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PPP Magnalink Variable Resource Compression

Status of This Memo

This memo provides information for the Internet community. This memo does not specify an Internet standard of any kind. Distribution of this memo is unlimited.

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.

The contact person for evaluation under NDA and Licensing is:

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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
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+		
Compressed data ...		
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+		

C compressed flag
1 data is compressed
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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