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SERIES T: TERMINALS FOR TELEMATIC SERVICES

Procedures for the transfer of facsimile data via store-and-forward on the Internet

ITU-T Recommendation T.37

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TERMINALS FOR TELEMATIC SERVICES

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ITU-T RECOMMENDATION T.37

PROCEDURES FOR THE TRANSFER OF FACSIMILE DATA VIA STORE-AND-FORWARD ON THE INTERNET

Summary

Recommendation T.37 describes the technical features necessary for the Store-and-Forward 'Simple' mode of operation of facsimile document transmission via Internet Mail. The general guidelines for the modes of operation of facsimile over the Internet are contained in Recommendation F.185.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

Recommendation T.37

PROCEDURES FOR THE TRANSFER OF FACSIMILE DATA
VIA STORE-AND-FORWARD ON THE INTERNET

(Geneva, 1998)

1   Scope

This Recommendation:

a)   defines procedures that enable facsimile data to be transferred using Internet Email as a store and forward system;

b)   supports the requirements of Recommendation F.185;

c)   identifies a method for determining the capabilities of a receiving device;

d)   identifies a method for providing notification of delivery;

e)   does not require changes to current ITU facsimile Recommendations;

f)   permits extensive interworking between facsimile and Internet mail users and facilities, sharing common services where possible.

2   Introduction and background

Recommendation F.185 defines the guidelines for the support of facsimile document communication for both real-time and store-and-forward modes over the Internet. For store-and-forward facsimile, this Recommendation defines the procedures and message formats.

Internet store-and-forward facsimile uses approved IETF protocols for posting, relaying and delivery of documents. It requires no changes to Internet standards or to ITU facsimile Recommendations. Such an approach leads to a system that can be used to accomplish interworking between facsimile store-and-forward users and users of general Internet mail.

The use of the message formats defined in this Recommendation with other store and forward systems is outside the scope of this Recommendation.

3   References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

–   ITU-T Recommendation T.30 (1996), *Procedures for document facsimile transmission in the general switched telephone network*.

–   ITU-T Recommendation T.4 (1996), *Standardization of Group 3 facsimile terminals for document transmission*.

–   CCITT Recommendation T.6 (1988), *Facsimile coding schemes and coding control functions for Group 4 facsimile apparatus*.

–   ITU-T Recommendation E.164 (1997), *The international public telecommunications numbering plan*.

–   ITU-T Recommendation T.563 (1996), *Terminal characteristics for Group 4 facsimile apparatus*.

–   ITU-T Recommendation F.185 (1998), *Internet facsimile: Guidelines for the support of the communication of facsimile documents*.

- RFC 822, *Standard for the format of ARPA Internet text messages*.

- RFC 821, *Simple Mail Transfer Protocol*.

- RFC 1123, *Requirements for Internet hosts – Application and support*.

- RFC 1725, *Post Office Protocol – Version 3*.

- RFC 1891, *SMTP Service Extension for Delivery Status Notifications*.

- RFC 1894, *An Extensible Message Format for Delivery Status Notification*.

- RFC 2045, *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*.

- RFC 2046, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*.

- RFC 2047, *MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text*.

- RFC 2048, *Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures*.

- RFC 2049, *Multipurpose Internet Mail Extensions (MIME) Part Five: Conformance Criteria and Examples*.

- RFC 2301, *File Format for Internet Fax*.

- RFC 2303, *Minimal PSTN address format in Internet Mail*.

- RFC 2304, *Minimal FAX address format in Internet Mail*.

- RFC 2305, *A Simple Mode of Facsimile Using Internet Mail*.

4 Definitions and abbreviations

4.1 Definitions

This Recommendation defines the following terms:

4.1.1 **receiver**: User agent capable of receiving or retrieving Email.

4.1.2 **sender**: User agent capable of sending Email.

4.1.3 **device**: Terminal containing a receiver and/or a sender.

4.1.4 **offramp gateway**: Equipment capable of receiving Email and relaying it to one or more G3/G4 facsimile terminals.

4.1.5 **mailstore**: Equipment capable of receiving Email and storing it for later retrieval by a receiver.

4.1.6 **notice**: Provision of status information to the originator or recipient in a manner to be determined by the device. The method to be used is outside the scope of this Recommendation.

4.2 Abbreviations

All abbreviations are as defined in Recommendations T.30 and F.185 unless specifically stated otherwise.

DSN   Delivery Status Notification

Email   Electronic Mail

ESMTP   Extended Simple Mail Transfer Protocol

G3   Group 3 facsimile

G4   Group 4 facsimile

IETF   Internet Engineering Task Force

IFD   TIFF Image File Directory

IMAP4   Interactive Message Access Protocol

MDN   Message Disposition Notification

MIME   Multipurpose Internet Mail Extensions

POP3   Post Office Protocol version 3

RFC   Request For Comment

SMTP   Simple Mail Transfer Protocol

TIFF   Tagged Image File Format

5   Addressing

Internet mail addressing is used to specify the addresses of sending and receiving terminals. Addressing information for the GSTN and ISDN conforms to Recommendation E.164.

6   Modes of operation

Store-and-forward facsimile may operate in one of two modes.

Interoperability is provided by communicating in the Simple Mode as defined below. All terminals conforming to this Recommendation and capable of reception must be able to receive in Simple Mode. It is recommended that terminals conforming to this Recommendation and capable of transmitting should, as a minimum, be capable of transmitting in Simple Mode.

6.1   Simple Mode

This supports the transfer of image data. Capabilities exchange and confirmation of receipt are not required for Simple Mode but may be provided using optional Email functions outside the scope of this Recommendation.

6.1.1   Introduction

A functional summary of the procedures and related references for Simple Mode is included below.

Table 1/T.37 – Functional summary of procedures for Simple Mode

Addressing	Relevant IETF RFCs
Image format	RFC 2301 Profile S
Transport/retrieval	Mechanisms such as SMTP, ESMTP, POP3, IMAP4 (IETF RFCs)

6.1.2   Procedures for Simple Mode

Simple Mode facsimile is achieved when the prescribed image format is sent and received using the prescribed addressing and transport/retrieval systems listed above and as described in sections 2, 3 and 4 of RFC 2305.

6.2 Full Mode

NOTE – This section is for further study. The information below represents guidelines for the work required to complete this section.

This supports the transfer of image data. Capabilities exchange and confirmation are required for Full Mode.

6.2.1 Introduction

A functional summary of the procedures and related references for Full Mode is included below.

Table 2/T.37 – Functional summary of procedures for Full Mode

Addressing	Relevant IETF RFCs
Image format	RFC 2301
Confirmation of receipt (Note 1)	For mailstores and offramp gateways: DSN (RFC 1894) For senders and receivers: MDN
Capabilities exchange (Note 2)	Required mechanism to emulate the end-to-end nature of facsimile between senders and receivers: MDN
Transport/retrieval (Note 3)	Mechanisms such as SMTP, ESMTP, POP3, IMAP4 (IETF RFCs)

NOTE 1 – MDN is defined within the IETF.

NOTE 2 – Extensions to MDN are discussed in on-going work within the IETF. It is likely that there will be many alternative mechanisms for the request/delivery of capabilities but this Recommendation will identify a default mechanism which will be required by all senders and receivers using Full Mode. This Recommendation will also identify mechanisms which will be required by gateways and mailstores and which may be strongly recommended or optional for senders, receivers, gateways and mailstore.

The capability parameters to be provided are discussed in on-going work within the IETF. This Recommendation will identify facsimile-related parameters that may be requested by senders and which are required to be provided by receivers. This Recommendation will also identify parameters which will be required by gateways and mailstore and which may be strongly recommended or optional for senders, receivers, gateways and mailstores.

NOTE 3 – Devices supporting Full Mode may use any currently approved Internet Mail transport or security mechanisms or any such mechanisms, or extension to such mechanisms, which may be approved in the future. The specific definition of these mechanisms, or future extensions to these mechanisms, is outside the scope of this Recommendation.

NOTE 4 – The requirement for onramp and offramp gateways to support G4 facsimile terminals is for further study.

6.2.2 Procedures for Full Mode

Full Mode facsimile is achieved when the prescribed image format is sent and received using the prescribed addressing and transport/retrieval systems listed above. These procedures are for further study.

Appendix I

Summary of implementation requirements

This appendix summarises and indexes the key implementation points covered elsewhere in this Recommendation. It is provided for information only.

I.1 Simple Mode implementation requirement

Table I.1/T.37 – Implementation requirements for Simple Mode

Sender		
Required	Send image data as a single MIME multi-page RFC 2301 Profile S file	RFC 2305 § 2.2.3
	Provide notice in case of local transmission problems	RFC 2305 § 2.3.1
	Provide a return address of an Internet Email receiver which is MIME compliant	RFC 2049
Strongly recommended	Include Message-ID	RFC 2305 § 2.2.1
	Use Base 64 encoding for image data	
Optional	Use other TIFF Profiles if it has prior knowledge that such profiles are supported by the receiver (e.g. RFC 2301 Profile F for G4)	RFC 2305 § 4
	Provide notice on receipt of DSN or other notifications	RFC 1894
Receiver		
Required	Be MIME compliant except that it is not required to offer to place a MIME attachment in a file and may print a received file rather than display	RFC 2305 § 2.2.2
	Be capable of processing multiple MIME RFC 2301 Profile S image files within a single message	RFC 2305 § 2.2.4
	Provide notice in case of reception or processing problems	RFC 2305 § 2.3.2
Optional	Use other TIFF Profiles (e.g. RFC 2301 Profile F for G4)	RFC 2305 § 4
Offramp gateway (When implemented)		
Required	Be SMTP compliant	RFC 821
	Provide delivery failure notification	RFC 1894, RFC 2305 § 2.3.1
	Be able to process PSTN/FAX Email addresses	RFC 2303, RFC 2304
	Comply with the relevant ITU Recommendations relating to facsimile transmission	T.30
	Attempt to relay authorised Email to the corresponding G3 facsimile terminals	RFC 2305 § 3.2
	Ensure that local legal requirements relating to facsimile transmissions are met	
Strongly recommended	Use DSN for delivery failure notification	RFC 2305 § 2.3.1, RFC 1894
	Use an approved mailbox access protocol when serving multiple users	RFC 2305 § 2.1.3
Optional	Translate image data into a format acceptable by the receiving G3 facsimile terminal	RFC 2305 § 2.1.2
	Use a mailbox access protocol when serving a single mail recipient	RFC 2305 § 2.1.3
Mailstore (When implemented)		
Required	Be SMTP compliant	RFC 821
	Provide delivery failure notification in the form of a DSN	RFC 1894

Appendix II

Simple Mode coding example

This appendix provides an example of coding image data for Simple Mode. It corresponds with RFC 2301 Profile S and is provided for information only.

II.1 Simple Mode coding example

Table II.1/T.37 – Coding example of TIFF header, IFD and image data

Header			
Offset	**Description**		**Coding**
0000	Octet order		49 49
0002	42		2A 00
0004	1st IFD offset		08 00 00 00

IFD						
Offset	**Description**	**Tag code**	**Type**	**Minimum Capabilities**	**Comments**	**Coding Sample**
0008	Number of Directory Entries	–	–	–		10 00
000A	NewSubfile Type	254	Long	2	Bit 1 = 1	FE 00 04 00 01 00 00 00 02 00 00 00
0016	ImageWidth	256	Short or Long	1728	A4	00 01 03 00 01 00 00 00 C0 06 00 00
0022	ImageLength	257	Short or Long	xxxx		01 01 03 00 01 00 00 00 xx xx xx xx
002E	BitsPerSample	258	Short	1		02 01 03 00 01 00 00 00 01 00 00 00
003A	Compression	259	Short	3	T.4	03 01 03 00 01 00 00 00 03 00 00 00
0046	Photometoric Interpretation	262	Short	0	0 is white	06 01 03 00 01 00 00 00 00 00 00 00
0052	FillOrder	266	Short	2	LSB first	0A 01 03 00 01 00 00 00 02 00 00 00
005E	StripOffsets	273	Short or Long	xxxxxxx		11 01 04 00 01 00 00 00 DE 00 00 00
006A	SamplesPerPixel	277	Short	1		15 01 03 00 01 00 00 00 01 00 00 00
0076	RowsPerStrip	278	Short or Long	= Image Length		16 01 04 00 01 00 00 00 xx xx xx xx
0082	StripOctet Counts	279	Short or Long	xxxxxxx		17 01 04 00 01 00 00 00 xx xx xx xx
008E	Xresolution	282	Rational	204, 200 (Note 1)		1A 01 05 00 01 00 00 00 CE 00 00 00

Table II.1/T.37 – Coding example of TIFF header, IFD and image data *(end)*

IFD

Offset	Description	Tag code	Type	Minimum Capabilities	Comments	Coding Sample
009A	Yresolution	283	Rational	200, 196, 100, 98 (Note 1)		1B 01 05 00 01 00 00 00 D6 00 00 00
00A6	T4Option	292	Long	0,4 (Note 2)	0;MH and not octet-aligned EOL 4;MH and octet-aligned EOL	24 01 04 00 01 00 00 00 00 00 00 00 or 24 01 04 00 01 00 00 00 04 00 00 00
00B2	ResolutionUnit	296	Short	2	inch	28 01 03 00 01 00 00 00 02 00 00 00
00BE	PageNumber	297	Short	xxxx/xxxx		29 01 03 00 02 00 00 00 00 00 00 00
00CA	NextIFDoffset	–	–	–	last IFD	00 00 00 00

Values longer than 4 octets

Offset	Description	Coding
00CE	The value or the Xresolution (204)	CC 00 00 00 01 00 00 00
00D6	The value of the Yresolution (196)	C4 00 00 00 01 00 00 00

Image data

Offset	Description	Coding
00DE	Compressed data	xx xx ………

NOTE 1 – The following Xresolution and YResolution combinations are permitted for Simple Mode:

(Xresolution, Yresolution) - <204,98>, <204,196> <200,100>, <200,200>

(Xresolution, Yresolution) = (200,100) is considered as equivalent to (204,98).

(Xresolution, Yresolution) = (200,200) is considered as equivalent to (204,196).

NOTE 2 – RTC may be added to the end of each page. This applies only when Bit 2 of T4 Option is set to '0' (not octet-aligned EOL).

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