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Takeover Suggestion Flag for the ENRP Handle Update Message
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Abstract

This document describes the Takeover Suggestion Flag for the ENRP_HANDLE_UPDATE message of the ENRP protocol.

Status of This Memo

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

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This Internet-Draft will expire on 1 October 2025.

Table of Contents

1. Introduction

Reliable Server Pooling as described in [3] defines protocols for providing highly available services. The management component used for pool administration is denoted as ENRP Server or Pool Registrar (PR). Since a single ENRP server constitutes a single point of failure, there must be multiple ENRP servers. Servers, denoted as Pool Elements (PE), use an arbitrary ENRP server for registration into the pool. The chosen ENRP server becomes the Home ENRP Server, also denoted as Home PR (PR-H), of the PE. It is responsible for making the PE identity known to the other ENRP servers (by using ENRP_HANDLE_UPDATE messages) and also to monitor the PE health (by using keep-alive messages).

As shown in [11], the following scenario leads to unbalanced ENRP server workload: consider a set of multiple ENRP servers with one subset being unreliable (for example, their network connection has problems) and some reliable ENRP servers. After a while, the reliable ENRP server will get the home ENRP server role for almost all of the PEs, which results in high workload for this ENRP server. Since the home ENRP server role is more computation-intensive (as shown by [13]), this leads to highly unbalanced workload for large RSerPool setups. This unbalanced workload remains, even when the unreliable ENRP servers become reliable again (for example, when the network problems have been solved).

1.1. Scope

The Takeover Suggestion Flag defined in this draft defines a flag for the ENRP_HANDLE_UPDATE message. If the flag is set, the receiving ENRP server is suggested to take over the PE specified in the ENRP_HANDLE_UPDATE message.

1.2. Terminology

The terms are commonly identified in related work and can be found in the RSerPool Overview document RFC 5351 [3].

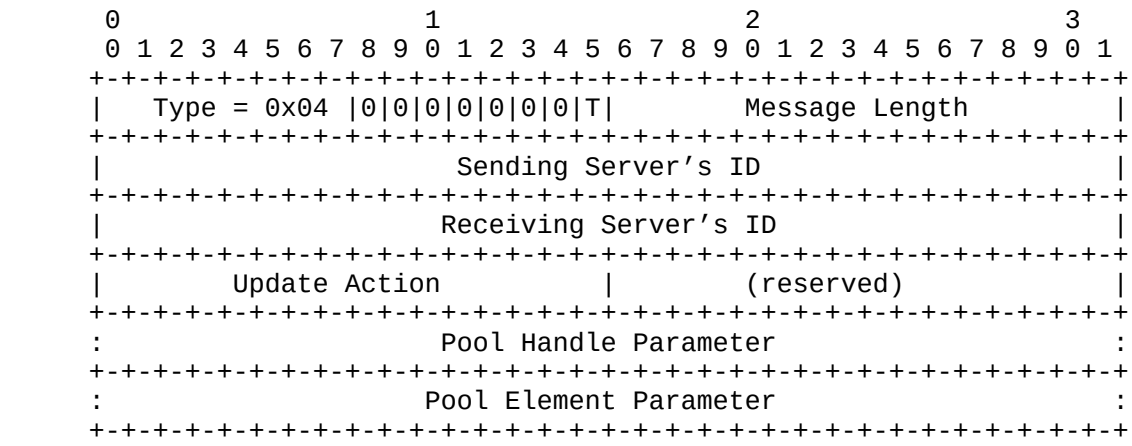
1.3. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [1] [2] when, and only when, they appear in all capitals, as shown here.

2. Takeover Suggestion Flag

2.1. Definition

In this subsection, only the differences to the ENRP_HANDLE_UPDATE message defined in [5] are explained. The following figure shows the ENRP_HANDLE_UPDATE message:



T flag: 1 bit (boolean)

If set, the receiving ENRP server is suggested to take over the PE specified by the Pool Handle and Pool Element Parameters. It is RECOMMENDED for the receiving ENRP server to perform this takeover if it has the resources to do so.

3. Reference Implementation

The RSerPool reference implementation RSPLIB can be found at [15]. It supports the functionalities defined by [3], [4], [5], [6] and [8] as well as the options [9], [10] and of course the option defined by this document. An introduction to this implementation is provided in [12].

4. 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 [14], some further information can be found on the project website [16].

5. Security Considerations

Security considerations for RSerPool systems are described by [7].

6. IANA Considerations

This document does not require additional IANA actions beyond those already identified in the ENRP and ASAP protocol specifications.

7. References

7.1. Normative References

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[4] Stewart, R., Xie, Q., Stillman, M., and M. Tuexen, "Aggregate Server Access Protocol (ASAP)", RFC 5352, DOI 10.17487/RFC5352, September 2008, <https://www.rfc-editor.org/info/rfc5352>.

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[9] Dreibholz, T., "Handle Resolution Option for ASAP", Work in Progress, Internet-Draft, draft-dreibholz-rserpool-asap-hropt-29, 6 September 2021, <https://www.ietf.org/archive/id/draft-dreibholz-rserpool-asap-hropt-29.txt>.

[10] Dreibholz, T. and X. Zhou, "Definition of a Delay Measurement Infrastructure and Delay-Sensitive Least-Used Policy for Reliable Server Pooling", Work in Progress, Internet-Draft, draft-dreibholz-rserpool-delay-28, 6 September 2021, <https://www.ietf.org/archive/id/draft-dreibholz-rserpool-delay-28.txt>.

7.2. Informative References

[11] Zhou, X., Dreibholz, T., Fa, F., Du, W., and E. P. Rathgeb, "Evaluation and Optimization of the Registrar Redundancy Handling in Reliable Server Pooling Systems", Proceedings of the IEEE 23rd International Conference on Advanced Information Networking and Applications (AINA) Pages 256-262, ISBN 978-0-7695-3638-5, DOI 10.1109/AINA.2009.25, 26 May 2009, <https://www.wiwi.uni-due.de/fileadmin/fileupload/I-TDR/ReliableServer/Publications/AINA2009.pdf>.

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[13] Dreibholz, T. and E. P. Rathgeb, "An Evaluation of the Pool Maintenance Overhead in Reliable Server Pooling Systems", SERSC International Journal on Hybrid Information Technology (IJHIT) Number 2, Volume 1, Pages 17-32, ISSN 1738-9968, April 2008, <https://www.wiwi.uni-due.de/fileadmin/fileupload/I-TDR/ReliableServer/Publications/IJHIT2008.pdf>.

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