Network Working Group
Request for Comments: 1993
Category: Informational

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August 1996

# PPP Gandalf FZA Compression Protocol

## Status of this Memo



## Abstract

The Point-to-Point Protocol (PPP) [1] provides a standard method for transporting multi-protocol datagrams over point-to-point links.

The PPP Compression Control Protocol [2] provides a method to negotiate and utilize compression protocols over PPP encapsulated links.

This document describes the use of the Gandalf FZA data compression algorithm [3] for compressing PPP encapsulated packets.

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## 1. Introduction

FZA is a high performance LZ [4] derivative that maximizes compression at the expense of memory and CPU. Compression performance can be adjusted based on CPU and memory available.

Multiple PPP packets can be combined in a single compressed frame, or a single PPP packet can be spread across multiple frames.

### 1.1. Licensing

Source and object licenses are available on a non-discriminatory basis for either a royalty or fixed price arrangement. Patent indemnity is included with the license.

## 2. FZA Packets

Before any FZA packets may be communicated, PPP must reach the Network-Layer Protocol phase.

When the Compression Control Protocol (CCP) has reached the Opened state, and FZA is negotiated as the primary compression algorithm, the PPP Protocol field indicates type hex 00FB (link compressed datagram), or type hex 00FD (compressed datagram).

The maximum length of the FZA datagram transmitted over a PPP link is the same as the maximum length of the Information field of a PPP encapsulated packet.

### Padding

The FZA packets require the negotiation of the Self-Describing-Padding Configuration Option [5] at LCP Link Establishment.

### Reliability and Sequencing

The FZA algorithm expects a reliable link, as described in "PPP Reliable Transmission" [6].

FZA expects the packets to be delivered in sequence.

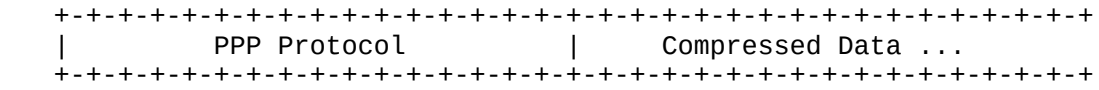
### Data Expansion

The maximum expansion of Gandalf FZA is 2:1. However, typical expansion on pre-compressed data is 1.01:1. Expanded data is sent to maintain the integrity of the compression history.

When the expansion exceeds the size of the peer’s Maximum Receive Unit for the link, the expanded packet is sent in multiple PPP frames. The compressed data contains an indication of the end of the original packet.

## 2.1. Packet Format

A summary of the Gandalf FZA packet format is shown below. The fields are transmitted from left to right.




PPP Protocol

One or two octets. The PPP Protocol field is described in the Point-to-Point Protocol Encapsulation [1].

Type 00FD is used when the PPP multilink protocol is not used, and/or "inside" a multilink bundle. Type 00FB is used "outside" multilink, to compress independently on individual links of a multilink bundle. This value MAY be compressed when LCP Protocol-Field-Compression is negotiated.

Compressed Data

One or more octets. The compressed PPP encapsulated packet(s).

Prior to compression, the uncompressed data begins with the original PPP Protocol number. This value MAY be compressed when LCP Protocol-Field-Compression is negotiated.

The original Protocol number is followed by the original Information field. The length of the original Information field before compression MUST NOT exceed the link Maximum Receive Unit (MRU).

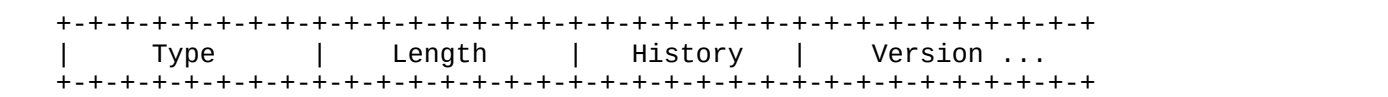
PPP Link Control Protocol packets MUST NOT be sent within compressed data.

## 3. Configuration Option Format

Description

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

A summary of the Gandalf-FZA Configuration Option format is shown below. The fields are transmitted from left to right.




Type

19

Length

>= 3

History

One octet. The History field specifies the maximum size of the compression history in powers of 2. Valid values range from 12 to 15.

The peer is not required to send as many histories as the implementation indicates that it can accept.

Version

Zero or more octets of additional configuration information. Any implementation that does not implement this information MUST send a Configure-Nak without this field.

The Version field is not present for FZA.

The Version field is a single octet containing the value 1 for FZA+.

## Security Considerations

Security issues are not discussed in this memo.

Acknowledgements

FZA was developed by David Carr while at Gandalf Data Limited.

FZA+ was an improvement by Abbie Barbir.

Editting and formatting by William Simpson.

References

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

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

[3] Barbir, A., "A New Fast Approximate Arithmetic Coder", Proceedings of IEEE 28th SouthEastern Symposium on Systems Theory (SSST), Baton Rouge, Louisiana, pages 482-486, April 1996.

[4] Lempel, A. and Ziv, J., "A Universal Algorithm for Sequential Data Compression", IEEE Transactions On Information Theory, Vol. IT-23, No. 3, May 1977.

[5] Simpson, W., Editor, "PPP LCP Extensions", RFC 1570, DayDreamer, January 1994.

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

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