Additional Policies for the Partial Delivery Extension of the Stream
Control Transmission Protocol
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Abstract

This document defines policies for the Partial Reliability Extension
of the Stream Control Transmission Protocol (PR-SCTP) allowing to
limit the number of retransmissions or to prioritize user messages
for more efficient send buffer usage.

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Table of Contents

1. Introduction .............................................. 2
   1.1. Overview ............................................. 2
2. Additional PR-SCTP Policies ................................. 3
   2.1. Limited Retransmissions Policy ......................... 3
   2.2. Priority Policy ..................................... 3
3. Socket API Considerations .................................. 3
   3.1. Support for Added PR-SCTP Policies .................... 3
   3.2. Socket Option for Getting the PR-SCTP Status
        (SCTP_GET_PR_STATUS) ................................. 4
4. IANA Considerations ...................................... 5
5. Security Considerations ................................... 5
6. Acknowledgments .......................................... 5
7. References ................................................. 5
   7.1. Normative References ................................ 5
   7.2. Informative References ............................... 5

Authors’ Addresses ........................................ 6

1. Introduction

1.1. Overview

The SCTP Partial Reliability Extension (PR-SCTP) defined in [RFC3758]
provides a generic method for senders to abandon user messages. The
decision to abandon a user message is sender side only and the exact
condition is called a PR-SCTP policy. [RFC3758] also defines one
particular PR-SCTP policy, called Timed Reliability. This allows the
sender to specify a timeout for a user message after which the SCTP
stack abandons the user message.

This document specifies two additional PR-SCTP policies:

Limited Retransmission Policy: Allows to limit the number of
retransmissions.

Priority Policy: Allows to discard lower priority messages if space
for higher priority messages is needed in the send buffer.

2. Additional PR-SCTP Policies
2.1. Limited Retransmissions Policy

Using the Limited Retransmission Policy allows the sender of a user message to specify an upper limit for the number retransmissions for each DATA chunk of the given user messages. The sender must abandon a user message if the number of retransmission of any of the DATA chunks of the user message would exceed the provided limit. Please note that the number of retransmissions includes the fast and the timer based retransmissions.

Limiting the number of retransmissions to 0 is allowed. This provides a service similar to UDP, which also doesn’t do any retransmissions.

The Limited Retransmissions Policy is used for data channels in the RTCWeb protocol stack. See [I-D.ietf-rtcweb-data-channel] for more information.

2.2. Priority Policy

Using the Priority Policy allows the sender of a user message to specify a priority. When storing a user message in the send buffer and there is not enough available space, the SCTP stack may abandon other user messages with a priority lower than the provided one.

This allows to transfer message with high priority without blocking the send() call, if it is acceptable to abandon lower priority messages.

The Priority Policy can be used in the IPFIX protocol stack. See [RFC5101] for more information.

3. Socket API Considerations

This section describes how the socket API defined in [RFC6458] is extended to support the newly defined PR-SCTP policies and to provide some statistical information.

Please note that this section is informational only.

3.1. Support for Added PR-SCTP Policies

As defined in [RFC6458], the PR-SCTP policy is specified and configured by using the following sctp_prinfo structure:

```c
struct sctp_prinfo {
    uint16_t pr_policy;
    uint32_t pr_value;
};
```
When the Limited Retransmission Policy described in Section 2.1 is used, pr_policy has the value SCTP_PR_SCTP_RTX and the number of retransmissions is given in pr_value.

For using the Priority Policy described in Section 2.2, pr_policy has the value SCTP_PR_SCTP_PRIO. The priority is given in pr_value. The value of zero is the highest priority and larger numbers in pr_value denote lower priorities.

The following table summarizes the possible parameter settings defined in [RFC6458] and this document:

<table>
<thead>
<tr>
<th>pr_policy</th>
<th>pr_value</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTP_PR_SCTP_NONE</td>
<td>Ignored</td>
<td>[RFC6458]</td>
</tr>
<tr>
<td>SCTP_PR_SCTP_TTL</td>
<td>Lifetime in ms</td>
<td>[RFC6458]</td>
</tr>
<tr>
<td>SCTP_PR_SCTP_RTX</td>
<td>Number of retransmissions</td>
<td>Section 2.1</td>
</tr>
<tr>
<td>SCTP_PR_SCTP_PRIO</td>
<td>Priority</td>
<td>Section 2.2</td>
</tr>
</tbody>
</table>

3.2. Socket Option for Getting the PR-SCTP Status (SCTP_GET_PR_STATUS)

This socket option uses IPPROTO_SCTP as its level, SCTP_GET_PR_STATUS as its name and can only be used with getsockopt(). The socket option value uses the following structure:

```c
struct sctp_prstatus {
    sctp_assoc_t sprstat_assoc_id;
    uint32_t sprstat_abandoned_unsent;
    uint32_t sprstat_abandoned_sent;
};
```

sprstat_assoc_id: This parameter is ignored for one-to-one style sockets. For one-to-many style sockets this parameter indicates for which association the user wants the information. It is an error to use SCTP_(CURRENT|ALL|FUTURE)_ASSOC in sprstat_assoc_id.

sprstat_abandoned_unsent: The number of user messages which are abandoned, but no part of it has been sent.

sprstat_abandoned_sent: The number of user messages which are abandoned, but at least part of it has been sent.
If more detailed information about abandoned user messages is required, the subscription to the SCTP_SEND_FAILED_EVENT is recommended.

Please note that sctp_opt_info() needs to be extended to support SCTP_GET_PR_STATUS.

4. IANA Considerations

This document requires no actions from IANA.

5. Security Considerations

This document does not add any additional security considerations in addition to the ones given in [RFC4960], [RFC3758], and [RFC6458].

6. Acknowledgments

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7. References

7.1. Normative References


7.2. Informative References


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