

NGN Interconnect: Interconnect Transmission Control Protocol (TCP)

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Foreword

This NICC Document (ND) has been produced by NICC.

Introduction

This specification forms part of the Next Generation Network, Multi-Service Interconnect (MSI) Release Structure and ought to be read in conjunction with the associated releases of the standard 'Multi-Service Interconnect of UK Next Generation Networks' [1]

In line with the four level documentation structure defined in the release document ND1610 [1], this is a NICC layer 3 document.

1 Scope

This document specifies the requirements of the Transmission Control Protocol (TCP) for the transport of applications' signalling messages across a UK national interconnect between Public Networks. This TCP specification is appropriate to interconnect within the UK network for end node to end node configuration.

This specification was proposed by the NICC-TSG because a need was identified to support the transport of signalling over IP 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.

2 References

For the particular version of a document applicable to this release see [ND1610](#) [1].

2.1 Normative References

- [1] ND1610 "Multi-Service Interconnect for NGNs – Green Release"
- [2] RFC 793, J. Postel, "Transmission Control Protocol," IETF
- [3] RFC 1122, R. Braden, et al., "Requirements for Internet Hosts - Communication Layers," IETF
- [4] RFC 1191, J.C.Mogul and S.E.Deering, "Path MTU discovery," IETF
- [5] ND1612 Generic IP Connectivity for PSTN / ISDN Services between UK Next Generation Networks

2.2 Informative references

- [6] RFC 2018, M.Mathis, et al., "TCP Selective Acknowledgement Options," IETF
- [7] G.Gordon, "Syn cookies, an exploration", GIAC, available from http://www.giac.org/certified_professionals/practicals/gsec/2013.php
- [8] RFC 4614, M.Duke, et al., "A Roadmap for Transmission Control Protocol (TCP) Specification Documents," IETF
- [9] SR 001 262 (V2.0.0): " ETSI drafting rules Section 23:- Verbal Forms For The Expression Of Provisions "

3 Definitions and Abbreviations

3.1 Definitions

The key words “**shall**”, “**shall not**”, “**must**”, “**must not**”, “**should**”, “**should not**”, “**may**”, “**need not**”, “**can**” and “**cannot**” in this document are to be interpreted as defined in the ETSI Drafting Rules [9].

3.2 Abbreviations

CP	Communications Provider
ETSI	European Telecommunications Standards Institute
IETF	Internet Engineering Task Force
IP	Internet Protocol
MSS	Maximum Segment Size
MTU	Maximum Transmission Unit
NICC	Network Interoperability Consultative Committee
RFC	Request for Comments
SCTP	Stream Control Transmission Protocol
SIP	Session Initiation Protocol
TCP	Transmission Control Protocol
TSG	Technical Steering Group
UK	United Kingdom of Great Britain and Northern Ireland

4 Overview

NICC has produced this UK extension to IETF RFC 793 [2]. The description of TCP contained in this document, together with [2] and [3], specifies the minimum set of features and capabilities that shall be supported by an implementation of the protocol for national interconnect between operators, using SS7 and SIP.

Whilst there is no current obligation on any CP to offer a UK TCP 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 TCP document is,

IETF RFC 793 [2]

as amended by section 4.2 of:

IETF RFC 1122 [3]

Further information about TCP specifications can be found in

IETF RFC 4614 [8]

All functionality outlined as mandatory in [2] or in section 4.2 of [3] is considered as mandatory; any functionality outlined 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'.

5 Timers

Timer values used SHOULD be within the functional requirements of the upper protocol layers.

6 TCP

6.1 IP Features

The node implementing TCP SHALL allow paths to be configured so as to use MTU path discovery [4].

6.2 TCP Features

The node implementing TCP SHALL allow the receive MSS size for each path to be manually configured (section 3.1 of [2]).

TCP keep-alives (section 4.2.3.6 of [3]) SHALL be used where there is a requirement to detect failure of the TCP path within a given timescale. Such requirements are found in section 8.2 of [5].

The TCP Urgent mechanism (section 3.7 of [2]) SHALL NOT be used.

6.3 IP Connectivity Failure Detection

The timer R2 in section 4.2.3.5 of [3] SHALL be set to a value that will cause the link to be treated as failed if a data segment is not acknowledged within 2 seconds. If there are separate timers for different types of segment, this requirement applies only to segments carrying data. Note that this corresponds to the "timeout" parameter of the "open" command in section 3.8 of [2].

Where there is a requirement to detect failure of the TCP path within a given timescale, a conforming TCP implementation SHALL send segments (whether data segments, acknowledgements, retransmissions, or keep-alives) on each TCP connection no longer apart than one-quarter of the detection timescale (for example, if the requirement is to detect failure within 100ms, then segments shall be sent no greater than 25ms apart). Failure to receive a segment on a given TCP connection within the required time of receipt of the previous segment on the same connection SHALL be treated as a failure of the lower-level connectivity between the two ends of the TCP path. The end node need not close the connection, but the TCP implementation SHALL NOT accept further data from the higher layer to be sent on this connection until it has received a further (non-RST) segment. (Note: this is not a prohibition on sending further segments, and does not affect retransmission of unacknowledged data.) These requirements shall apply notwithstanding any contrary requirements in [2] and [3]. They may involve the use of timers; if so, these timers are conceptually separate from the timers specified in [2] and [3].

6.4 TCP Options

Implementations need not provide any optional features of TCP. However, they may wish to consider the use of the following features which are functionally similar to, and provide the claimed benefits of, those in SCTP.

Selective Acknowledgement [6]

SYN cookies [7]

History

Document history		
1.1.1	December 2007	Initial issue
1.1.2	June 2008	Pasted onto new NICC document format for publication