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Lizhong Jin (ed.), ZTE
Raymond Key (ed.), Telstra
Simon Delord, Alcatel-Lucent
Thomas Nadeau, Huawei
Vishwas Manral, IPInfusion
Sami Boutros, Cisco
Reshad Rahman, Cisco

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Pseudowire Control Word Negotiation Mechanism Update
draft-jin-pwe3-cbit-negotiation-04

Abstract

This document describes the problem of control word negotiation mechanism specified in [[RFC4447](#)]. Based on the problem analysis, a message exchanging mechanism is introduced to solve this control word negotiation issue. This document is to update [[RFC4447](#)] control word negotiation mechanism.

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Conventions used in this document

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 [[RFC2119](#)].

1. Introduction

This document describes the problem of control word negotiation mechanism specified in [\[RFC4447\]](#). Based on the problem analysis, a message exchanging mechanism is introduced to solve this negotiation issue. The control word negotiation mechanism in this document is to update [\[RFC4447\] section 6.2](#) "PW Types for Which the Control Word is NOT Mandatory".

2. Problem Statement

[\[RFC4447\] section 6](#) describes the control word negotiation mechanism. Each PW endpoint has the capability of being configurable with a parameter that specifies whether the use of the control word is PREFERRED or NOT PREFERRED. While in some case of control word negotiation, PE will advertise C-bit=0 in label mapping message with its locally configured control word PREFERRED. This kind of behavior will cause some problem when peer PE changes its control word from NOT PREFERRED to PREFERRED.

This following case will describe the negotiation problem in detail:

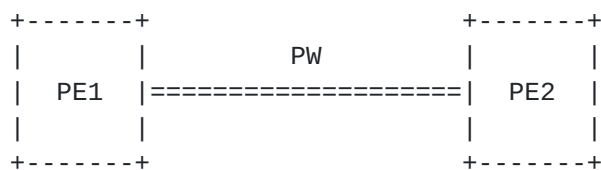


Figure 1

1. Initially, the control word on PE1 is configured to PREFERRED, and on PE2 to NOT PREFERRED.
2. The negotiation result for the control word for this PW is "not supported", and PE1 send label mapping with C-bit=0 finally.
3. PE2 then changes its control word configuration to PREFERRED.
4. PE2 will then send label withdraw message to PE1.
5. According to the control word negotiation mechanism, the received label mapping on PE2 from PE1 indicates C-bit=0, therefore PE2 will still send label mapping with C-bit=0.

The negotiation result for the PW control word is still "not supported", even though the control word configuration on both PE1 and PE2 is set to PREFERRED.

3. Control word re-negotiation by label request message

In order to solve this problem, the control word re-negotiation is operated by adding label request message. The control word negotiation mechanism can still follow the procedure described in [\[RFC4447\] section 6](#).

When Local PE changes its control word from NOT PREFERRED to PREFERRED and only if it already received the remote label mapping message with C-bit=0, additional procedure will be added as follow:

- i. Local PE MUST send a label withdraw message to remote PE if it has previously sent a label mapping, and wait until receiving a label release from the remote PE.
- ii. Local PE MUST send a label request message to remote PE, and wait until receiving a label mapping message containing the remote PE configured control word setting.
- iii. After receiving remote PE label mapping with control word setting, Local PE MUST follow procedures defined in [\[RFC4447\] section 6](#) when sending its label mapping message.

When the peer PE successfully processed the label withdraw and removed the remote label binding, it MUST send label mapping as a response of label request with locally configured control word parameter.

Note: the FEC element in label request message should be the PE's local FEC element. Only if FEC element in label request message could bind together with peer PE's local FEC element, the peer PE sends label mapping with its bound local FEC element and label as a response. The label request message format and procedure is described in [\[RFC5036\]](#).

The multi-segment PW case for T-PE is same, and the request message MUST be processed in ordered mode. When S-PE receives a label request message from a remote peer, it MUST advertise the request message to the other remote PE. This is necessary since S-PE does not have full information of interface parameter field in the FEC advertisement.

As local T-PE will send label withdraw before sending label request to remote peer, the S-PE MUST send the label withdraw upstream before it advertises the label request. When S-PE receives the label withdraw, it should process this message to send a label release as a response and a label withdraw to upstream S-PE/T-PE, then process the next LDP message, e.g. the label request message.

When Local PE changes its control word from PREFERRED to NOT PREFERRED, Local PE would be able to re-negotiate the Control Word to be NOT PREFERRED following the procedures defined in [[RFC4447](#)], and no label request message to peer PE will be needed. In that case, Local PE will always send new label mapping with C-bit reflecting the local Control Word configuration.

The procedure of PE1 and PE2 for the case in figure 1 should be as follows:

1. PE2 changes locally configured control word to PREFERRED.
2. PE2 will then send label withdraw message to PE1.
3. PE1 will send label release in reply to label withdraw message from PE2.
4. Upon receipt of Label release message from PE1, PE2 MUST send label request messages to PE1 although it already received the label mapping with C-bit=0.
5. PE1 MUST send label mapping message with C-bit=1 again to PE2 (Note: PE1 MUST send label mapping with locally configured CW parameter).
6. PE2 receives the label mapping from PE1 and updates the remote label binding information. PE2 MUST wait for PE1 label binding before sending its label binding with C-bit set, only if it previously had a label binding with C-bit=0 from PE1.
7. PE2 will send label mapping to PE1 with C-bit=1.

It is to be noted that the above assume that PE1 is configured to support CW, however in step 5 if PE1 doesn't support CW, PE1 would send the label mapping message with C-bit=0, this would result in PE2 in step 7 sending a label mapping with C-bit=0 as per [[RFC4447](#)] CW negotiation procedure.

By sending label request message, PE2 will get the configured CW parameter of peer PE1 in the received label mapping message. By using the new CW parameter from label mapping message received from peer PE1 and locally configured CW, PE2 should determine the PW CW parameter according to [[RFC4447](#)] [section 6](#).

The diagram in [Appendix A](#) in this document updates the control word negotiation diagram in [[RFC4447](#)] [Appendix A](#).

[4. Backward Compatibility](#)

Since control word re-negotiation is operated by adding label request message, and still follows the procedure described in [\[RFC4447\]](#) [section 6](#), it is fully compatible with existing implementations. The remote PE (PE1 in figure 1) which already implement label request message could be compatible with the PE (PE2 in figure 1) following the mechanism of this document.

[5. Security Considerations](#)

This document does not introduce any additional security constraints.

[6. IANA Considerations](#)

This document does not require IANA assignment.

[7. Acknowledgements](#)

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Authors' Addresses

Lizhong Jin (editor)
ZTE Corporation
889, Bibo Road
Shanghai, 201203, China
Email: lizhong.jin@zte.com.cn

Raymond Key (editor)
Telstra
242 Exhibition Street, Melbourne
VIC 3000, Australia
Email: raymond.key@ieee.org

Simon Delord
Alcatel-Lucent
Email: simon.delord@gmail.com

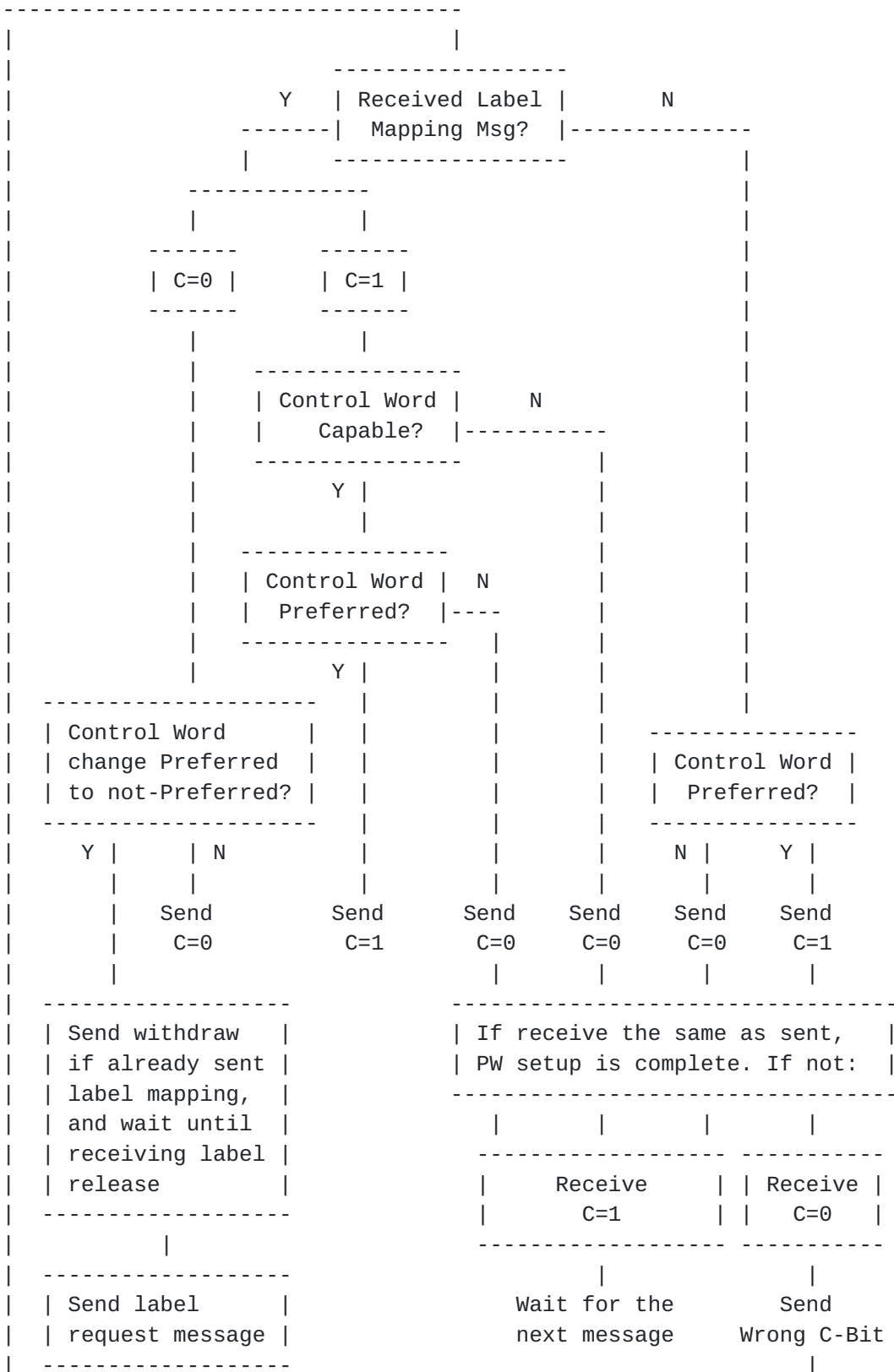
Thomas Nadeau
Huawei
Email: tnadeau@lucidvision.com

Vishwas Manral
IPInfusion
Email: vishwas@ipinfusion.com

Sami Boutros
Cisco Systems, Inc.
3750 Cisco Way
San Jose, California 95134
USA
Email: sboutros@cisco.com

Reshad Rahman
Cisco Systems, Inc.
2000 Innovation Drive
Ottawa, Ontario K2K 3E8
CANADA
Email: rrahman@cisco.com

Appendix A. Updated C-bit Handling Procedures Diagram



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Send Label
Mapping Message

Jin, et al.

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