Network Working Group
Internet-Draft
Intended status: Experimental
Expires: July 6, 2013

T. Dreibholz
Simula Research Laboratory
M. Becke
H. Adhari
University of Duisburg-Essen
January 2, 2013

SCTP Socket API Extensions for Concurrent Multipath Transfer
draft-dreibholz-tsvwg-sctpsocket-multipath-05.txt

Abstract

This document describes extensions to the SCTP sockets API for configuring the CMT-SCTP and CMT/RP-SCTP extensions.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on July 6, 2013.

Copyright Notice

Copyright (c) 2013 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Introduction 3
2. Concurrent Multipath Transfer and Resource Pooling Activation/Deactivation (SCTP_CMT_ON_OFF) 3
3. Testbed Platform 4
4. Security Considerations 4
5. IANA Considerations 4
6. Acknowledgments 4
7. References 4
7.1. Normative References 4
7.2. Informative References 4
Authors' Addresses 6

1. Introduction

This draft describes extensions to the SCTP sockets API (see [RFC6458], [RFC4960]) which allow an application to configure the behaviour of the Concurrent Multipath Transfer (CMT) extensions CMT-SCTP, CMT/RPv1-SCTP, CMT/RPv2-SCTP and MPTCP-like (see [I-D.tuexen-tsvwg-sctp-multipath], [Globecom2010], [PAMS2012], [Dre2012], [PAMS2011], [SoftCOM2011], [ConTEL2011], [AINA2010], [IAS2006]).

2. Concurrent Multipath Transfer and Resource Pooling Activation/ Deactivation (SCTP_CMT_ON_OFF)

This socket option activates or deactivates CMT and sets the corresponding Resource Pooling variant to be applied. The sctp_assoc_value structure is used to specify the association for which the CMT state should be changed and the new CMT state.

Definition of the sctp_assoc_value structure:

```
struct sctp_assoc_value {
   sctp_assoc_t assoc_id;
   uint32_t     assoc_value;
};
```

assoc_id: Holds the identifier for the association of which the CMT state should be changed. Ignored for one-to-one style sockets.

assoc_value:

0 Turns CMT off.

1 Turns plain CMT-SCTP on. No Resource Pooling is applied.

2 Turns CMT-SCTP on. CMT/RPv1 Resource Pooling as defined in [AINA2010] is applied.

3 Turns CMT-SCTP on. CMT/RPv2 Resource Pooling as defined in [ConTEL2011] is applied.

4 Turns CMT-SCTP on. MPTCP-like Resource Pooling as defined in [SoftCOM2011], [ConTEL2011], [PAMS2012] is applied.

3. Testbed Platform

A large-scale and realistic Internet testbed platform with support for the multi-homing feature of the underlying SCTP protocol is NorNet. A description of NorNet is provided in [PAMS2013-NorNet], some further information can be found on the project website [NorNet-Website].

4. Security Considerations

Security considerations for the SCTP sockets API are described by [RFC6458].

5. IANA Considerations

This document does not require IANA actions.

6. Acknowledgments

The authors would like to thank Michael Tuexen for his support.

7. References

7.1. Normative References

[RFC4960] Stewart, R., "Stream Control Transmission Protocol", RFC 4960, September 2007.

[RFC6458] Stewart, R., Tuexen, M., Poon, K., Lei, P., and V. Yasevich, "Sockets API Extensions for the Stream Control Transmission Protocol (SCTP)", RFC 6458, December 2011.

[I-D.tuexen-tsvwg-sctp-multipath] Amer, P., Becke, M., Dreibholz, T., Ekiz, N., Iyengar, J., Natarajan, P., Stewart, R., and M. Tuexen, "Load Sharing for the Stream Control Transmission Protocol (SCTP)", draft-tuexen-tsvwg-sctp-multipath-05 (work in progress), September 2012.

7.2. Informative References

[Dre2012] Dreibholz, T., "Evaluation and Optimisation of Multi-Path Transport using the Stream Control Transmission Protocol", March 2012.

[PAMS2012]
Dreibholz, T., Adhari, H., Becke, M., and E. Rathgeb, "Simulation and Experimental Evaluation of Multipath Congestion Control Strategies", Proceedings of the 2nd International Workshop on Protocols and Applications with Multi-Homing Support (PAMS), ISBN 978-0-7695-4652-0, DOI 10.1109/WAINA.2012.186, March 2012.

[SoftCOM2011]
Dreibholz, T., Becke, M., Adhari, H., and E. Rathgeb, "Evaluation of A New Multipath Congestion Control Scheme using the NetPerfMeter Tool-Chain", Proceedings of the 19th IEEE International Conference on Software, Telecommunications and Computer Networks (SoftCOM), Pages 1-6, ISBN 978-953-290-027-9, September 2011.

[PAMS2011]
Adhari, H., Dreibholz, T., Becke, M., Rathgeb, E., and M. Tuexen, "Evaluation of Concurrent Multipath Transfer over Dissimilar Paths", Proceedings of the 1st International Workshop on Protocols and Applications with Multi-Homing Support (PAMS), Pages 708-714, ISBN 978-0-7695-4338-3, DOI 10.1109/WAINA.2011.92, March 2011.

[ConTEL2011]
Dreibholz, T., Becke, M., Adhari, H., and E. Rathgeb, "On the Impact of Congestion Control for Concurrent Multipath Transfer on the Transport Layer", Proceedings of the 11th IEEE International Conference on Telecommunications (ConTEL), Pages 397-404, ISBN 978-953-184-152-8, June 2011.

[AINA2010]
Dreibholz, T., Becke, M., Pulinthanath, J., and E. Rathgeb, "Applying TCP-Friendly Congestion Control to Concurrent Multipath Transfer", Proceedings of the 24th IEEE International Conference on Advanced Information Networking and Applications (AINA), Pages 312-319, ISSN 1550-445X, DOI 10.1109/AINA.2010.117, April 2010.

[Globecom2010]
Dreibholz, T., Becke, M., Rathgeb, E., and M. Tuexen, "On the Use of Concurrent Multipath Transfer over Asymmetric Paths", Proceedings of the IEEE Global Communications Conference (GLOBECOM), ISBN 978-1-4244-5637-6, DOI 10.1109/GLOCOM.2010.5683579, December 2010.

[IAS2006] Iyengar, J., Amer, P., and R. Stewart, "Concurrent

Multipath Transfer Using SCTP Multihoming Over Independent End-to-End Paths", IEEE/ACM Transactions on Networking, Volume 14, Number 5, Pages 951-964, ISSN 1063-6692, DOI 10.1109/TNET.2006.882843, October 2006.

[NorNet-Website]
Xiang, J., "NorNet -- A Programmable Testbed for Measurements and Experimental Networking Research", 2013.

[PAMS2013-NorNet]
Dreibholz, T. and E. Gran, "Design and Implementation of the NorNet Core Research Testbed for Multi-Homed Systems", Proceedings of the 3nd International Workshop on Protocols and Applications with Multi-Homing Support (PAMS) , March 2013.

Authors' Addresses

Thomas Dreibholz
Simula Research Laboratory, Network Systems Group
Martin Linges vei 17
1364 Fornebu, Akershus
Norway

Phone: +47-6782-8200
Fax: +47-6782-8201
Email: dreibh@simula.no
URI: http://www.iem.uni-due.de/~dreibh/

Martin Becke
University of Duisburg-Essen, Institute for Experimental Mathematics
Ellernstrasse 29
45326 Essen, Nordrhein-Westfalen
Germany

Phone: +49-201-183-7667
Fax: +49-201-183-7673
Email: martin.becke@uni-due.de

Hakim Adhari
University of Duisburg-Essen, Institute for Experimental Mathematics
Ellernstrasse 29
45326 Essen, Nordrhein-Westfalen
Germany

Phone: +49-201-183-7667
Fax: +49-201-183-7673
Email: hakim.adhari@iem.uni-due.de