Storage Maintenance (storm) Working Group   Michael Ko
Internet Draft   Huawei Symantec
Intended status: Proposed Standard   David L. Black
Expires: July 2012   EMC
                                                January 17, 2012

IANA Registries for the RDDP
(Remote Direct Data Placement) Protocols
draft-ietf-storm-rddp-registries-02.txt

Status of this Memo

Abstract

   The original RFCs that specified the RDDP protocol suite did not
   create IANA registries for RDDP error codes, operation codes and
   function codes. Extensions to the RDDP protocols now require
   these registries to be created. This memo creates the RDDP
   registries, populates them with values defined in the original
   RDDP RFCs, and provides guidance to IANA for future assignment
   of code points within these registries.

Table of Contents

1. Introduction

   The original RFCs that specified the RDDP protocol suite
   [RFC5040][RFC5041][RFC5043][RFC5044] did not create IANA registries.
   Extensions to the RDDP protocols [MPA-PEER][RDMAP-EXT] now requires
   creation and use of IANA registries. This memo creates the RDDP-
   related IANA registries, specifies their initial contents based on
   the values defined in the original RDDP RFCs, and provides guidance
   to IANA for future assignments from these registries. In addition,
   this memo allocates operation code and function code points for
   experimental use [RFC3692].

2. Security Considerations

   Since this document is only concerned with creation and IANA
   management of RDDP registries, it raises no new security issues.

   However, a few words are necessary about the use of the experimental
   code points defined in Sections 3.4 and 3.5. Potentially harmful
   side effects from the use of the experimental values need to be
   carefully evaluated before deploying any experiment across networks
   that the owner of the experiment does not entirely control. Guidance
   given in [RFC3692] about the use of experimental values needs to be
   followed.

3. IANA Considerations

   Allocation requests for the registries created by this memo may come
   with a suggested numerical value or values that should be assigned.
   Such suggestions are useful when early implementations have already
   chosen particular code points before the final RFC is published. If

the allocation request in general is accepted, such suggestions may
be honored if the suggested value is still free to be assigned.

This memo creates the following RDDP registries for IANA to manage:

   o RDMAP Errors (Section 3.1)
   o DDP Errors (Section 3.2)
   o MPA Errors (Section 3.3)
   o RDMAP Message Operation Codes (Section 3.4)
   o SCTP Function Codes for DDP Stream Session Control (Section 3.5)

Each of the following sections specifies a registry, its initial
contents and the allocation policy in more detail.

3.1 RDMAP Errors

Name of the registry: "RDMAP Errors"

Namespace details: An RDMAP (Remote Direct Memory Access Protocol)
error is a 16 bit field divided into three subfields [RFC5040]:
   o 4-bit Layer, always 0x0 for RDMAP errors
   o 4-bit Error Type
   o 8-bit Error Code
The Error Code field is optional for this registry, as Error Codes
are not used with all RDMAP Error Types. When no numerical Error
Code is registered, any 8-bit value may be used as the Error Code,
as the Layer and Error Type values are sufficient to specify the
error. For this reason, if an RDMAP Error Type is registered
without an Error Code, an entry must not be added to this registry
with an Error Code for the same Error Type.

Information that must be provided to assign a new value: An IESG-
approved standards-track specification defining the semantics and
interoperability requirements of the proposed new value and the
fields to be recorded in the registry.

Fields to record in the registry: Layer/Error-Type/Error-Code,
Error-Type-Name/Error-Code-Name, RFC Reference. The Error-Code
and Error-Code-Name are omitted for Error-Types that do not have
Error-Codes.

When a specific error code is not registered, the registry entry
contains the string "ALL" for the Error Code instead of a numerical
value, and the Error Code Name is omitted from the registry entry.

Initial registry contents:

0x0/0x0/ALL , Local Catastrophic Error, [RFC5040]

0x0/0x1/0x00, Remote Protection Error / Invalid Steering Tag,
[RFC5040]

0x0/0x1/0x01, Remote Protection Error / Base or bounds violation,
[RFC5040]

0x0/0x1/0x02, Remote Protection Error / Access rights violation,
[RFC5040]

0x0/0x1/0x03, Remote Protection Error / Steering Tag not associated
with RDMAP Stream, [RFC5040]

0x0/0x1/0x04, Remote Protection Error / Tagged Offset wrap,
[RFC5040]

0x0/0x1/0x09, Remote Protection Error / Steering Tag cannot be
invalidated, [RFC5040]

0x0/0x1/0xff, Remote Protection Error / Unspecified Error,
[RFC5040]

0x0/0x2/0x05, Remote Operation Error / Invalid RDMAP version,
[RFC5040]

0x0/0x2/0x06, Remote Operation Error / Unexpected OpCode,
[RFC5040]

0x0/0x2/0x07, Remote Operation Error / Catastrophic error,
localized to RDMAP Stream, [RFC5040]

0x0/0x2/0x08, Remote Operation Error / Catastrophic error, global,
[RFC5040]

0x0/0x2/0x09, Remote Operation Error / Steering Tag cannot be
Invalidated, [RFC5040]

0x0/0x2/0xff, Remote Operation Error / Unspecified Error, [RFC5040]

All combinations not listed above that combine 0x0 as the Layer with
an Error Type and Error Code are Unassigned and available to IANA
for assignment.

Allocation Policy: Standards Action ([RFC5226])

3.2 DDP Errors

Name of the registry: "DDP Errors"

Namespace details: A DDP (Direct Data Placement) error is a 16 bit
field divided into three subfields [RFC5041]:
   o 4-bit Layer, always 0x1 for DDP errors
   o 4-bit Error Type
   o 8-bit Error Code
The Error Code field is required for this registry, except for the
registry entry that reserves a set of errors for use by the Lower
Layer Protocol. When no numerical Error Code is registered, any
8-bit value may be used as the Error Code, as the Layer and Error
Type values are sufficient to specify the error. For this reason,
if a DDP Error Type is registered without an Error Code, an entry
must not be added to this registry with an Error Code for the same
Error Type.

Information that must be provided to assign a new value: An IESG-
approved standards-track specification defining the semantics and
interoperability requirements of the proposed new value and the
fields to be recorded in the registry.

Fields to record in the registry: Layer/Error-Type/Error-Code,
Error-Type-Name/Error-Code-Name, RFC Reference.

The last registry entry in the initial registry contents below
reserves a set of errors for use by the Lower Layer Protocol.
That entry uses "ALL" for the Error Code and omits the Error Code
Name. The use of "ALL" is unique to that entry; all other entries
in this registry are required to contain a numeric Error Code and
an Error Code Name.

Initial registry contents:

0x1/0x0/0x00, Local Catastrophic, [RFC5041]

0x1/0x1/0x00, Tagged Buffer Error / Invalid Steering Tag, [RFC5041]

0x1/0x1/0x01, Tagged Buffer Error / Base or bounds violation,
[RFC5041]

0x1/0x1/0x02, Tagged Buffer Error / Steering Tag not associated with
DDP Stream, [RFC5041]

0x1/0x1/0x03, Tagged Buffer Error / Tagged Offset wrap, [RFC5041]

0x1/0x1/0x04, Tagged Buffer Error / Invalid DDP version, [RFC5041]

0x1/0x2/0x01, Untagged Buffer Error / Invalid Queue Number, [RFC5041]

0x1/0x2/0x02, Untagged Buffer Error / Invalid Message Sequence Number - no buffer available, [RFC5041]

0x1/0x2/0x03, Untagged Buffer Error / Invalid Message Sequence Number - Message Sequence Number range is not valid, [RFC5041]

0x1/0x2/0x04, Untagged Buffer Error / Invalid Message Offset, [RFC5041]

0x1/0x2/0x05, Untagged Buffer Error / DDP Message too long for available buffer, [RFC5041]

0x1/0x2/0x06, Untagged Buffer Error / Invalid DDP version, [RFC5041]

0x1/0x3/ALL , Reserved for use by Lower Layer Protocol, [RFC5041]

All combinations not listed above that combine 0x1 as the Layer with an Error Type and Error Code are Unassigned and available to IANA for assignment.

Allocation Policy: Standards Action ([RFC5226])

[3.3](3.3) MPA Errors

Name of the registry: "MPA Errors"

Namespace details: An MPA (Marker PDU Aligned Framing for TCP) error
is a 16 bit field divided into three subfields [[RFC5044](RFC5044)]:
    o 4-bit Layer, always 0x2 for MPA errors
    o 4-bit Error Type
    o 8-bit Error Code
The Error Code field is required for this registry.

Information that must be provided to assign a new value: An IESG-
approved standards-track specification defining the semantics and
interoperability requirements of the proposed new value and the
fields to be recorded in the registry.

Fields to record in the registry: Layer/Error-Type/Error-Code,
Error-Type-Name/Error-Code-Name, RFC Reference.

The string "ALL" is not used for the Error Code in this registry;
every entry is required to contain a numeric Error Code and an
Error Code Name.

Initial registry contents:

0x2/0x0/0x01, MPA Error / TCP connection closed, terminated, or
lost, [[RFC5044](RFC5044)]

0x2/0x0/0x02, MPA Error / MPA CRC Error, [[RFC5044](RFC5044)]

0x2/0x0/0x03, MPA Error / MPA Marker and ULPDU Length field
mismatch, [[RFC5044](RFC5044)]

0x2/0x0/0x04, MPA Error / Invalid MPA Request Frame or MPA
Response Frame, [[RFC5044](RFC5044)]

All combinations not listed above that combine 0x2 as the Layer with
an Error Type and Error Code are Unassigned and available to IANA
for assignment.

Allocation Policy: Standards Action ([[RFC5226](RFC5226)])

3.4 RDMAP Message Operation Codes

Name of the registry: "RDMAP Message Operation Codes"

Namespace details: RDMAP Operation Codes are 4-bit values [RFC5040].

Information that must be provided to assign a new value: An IESG-approved standards-track specification defining the semantics and interoperability requirements of the proposed new value and the fields to be recorded in the registry.

Fields to record in the registry: RDMAP Message Operation Code, Message Type, RFC Reference

Initial registry contents:

0x0, RDMA Write, [RFC5040]

0x1, RDMA Read Request, [RFC5040]

0x2, RDMA Read Response, [RFC5040]

0x3, Send, [RFC5040]

0x4, Send with Invalidate, [RFC5040]

0x5, Send with Solicited Event, [RFC5040]

0x6, Send with Solicited Event and Invalidate, [RFC5040]

0x7, Terminate, [RFC5040]

0xF, Reserved (Experimental) [RFCXXXX]

RFC Editor: Please replace [RFCXXXX] in the above line with the RFC number assigned to this document.

All other values are Unassigned and available to IANA for assignment.

Allocation Policy: Standards Action ([RFC5226])

3.5 SCTP Function Codes for DDP Stream Session Control

Name of the registry: "SCTP Function Codes for DDP Session Control"

Namespace details: SCTP (Stream Control Transmission Protocol)
function codes for DDP session control are 16-bit values [RFC5043].

Information that must be provided to assign a new value: An IESG-
approved standards-track specification defining the semantics and
interoperability requirements of the proposed new value and the
fields to be recorded in the registry.

Fields to record in the registry: SCTP Function Code, SCTP
Function Name, RFC Reference

Initial registry contents:

0x0001, DDP Stream Session Initiate, [RFC5043]

0x0002, DDP Stream Session Accept, [RFC5043]

0x0003, DDP Stream Session Reject, [RFC5043]

0x0004, DDP Stream Session Terminate, [RFC5043]

0xFFFF, Reserved (Experimental) [RFCXXXX]

RFC Editor: Please replace [RFCXXXX] in the above line with the RFC
number assigned to this document.

All other values are Unassigned and available to IANA for assignment.

Allocation Policy: Standards Action ([RFC5226])

4. Normative References

   [RFC5040] R. Recio et al., "An RDMA Protocol Specification",
        RFC 5040, October 2007.

   [RFC5041] H. Shah et al., "Direct Data Placement over Reliable
        Transports", RFC 5041, October 2007.

   [RFC5043] C. Bestler et al., "Stream Control Transmission Protocol
        (SCTP) Direct Data Placement (DDP) Adaptation", RFC 5043,
        October 2007.

   [RFC5044] P. Culley et al., "Marker PDU Aligned Framing for TCP
        Specification", RFC 5044, October 2007.

   [RFC5226] T. Narten and H. Alvestrand, "Guidelines for Writing
        an IANA Considerations Section in RFCs", RFC 5226, BCP 26,
        May 2008.

5. Informative References

   [MPA-PEER] A. Kanevsky, et al., "Enhanced RDMA Connection
        Establishment", draft-ietf-storm-mpa-peer-connect-09, work
        in progress, December 2011.

   [RDMAP-EXT] H. Shah, et al., "RDMA Protocol Extensions",
        draft-ietf-storm-rdmap-ext-02, work in progress, January 2012.

   [RFC3692] Narten, T., "Assigning Experimental and Testing Numbers
        Considered Useful", BCP 82, RFC 3692, January 2004.

6. Acknowledgments

   IANA's review of a draft version of this document indicated
   the need for some corrections; the authors thank IANA for
   that review. The authors would also like to thank Pete Resnick
   and Jari Arkko for their helpful comments from IESG review.

Author's Address

    Michael Ko
    Huawei Symantec
    20245 Stevens Creek Blvd.
    Cupertino, CA 95014, USA
    Phone: +1-408-510-7465
    Email: michael@huaweisymantec.com

    David L. Black
    EMC Corporation
    176 South St.
    Hopkinton, MA 01748, USA
    Phone: +1-508-293-7953
    Email: david.black@emc.com