Pseudowire Control Word Negotiation Mechanism Analysis and Update
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Abstract

This draft describes the problem of control word negotiation mechanism specified in [RFC4447]. Based on the problem analysis, possible solutions and their potential shortcomings are also discussed.

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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 draft describes the problem of control word negotiation mechanism specified in [RFC4447].

Based on the problem analysis, possible solutions and their potential shortcomings are also discussed.

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.

This negotiation mechanism will not work properly in the following case:

```
+-------+  |       | PW |       |  +-------+
|       |  | PE1   |==| PE2   |  |
+-------+  |       |   |       |  +-------+
```

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 CW=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 CW=0, therefore PE2 will still send label mapping with CW=0.

6. 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. Possible Solutions

The solution for this problem should be applicable to both SS-PW and MS-PW.

In this draft, possible solutions are discussed.
3.1. Option 1: Change PW LDP Dynamic Negotiation Process

The first solution is only applicable for SS-PW.

PE1 should have the capability to identify that local configuration CW capability and advertised CW capability are different.

The control word negotiation mechanism can still follow the procedure described in [RFC4447] section 6.

The behaviour of PE1 and PE2 should be as follows:

1. PE2 changes its control word configuration to PREFERRED.

2. PE2 will then send label withdraw message to PE1.

3. When PE1 receives this label withdraw message, it should check that the local configuration CW capability and the advertised CW capability are different. PE1 will then send a label withdraw message to PE2.

4. PE1 then sends a new label mapping message with CW=1 to PE2. And then PE1 send label release to PE2 as a response to label withdraw in step 2).

5. PE2 sends a label release as a response to label withdraw sent by PE1 (step 3).

6. By receiving label release from PE1, PE2 will send new label mapping with CW=1 to PE1 to setup the PW.

By changing the message sequence of label release and label mapping message on PE1, PE2 will be blocked to send out new label mapping until receiving label release message from PE1.

The above mechanism cannot be applied to MS-PW, because the label release message in MS-PW cannot be used as in SS-PW to block PE2 to send new label mapping message.

3.2. Option 2: Make CW Non-Configurable

The second solution is to change the control word to be not configurable, and default value is PREFERRED which can be degraded to NOT PREFERRED by negotiation automatically. The negotiation mechanism can still follow the procedure described in [RFC4447] section 6.

There is explicit requirement from some service providers to allow control word to be configurable. This option will not fulfill their need.
3.3. Option 3: Manual Configuration Process for CW

The third solution is to abandon the control word negotiation mechanism described in [RFC4447], and use a new simple mechanism.

The control word configured on both PW end-points MUST be the same, otherwise the PW will not be in operation UP.

It is important to note that this control word negotiation mechanism is not interoperable with the old mechanism defined in [RFC4447].

3.4. Option 4: Make CW Capability Mandatory

This option is to make CW capability mandatory. The PW will only be in operation UP when both PW end-points support control word capability.

We should consider some side effect while making CW capability mandatory, which will be analyzed in future.

3.5. Extra Considerations

The possible CW negotiation for multi-segment PW as well as potential complications with FEC129 will be covered in later version of this document.

Backward compatibility issues will be further discussed in later version of this document.

4. Security Considerations

This will be added in later version of this document.

5. IANA Considerations

This will be added in later version of this document.

6. Acknowledgements

This will be added in later version of this document.

7. References

7.1. Normative References

[RFC2119] Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, BCP 14, RFC 2119, March 1997

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