Network Working Group
INTERNET DRAFT

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Frame Relay Service Type for L2TP
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2. Abstract

The Layer Two Tunneling Protocol (L2TP) [1] provides a standard method for tunneling PPP [2] packets. In accordance with the L2TP Service Type specification [3], this document provides a solution for transporting Frame Relay (FR) [4] over a session in an L2TP tunnel.

3. Specification of Requirements

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [5].

4. Introduction

The Layer Two Tunneling Protocol (L2TP) [1] provides a standard method for tunneling PPP [2] packets. The L2TP Service Type [3]

allows layer 1 and layer 2 traffic to be tunneled through an L2TP tunnel.

This document presents a solution to carry the ever popular Frame Relay circuit traffic over the IP network through the features offered by L2TP and the Service Type attribute.

It talks about the use of [3] for setting up an L2TP tunnel and session containing FR traffic, and the signaling of some of the Frame Relay parameters.

5. FR Service Type

A FR Service Type value of [TBD] MUST be used. The encoding of the Service Type AVP remains as specified in [3].

6. Tunnel Establishment

The basic tunnel establishment procedures defined in [1] and [3] are unchanged. The FR Service Type value [TBD] MUST be included in the Service Capabilities List AVP.

7. Session Establishment

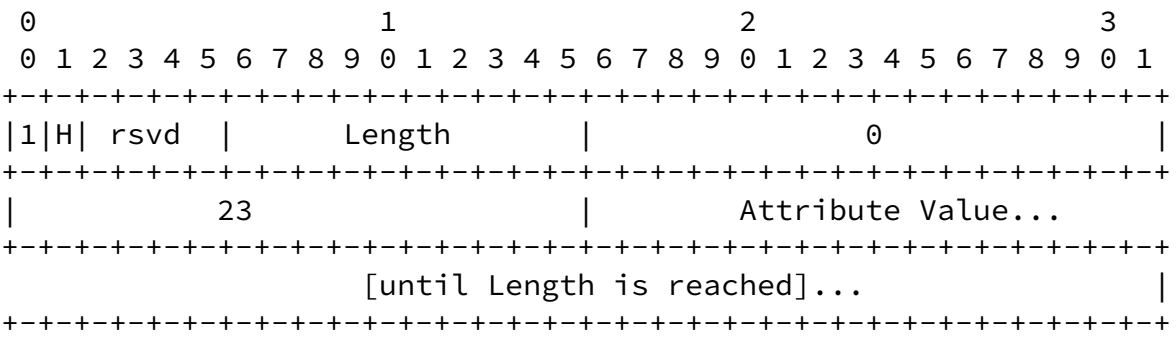
The basic call establishment procedures defined in [1] and [3] remain unchanged. The FR Service Type value [TBD] MUST be used in the Service Type AVP of an ICRQ or OCRQ.

7.1. Use of the Sub-Address AVP

As specified in [1], the Sub-Address AVP, Attribute Type 23, is included in ICRQ or OCRQ and is used to encode additional dialing information. For the purpose of this specification, the Sub-Address AVP will be used to encode the source and destination DLCI numbers, and interface information.

Additional non-addressing information is discussed in the following sections.

The Sub-Address AVP is encoded as follows:



The attribute value may be a simple ASCII string. For example, a source interface serial 1/1 and DLCI 100, and a destination interface serial 1/1 with DLCI 200 could be represented as "serial 1/1 DLCI 100, serial 1/1 DLCI 200". The format of the information contained

in this AVP should be agreed on by the administrators at the two L2TP peers.

When employing the Sub-Address AVP for this purpose, the AVP is mandatory (the M-bit MUST be set to 1). The AVP MAY be hidden (the H-bit set to 0 or 1).

7.2. FR Payload Message Format

The L2TP payload header format defined in [1] remains unchanged while carrying data for a Frame Relay circuit. Entire Frame Relay PDU will be carried, subject to the following requirements:

When transporting FR frames over an L2TP session the following rules MUST be followed:

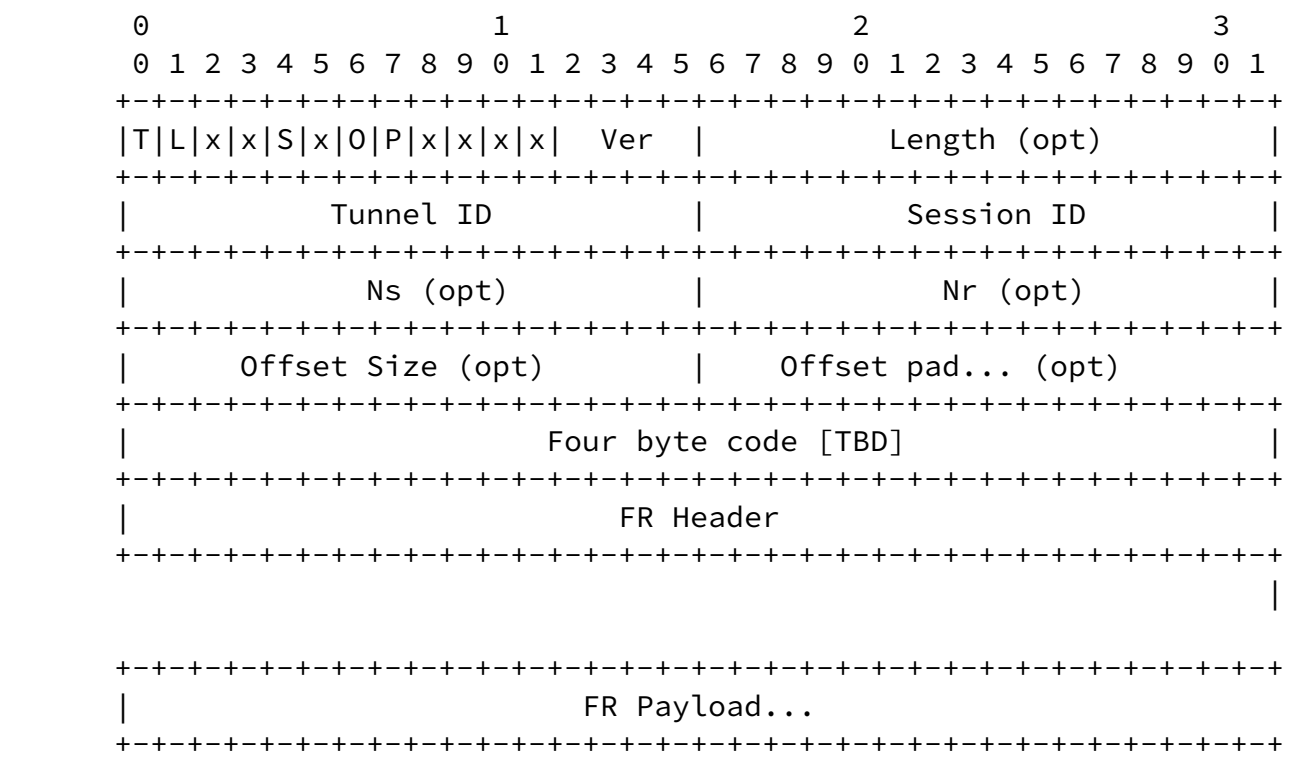
- All the Frame Relay packets will be preceded by a four byte code [TBD] in the L2TP payload packet. This code will allow L2TP to de-multiplex if additional functionality has to be added in future for signaling (please see the signaling and LMI sections).

- The beginning and ending FR 'Flag' fields (one octet each) MUST be removed from the FR frame before it is encapsulated as L2TP

payload. The destination LAC/LNS MUST insert new flags when reconstructing the FR frame for transmission to the FRAD.

o The FCS field MUST be removed from the FR frame before it is carried in L2TP It MUST be recalculated at the other end. This does create a potential problem since L2TP does not offer checksum, and UDP checksum is optional. Work is needed in this area to guarantee integrity of the packet on the remote side.

The encapsulated Frame Relay packet looks like this:



As is true for the PPP traffic carried by L2TP, the frame size should consider the MTU and the additional headers to avoid IP fragmentation.

7.3. FR Local Management Interface (LMI)

This draft does not discuss the LMI implications. Future work is necessary in this area.

8. Effects on Standard AVPs

If FR frames are being tunneled in accordance with this document, then the following Call Management AVPs MAY be ignored:

Bearer Type
Framing Type
Called Number
Calling Number
Initial Received LCP CONFREQ
Last Sent LCP CONFREQ
Last Received LCP CONFREQ
Proxy Authen Type
Proxy Authen Name
Proxy Authen Challenge
Proxy Authen ID
Proxy Authen Response
ACCM

9. Future work

This section provides a list of things we need work on:

- Signaling: The interface and DLCI information is conveyed through L2TP control packets. However, the frame parameters such as CIR, Be, and Bc related information is not covered.
- LMI through the network
- Data integrity (as mentioned in FR Payload Message Format section, currently there is no way to verify the data integrity due to lack of FR FCS, L2TP checksum, and optional UDP checksum.

10. Security Considerations

All the underlying L2TP Security considerations remain, though no 'new' ones are introduced?

11. IANA Considerations

To be completed.

12. Acknowledgments

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13. References

[1] Townsley, et. al., "Layer Two Tunneling Protocol L2TP", RFC 2661, February 1999.

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

[3] McPherson D., Nanji S., "L2TP Service Type", "Work in Progress", August 2000.

[4] Frame Relay, ANSI T1.618

[5] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119, March 1997.

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