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PNO-ISC/SPEC/012

Interconnect Stream Control Transmission Protocol (SCTP) and Adaptation Layers

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PNO-ISC SPECIFICATION NUMBER 012
**Interconnect Stream Control Transmission Protocol (SCTP) and Adaptation
Layers**

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0.2 Normative Information

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0.4 History

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| Issue 1.0 Draft B | April 2002 | Second Draft |
| Issue 1.0 Draft C | April 2002 | Third Draft |
| Issue 1.0 Draft D | June 2002 | Fourth Draft |
| Issue 1.0 Draft E | October 2002 | Fifth Draft |
| Issue 1.0 Draft F | December 2002 | Sixth Draft |
| Issue 1.0 Draft G | December 2002 | Seventh Draft |
| Issue 1.0 Draft H | December 2002 | Eight Draft |
| Issue 1.0 Draft J | May 2003 | Ninth Draft. Updated to combine with M3UA specification. |
| Issue 1.0 Draft K | June 2003 | Updated following final document review. |
| Issue 1.0 Draft L | June 2003 | Pages 2 and 3 re-ordered after comment at June ISC meeting |

0.5 Issue Control

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| All | Issue 1.0 Draft J | May 2003 |
| All | Issue 1.0 Draft K | June 2003 |
| All | Issue 1.0 Draft L | June 2003 |

0.6 Normative References

- [1] ETSI TS 102 142, "Services and Protocols for Advanced Networks (SPAN); MTP/SCCP/SSCOP and SIGTRAN (Message of SS7 over IP); Message transfer part 3 User Adaptation layer (M3UA)," version 1.1.1, May 2003.
- [2] ETSI TS 102 144, "Services and Protocols for Advanced Networks (SPAN); MTP/SCCP/SSCOP and SIGTRAN (Message of SS7 over IP); Stream Control Transmission Protocol (SCTP)," version 1.1.1, May 2003.
- [3] R. R. Stewart, et al., "Stream Control Transmission Protocol," RFC 2960, IETF, October 2000.
- [4] G. Sidebottom, et al., "Signalling System 7 (SS7) Message Transfer Part 3 (MTP3)-User Adaptation Layer (M3UA)," RFC 3332, IETF, September 2002.
- [5] PNO-ISC/SPEC/005, Issue 3, C7 Interconnect Message Transfer Part (MTP).
- [6] PNO-ISC/INFO/007, Issue 4, UK Interconnect use of SCCP and MTP.
- [7] PNO-ISC/SPEC/010, Issue 1, Bearer Independent Call Control.
- [8] PNO-ISC/SPEC/011, Issue 1, ATM Transport for UK Interconnect.
- [9] PNO-ISC/INFO/019, UK Interconnect use of Signalling for packet-based PSTN/ISDN.
- [10] ITU-T Q.706 (03/93), Signalling System No.7, Message Transfer Part, Signalling Performance.
- [11] ITU-T Q.716 (03/93), Signalling System No.7, Signalling Connection Control Part (SCCP performance).
- [12] ITU-T Q.766 (03/93), Performance objectives in the integrated services digital network application.
- [13] S. Kent & R. Atkinson, "Security Architecture for the Internet Protocol," RFC 2401, IETF, November 1998.
- [14] A. Jungmaier, E. Rescorla & M. Tuexen, "Transport Layer Security over Stream Control Transmission Protocol," RFC 3436, IETF, December 2002.

0.7 Informative References

Note: The IETF Internet drafts listed below are current at the time of writing. It is advisable to reference the latest available IETF Internet Draft for information.

PNO-ISC/SPEC/001, Issue 1, Point Codes for Network Interconnect in the UK.

ITU-T Q.704 (07/96), Signalling System No.7, Message Transfer Part, Signalling Network Functions and Messages.

J. Pastor-Balbas & K. Morneault, "M3UA Implementor's Guide", draft-ietf-sigtran-m3ua-implementors-guide-03.txt, IETF, February 2003.

R. Stewart, et al., "Stream Control Transmission Protocol (SCTP) Implementer's Guide", draft-ietf-tsvwg-sctpimpguide-08.txt, IETF, 26th February 2003.

J. Loughney, M. Tuexen & J. Pastor-Balbas, "Security Considerations for SIGTRAN Protocols," draft-ietf-sigtran-security-02.txt, IETF, January 2003.

S. M. Bellovin, et al., "On the use of SCTP with IPsec," draft-ietf-ipsec-sctp-06.txt, IETF, April 2003.

0.8 Glossary of terms

0.8.1 Abbreviations

| | |
|---------|--|
| ASP | Application server process |
| DUPU | Destination user part unavailable message |
| IETF | Internet Engineering Task Force |
| IP | Internet Protocol |
| ISC | Interconnect Standards Committee |
| M3UA | MTP3 User adaptation layer |
| MTP3 | Message Transfer Part - Level 3 |
| MTU | Maximum Transmission Unit |
| NICC | Network Interoperability Consultative Committee |
| PNO-IG | Public Network Operators' – Interest Group |
| PNO-ISC | Public Network Operators' – Interconnect Standards Committee |
| RFC | Request for Comments |
| SCN | Switched Circuit Network |
| SCON | Signalling congestion message |
| SCTP | Stream Control Transmission Protocol |
| SG | Signalling gateway |
| SP | Signalling point |
| SS7 | Signalling System Number 7 |
| TFC | Transfer controlled message |
| UK | United Kingdom |

0.8.2 Definitions

Reason 1 Congestion with the priority option is not used for UK interconnect.

The ETSI specifications TS 102 142 [1] and TS 102 144 [2] use the term 'not required'. For UK Interconnect use this term is defined as follows,

Not required It is not necessary for either the underlying functionality or signalling procedures associated with the service/feature to be supported by the implementation concerned for that implementation to qualify as conformant to the specification. Refer to 0.10.
Note 1: Interconnected or communicating implementations that provide support of the service/feature/message/parameter identified will not be considered as non-conformant to the specification.
Note 2: Implementations shall not rely on “not-required” features being disabled (or enabled).
Note 3: The normal compatibility rules shall apply to the messages, parameters and codepoints needed to support the feature/service.

0.9 Scope

This document specifies the requirements of the Stream Control Transmission Protocol (SCTP) and the MTP3 user adaptation layer (M3UA) for the transport of switched circuit network (SCN) signalling messages across a UK national interconnect between Public Networks. This specification is only appropriate to interconnect within the UK network and for signalling gateway to 'end node' configuration only.

This specification was proposed by the PNO-ISC because a need was identified to support the transport of signalling over IP within the UK.

This specification is an extension to the ETSI specifications TS 102 142 [1] and TS 102 144 [2] and includes additions specific to interconnect within the UK.

It must also be noted that this specification might only form part of an agreement and support of further functionality over an interconnect may be as part of a bilateral agreement.

0.10 Treatment of Items 'Not Required' or 'Shall Not Be Sent'

The ETSI specifications TS 102 142 [1] and TS 102 144 [2] use the terms 'not required' and 'shall not be used'. For UK Interconnect, the processing of received messages and/or parameters marked either as 'not required' or as 'shall not be sent' shall be according to the capabilities of the receiving node and may either be to discard them or to respond to them in a manner allowed by this specification. For preference these events shall optionally be reported to management.

END OF PNO-ISC/SPEC/012§0

1 Introduction

The Public Network Operators Interconnect Standards Committee (PNO-ISC) has produced this UK extension to ETSI TS 102 142 [1] and ETSI TS 102 144 [2]. This document, together with [1] and [2], specifies the minimum set of features and capabilities that shall be supported by an implementation of the protocol for national SS7 interconnect between operators.

Whilst there is no current obligation on any PNO to offer a UK SCTP and MTP3 User Adaptation Layer (M3UA) interconnect, if any such interconnect is offered then as a minimum the functionality outlined in this specification shall be used to ensure interoperability between UK networks.

The base SCTP document for PNO-ISC is,

ETSI TS 102 144 [2]

The base M3UA document for PNO-ISC is,

ETSI TS 102 142 [1]

The base SCTP document for ETSI is,

IETF RFC 2960 [3]

The base M3UA document for ETSI is,

IETF RFC 3332 [4]

Note: The above documents [3 and 4] are for proposed internet standard protocols, and active discussion and testing continues within the IETF. Implementations shall take note of IETF updates, guidelines and changes that complement or supersede RFC 2960 and RFC 3332. As changes to functionality, features and capabilities are made to RFC 2960 and/or RFC3332; this baseline document for PNO-ISC Transport may also need to be updated.

All functionality outlined as mandatory in [1 - 4] is considered as mandatory for PNO-ISC. Any functionality outlined in IETF RFC 2960 and RFC 3332 as 'SHOULD' & 'MUST' is to be considered as mandatory (SHALL). Any behaviour outlined as 'SHOULD NOT' & 'MUST NOT' is to be read as 'SHALL NOT'.

Terminology for this specification,

SHALL
SHALL NOT
NOT REQUIRED

As further ETSI specifications of functionality and adaptation layers are completed, this document will be updated to include key functionality agreed by PNO-ISC. The additions already agreed by PNO-ISC include,

M3UA SG-SG functionality,
MTP2 Peer to Peer Adaptation Layer (M2PA).

END OF PNO-ISC/SPEC/012§1

2 General

2.1 SIGTRAN Security

The security considerations listed in RFC 2960 [3] and RFC 3332 [4] should be taken into account for UK interconnect. In addition, encryption of the SCTP user data is also recommended, with either IPSec [13] or Transport Layer Security [14] through bilateral agreement.

2.2 Timers

Timer values used should be within the functional requirements of the upper protocol layers. Refer to [9].

END OF PNO-ISC/SPEC/012§2

3 SCTP

References numbers contained within brackets () refer to the applicable sections in ETSI TS 102 144 [2].

3.1 SCTP Features

- (4.3) The endpoint shall allow the MTU size for each path to be manually configured, within the range specified in Table 1 of [2].

3.2 SCTP Parameters

The default SCTP parameters defined in RFC 2960 [3] (and listed in Table 1 of [2]) are intended to allow SCTP to co-exist seamlessly with TCP in the Internet. The default timer and parameter values of SCTP are considered to be unsuitable to meet the performance requirements of SS7 user parts, especially during failure, congestion and packet loss situations. Hence they are not suitable for UK interconnect purposes. SCTP implementations shall support configurable parameters as defined in Table 1 of [2]. Refer to PNO-ISC/INFO/019 [9] for guidance on choosing the actual timer and parameter values.

END OF PNO-ISC/SPEC/012§3

4 M3UA

References numbers contained within brackets () refer to the applicable sections in RFC 3332 [4].

4.1 General

4.1.1. Performance requirements

Performance requirements are outside the scope of this document. However, the network implementation should take into account the performance requirements as outlined in [10], [11] and [12].

4.1.2. Stream requirements

A minimum number of 2 streams shall be supported. If the peer endpoint supports only 1 incoming stream, or outgoing stream the endpoint shall abort the association and may report the failure to initialise the association to layer management. No restriction is placed on the maximum number of streams to be supported by an endpoint, within the constraints of RFC 2960 [3].

4.2 Functional Areas

- (1.4.2.4) The behaviour if no active ASP is available is a nodal function. A description of recommended functionality is contained in [9].
- (1.4.6) When a SG determines that the transport of SS7 messages to a signalling point is encountering congestion, the SG shall trigger SS7 MTP3 TFC management messages to originating SS7 nodes, as per the congestion procedures of [5] and [8].
- (1.4.6) When the SG receives a SCON from an ASP and determines that a SP is encountering congestion, it shall trigger SS7 MTP3 TFC messages to concerned SS7 destinations according to the congestion procedures of [5] and [8]. The receiving node shall be able to detect local congestion and inform the transmitting node of this, by whatever means [9].
- (1.4.8) The required response times under association failure are outlined in [9].

4.3 M3UA Protocol Elements

- General It is recommended that the 'Info string' structure be ASCII text encoded (UK English) .
14 bit Point codes shall be used. The point code mask fields shall be set to 0.
- (3.4.4) Signalling Congestion (SCON),
 - Will not be sent when SS7 congestion level changes (*See reason 1*)The national option, without congestion priorities, is required [5].
- (3.4.5) DUPU, MTP3 User ID field
The values here shall align with the MTP3 User Part Unavailable message and service indicator. Additional service indicator values may also be required. Refer to [6] and [7].

4.4 Procedures

- (4.1.1) M3UA shall use an algorithm that produces an even distribution for transmitting messages across associations. Refer to [9].
- (4.3.4.3) By bi-lateral agreement, an AS can consist of more than one ASP.

END OF PNO-ISC/SPEC/012§4

END OF PNO-ISC/SPEC/012