transport. If the parameter is specified, the 'minred' value indicates that the offering endpoint wishes to receive **at least** that many redundancy frames per UDPTL datagram, if the answering endpoint chooses to use t38UDPRedundancy as the error correction mode, or that the offering endpoint wishes to receive **at least** that many FEC frames per UDPTL datagram, if the answering endpoint chooses to use t38UDPFEC as the error correction mode. Additionally, if 'maxred' is specified, it indicates that the offering endpoint wishes to receive **no more** than that many redundancy frames or FEC frames per UDPTL datagram.	Optional. If omitted then default value.	INTEGER $(0..2^{16}-1)$, [frames]	1 for 'minred', none for 'maxred' (NOTE 3)
12	Error Correction Span	**T38FaxUdpFECMaxSpan**	Parameter is declarative and the answer is independent of the offer, and is relevant only when using UDPTL as the transport. If the parameter is specified, it indicates that offering endpoint may not be able to properly process FEC frames that span more than the specified number of IFP frames.	Optional. If omitted then default value.	INTEGER $(0..2^{16}-1)$, [frames]	3
13	Vendor Information	**T38VendorInfo**	Parameter is declarative and the answer is independent of the offer. The parameter merely indicates the manufacturer of the endpoint.	Optional. .	Space separated List of three INTEGERs (NOTE 10)	No default value configured

No	Name	Syntax (SDP)	Semantic (SIP/SDP) Ref.: Clause D.2.3.5	Mandatory/ Optional?	Type and Unit	(Provisioned) Default Value
14	Supported Modem	**T38ModemType**	Parameter is declarative and indicates the modem capability supported by the gateway.	Optional. If omitted then default value (0)	Enumeration	t38G3FaxOnly

NOTE 1 – The bitrate of the V.17 modem is used as default value due to the majority of deployed G3FE devices, which are supporting V.17 modem speed.

NOTE 2 – The proposed default maximum buffer size relates to a conservative estimate of V.17 modem data for one second (= 1800 bytes due to 14400 bit/s times one second).

NOTE 3 – The maximum datagram size (which is the maximum size of the UDPTL PDU) is a result of the packetization time, the maximum bitrate (modem speed) and the redundancy level (and FEC). The proposed default value of 150 bytes represents a conservative estimate under the conditions of fastest modem speed, a maximum redundancy level of '3', and packetization time of 20 ms.

Dependency between T38FaxMaxDatagram, T38FaxMaxIFP and T38FaxUdpECDepth can be defined as:

T38FaxMaxDatagram >=UDPTL header+ T38FaxMaxIFP + T38FaxUdpECDepth* (number of bytes per FEC or number of bytes per redundant frame) + additional bytes for error recovery due to ASN.1 structure

NOTE 4 – Because data rate management method 2 is mandatory for UDP (see clause 8.2).

NOTE 5 – Because the packet redundancy method is simpler and more widely deployed as forward error correction methods.

NOTE 6 – The interpretation of the unit value of **T38MaxBitRate** parameter is specific to a given protocol.

NOTE 7 - The default value was calculated similarly to that of T38FaxMaxDatagram (in NOTE 3 of this table).

NOTE 8 – The main T.38 capability set are related to a particular T.38 version. It is therefore recommended to signal this parameter.

NOTE 9 – This parameter is recommended to be signalled in order to avoid potential interoperability problems (see clause B.3.7 which mandates this parameter for H.323-controlled T.38 endpoints).

NOTE 10 – See clauses D.2.3.1 and D.2.3.2.

[End Proposed Correction]

6.4 Corrections in Annex D

[Begin Proposal]

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D.2.8   Interoperability

Both SIP and Annex B require a well-known port to initiate call signalling. As described in SIP, its well-known port is 5060. Endpoints in this annex shall use the SIP well-known port by default.

D.2.8.1 Fallback Procedure:

In case of unsuccessful negotiation of T.38 session between gateways, it is recommended in order to maximize success rate of facsimile calls in GSTN that gateways should fallback to ITU-T V.152 with G.711 as VBD codec. If ITU-T V.152 is not an available mode, then non-V.152 audio with G.711 codec is a possible alternative. One example to achieve this is described in D.2.4.2.4

[End Proposed Correction]

6.5 Corrections in Annex E

[Begin Proposal]

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E.2.2.1.2   Voice and facsimile connection

Digits are collected by the media gateway (MG) and sent to the calling agent to invite the called party to a voice connection as defined in ITU-T Rec. H.248.1. A voice connection is set up.

Upon detection of CNG by the emitting media gateway (MG), the calling agent is informed (via H.248.1) of this event and instructs the destination MG to play CNG. If the destination MG then notifies the MGC of a CED (or V.21 flags) event and is capable of T.38, the MGC requests that each MG open a T.38 connection. Details for discrimination of the call as facsimile is described in clause 8/H.248.2. The MGC may also request that a new MG handle the facsimile connection. The T.38 protocol proceeds with a T.38 V.21 flags indicator packet.

NOTE: If T.38 is not supported by one of the MGs, the MGC may choose to abort a fax relay connection and attempt to make a connection over a conditioned audio channel, using procedures and methods as defined in ITU-T V.152. Note also it is possible that legacy systems may use a pass-through service with non-V.152/G.711 codec configuration.

Full flexibility of switching between MGs (e.g., voice+facsimile, voice-only or facsimile-only) and deciding on options will not be possible if the MGC is not notified of the facsimile events (and the MG alone detects facsimile and switches blindly to T.38). Upon completion of the facsimile call (T.38 completion) by the off-ramp media gateway (MG), the calling agent is informed (via H.248.1) of this event and may request that the connection be reverted to voice.

[End Proposed Correction]

Annex: T.38 Defect Report Form

DATE:	
CONTACT INFORMATION NAME: COMPANY: ADDRESS: TEL: FAX: EMAIL:	
AFFECTED RECOMMENDATIONS:	
DESCRIPTION OF PROBLEM:	
SUGGESTIONS FOR RESOLUTION:	

NOTE - Attach additional pages if more space is required than is provided above.

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