                PPP Magnalink Variable Resource Compression

Status of This Memo

Abstract

   The Point-to-Point Protocol (PPP) [1] provides a standard method of
   encapsulating multiple protocol datagrams over point-to-point links.
   The PPP Compression Control Protocol [2] provides a method for
   negotiating data compression over PPP links.

   The Magnalink Variable Resource Compression Algorithm (MVRCA) allows
   a wide range of interoperable compression implementations whose
   performance characteristics are a function of available CPU and
   memory resources.

Introduction

   The Magnalink variable resource compression algorithm defines a
   family of interoperable compression solutions with compression
   performance as a function of available CPU and memory resources.  It
   addresses the need for an algorithm which can be tailored to the
   system on which it is implemented without compromising
   interoperability.

Licensing

   Source licenses are available on a non-discriminatory basis.

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MVRCA Packets

   Before any MVRCA packets may be communicated, PPP must reach the
   Network-Layer Protocol phase[1], and the Compression Control Protocol
   must reach the Opened state.

   The text of a Packet to be compressed begins with PPP Protocol
   number.  The Packet header including the PPP Protocol number may have
   already been compressed when Protocol-Field-Compression has been
   negotiated.
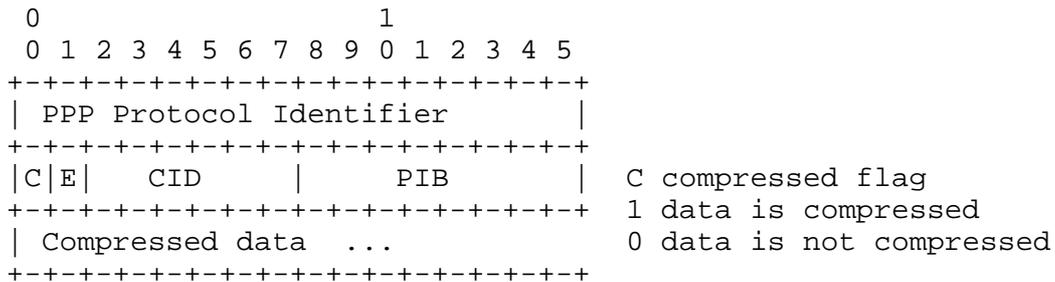
Reliability and Sequencing

   MVRCA packets may be sent across an unreliable link or may use a
   reliable link as described in "PPP Reliable Transmission"[3] if the
   reliable link has been negotiated. If frames are delivered out of
   order or a frame is dropped, the decompressor will detect this and
   requests a resynchronization using the Reset-Req and Reset-Ack types
   of the CCP[2], with the compressor for the affected context.

Data Expansion

   Although the compression algorithm may occasionally expand a data
   packet, there is no expansion in MVRCA since any expanded data is
   instead sent uncompressed. Dictionary synchronization is maintained
   across uncompressed packets.

Encapsulation

   The encapsulation consists of the PPP Protocol Identifier, a bit to
   indicate if the data is compressed, the Context Identifier(CID), a
   proprietary flag bit (E), a Packet Integrity Byte(PIB), and the
   Compressed data.

```
        0                   1
        0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       | PPP Protocol Identifier       |
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       |C|E|   CID     |     PIB       | C compressed flag
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+ 1 data is compressed
       | Compressed data  ...            0 data is not compressed
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Compressed/Uncompressed Flag (C)

   When attempting to compress certain types of Packets or Fragments the
   compressor may not be effective. When this occurs the uncompressed
   data is added to the compression History Buffer and sent across the
   link in frame with the Compressed/Uncompressed Flag(C) set to 0.

Context Identifier (CID)

   Since PPP will transport multiple protocol datagrams it may be
   advantageous to compress each protocol or each virtual circuit in a
   different History Buffer or Context. The CID allows the compressor to
   indicate to the decompressor which History Buffer the compressor
   decided to use for a given Packet. The basis of this decision is up
   to the implementor. The number of buffers and size of each buffer is
   negotiated.

   A CID of 0 indicates that the Packet by Packet context will be used
   if it has been negotiated. The Packet by Packet context is cleared
   between Packets so that this History Buffer is not maintained across
   Packet boundaries.
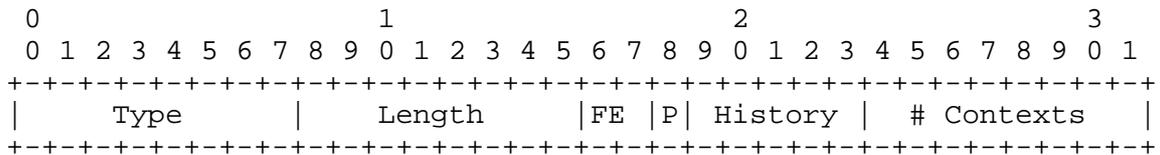
Packet Integrity Byte (PIB)

   To ensure that Packets are being compressed and decompressed
   correctly and to ensure History Buffer synchronization is maintained,
   a Packet Integrity Byte is added to the packet header.

   The packet integrity byte is defined in the full protocol
   specification.

Configuration Option Format

   Description

   The CCP MVRCA Configuration Option negotiates the use of MVRCA on the
   link. By default or ultimate disagreement, no compression is used.

```
    0                   1                   2                   3
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |     Type      |     Length    |FE |P| History |  # Contexts   |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Type

   24

Length

   4

FE  - Features

Negotiates features specific to this compression algorithm.

History

Defines the size of the compression history buffer.  Valid values are
defined in the full protocol specification.

# Contexts

This is the number of contexts. Each context implies the  creation of
a History Buffer for that context of the size  indicated in the
Context History field. Values are  1-63.  This value includes both
the Packet by Packet context and the number of contexts for which
history is maintained.  Therefore, when this value is 1 and the P
(Packet by Packet) flag is also 1, then only in packet compression is
supported and history context is not retained across packet
boundaries.  The Context Identifier (CID) starts with 1 for contexts
where the history is maintained.

P - Packet by Packet flag

When 1, packet by packet compression is enabled for the context whose
context ID is 0.  When P is 0, packet by packet compression is not
supported.

Security Considerations

   Security issues are not discussed in this memo.

References

   [1] Simpson, W., Editor, "The Point-to-Point Protocol (PPP)", STD 51,
       RFC 1661, July 1994.

   [2] Rand, D., "The PPP Compression Control Protocol (CCP)", RFC 1962,
       June 1996.

   [3] Rand, D., "PPP Reliable Transmission", RFC 1663, July 1994.

Acknowledgments

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