MPLS Working Group
Internet-Draft
Intended status: Informational
Expires: October 28, 2012

G. Liu
ZTE Corporation
Y. Weingarten

April 26, 2012

MPLS-TP protection for interconnected rings
draft-liu-mpls-tp-interconnected-ring-protection-01

Abstract

According to the ring protection Requirements in RFC 5654, Requirement 93 : When a network is constructed from interconnected rings, MPLS-TP MUST support recovery mechanisms that protect user data that traverses more than one ring. This includes the possibility of failure of the ring-interconnect nodes and links,so this document will describle all kinds of interconnected ring Scenarios and several protection solutions for recovery the failure of the ring-interconnect nodes and Links. .

This document is a product of a joint Internet Task Force(IETF) / International Telecommunications Union Telecommunications Standardization Sector (ITU-T) effort to include an MPLS Transport Profile within the IETF MPLS and PWE3 architectures to support the capabilities and functionalities of a packet transport network as defined by the ITU-T.

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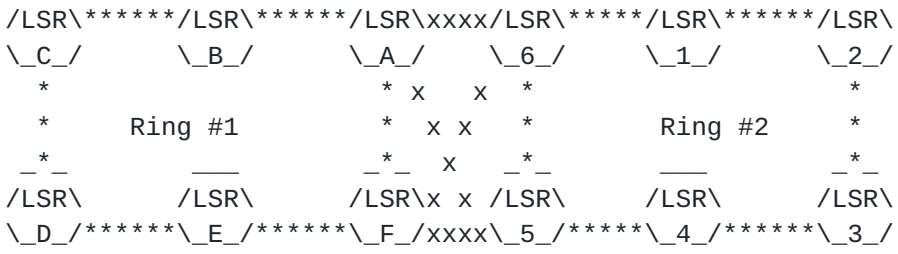
1. Introduction

This document describles different interconnected ring scenarios and several protection solutions to protect against the failure of the ring-interconnect nodes and links. there are mainly three common interconnection scenarios that we will address in this document:

Dual-node interconnection - when the interconnected rings are interconnected by two nodes from each ring (see Figure 1);

Single-node interconnection - when the connection between the interconnected rings are through a single node (see Figure 2).As the interconnnection node(LSR-A) is a single-point of failure, such the interconnection scenario should be avoided in real network;

Chain of rings - when a series of rings are connected through interconnection nodes that are part of both interconnected rings (see Figure 3)



*** physical link
xxx interconnection link

Figure 1

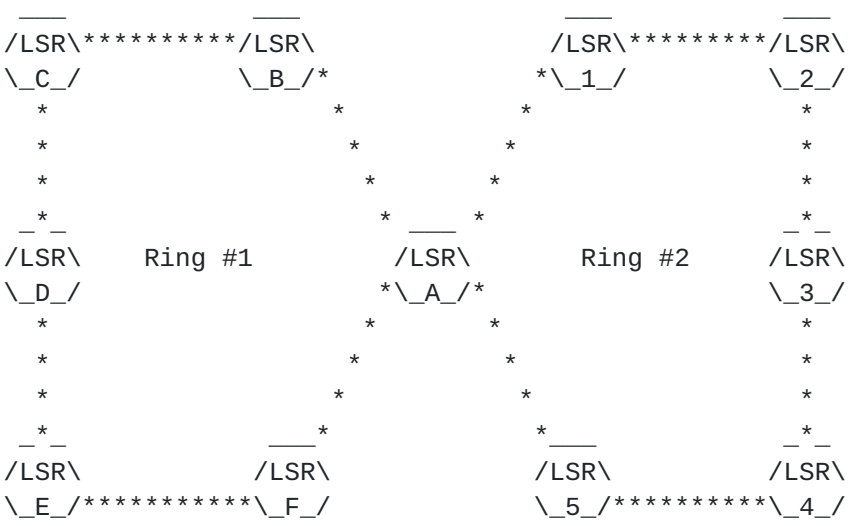

Ring #1
Ring #2
*** physical link

Figure 2

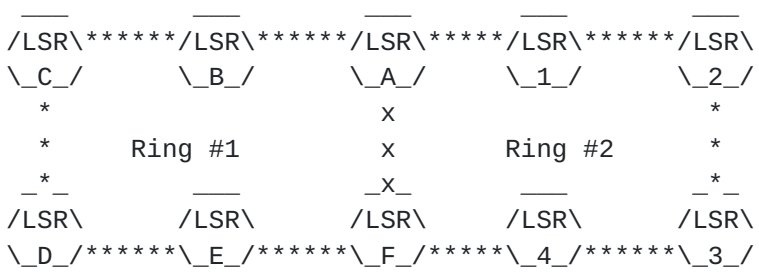

Ring #1
Ring #2
*** physical link
xxx shared link

Figure 3

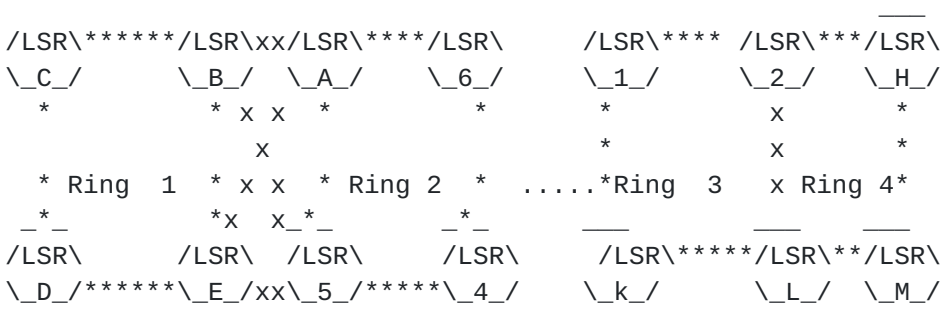
Regarding traffic that traveres more than two rings.the different interconnection scenarios could be mixed.

Dual-node and single-node mixed interconnection-when there not only exist two interconnected rings are interconnected by two nodes from each ring. but also there exist two interconnected rings are interconnected by single node(see figure 5);

Dual-node and chained mixed interconnection-when there exist two interconnnected rings are interconnected by two nodes from each ring. in addtion, there still exist two interconnnected rings are interconnected by a common chained link(see figure 4);

single-node and chained mixed interconnection-when there exist two interconnected rings are interconnected by single node, in addtion, there still exist two interconnected rings are interconnected by a common chained link(see figure 6);

Dual-node, single-node and chained mixed interconnection-when there exist all three interconnection scenrios in the network domain including Dual-node interconnnection, single-node interconnection and chained interconnnection(see figure 7);



*** physical link
xxx interconnection link

Figure 4

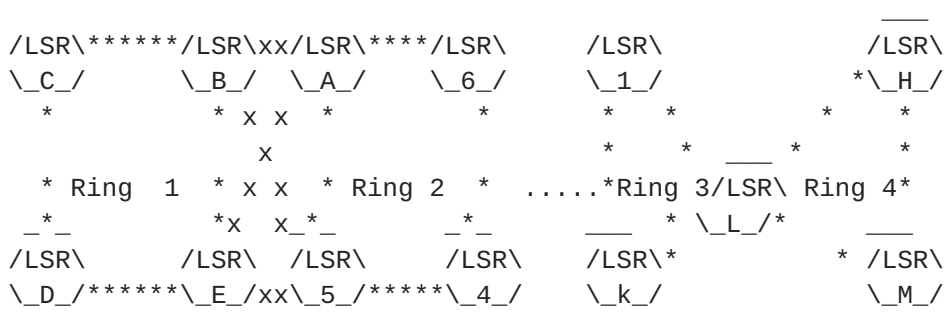


Figure 5

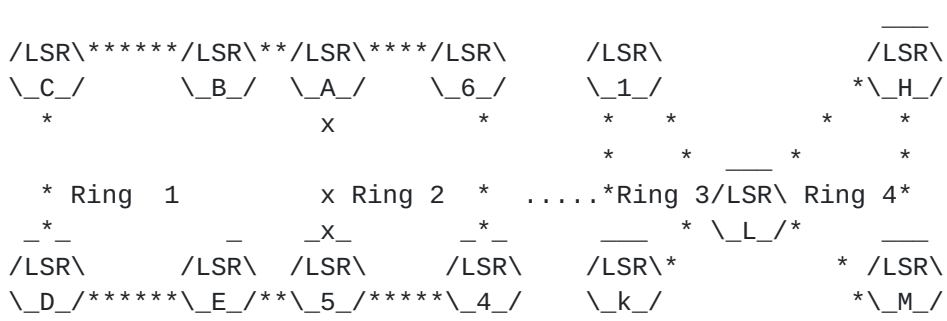


Figure 6

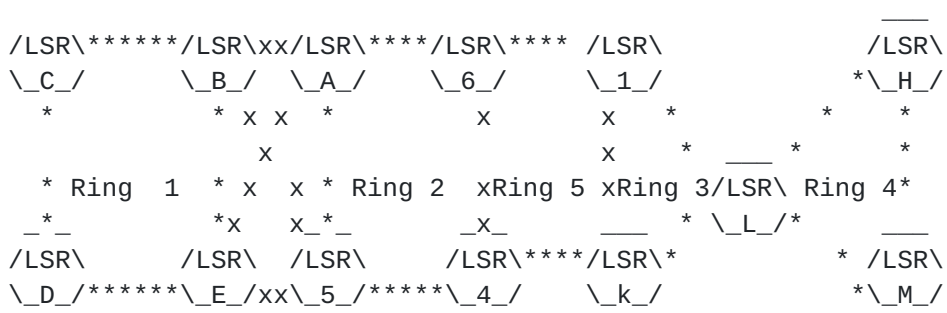


Figure 7

For a multi-ring service, it will be accross more than one ring just like above seven scenrios. if a failur happens on a multi-ring path, quickly recovery is necessary requirement for MPLS-TP network, so there are describles for recoverying the failure in the multi-ring interconnection sencrios in the following sections .

2. 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 RFC-2119.

OAM: Operations, Administration, Maintenance

LSP: Label Switched Path.

TLV: Type Length Value

P2MP:Point to Multi-Point

P2P:Point to Point

PSC:Protection Switching Coordination

SD:Signal Degrade

SF:Signal Fail

RDI:Remote Defect Indication

SPME:Sub-Path Maintenance Entity

MPLS-TP:Multi-Protocol Label Switching Transport Profile

ME: Maintenance Entity

MEP:MEG End Point

ACH: Associated Channel Header

CC-V: Contunuity Check-Verification;

3. recovery mechanisms

This following sections propose different mechanisms that may be used to protect traffic that traverses multiple rings in the different interconnection scenarios.

3.1. recovery mechanism for Dual-node interconnected-ring

Under the interconnected-ring scenrio just as figure 1,multi-ring traffic will be transported by interconnection link(LSR C-LSR 6).protecting against a failure on the interconnection link could be based on 1:1 linear protection of the segment from LSR-A to LSR-6 by using the protection path LSR-A to LSR-F to LSR-6. Alternatively, an end-to-end protection path(LSR-C to LSR-2 through D-E-F-5-4-3) could be used to protect all traffic. For the two alternatives, they both have different advantage and disadvantage. 1:1 linear segment protection may be faster than end-to-end protection. but when the interconnection node(LSR-A or LSR-6) has a failure, it maybe need another protection solution to recovery it. but end-to-end protection may protect one or multiple failures on multi-ring working path.in specially, it may protect the failure of interconnection node. .

3.2. recovery mechanism for Chained interconnected-ring

For the chained interconnected-ring scenrio, if the interconnection nodes(LSR-A and LSR-F) or the shared link(LSR-A-LSR-F) have failures, protecting each single ring will fail to provide recovery of the failure, so the affected multi-ring traffic should be protected by an end-to-end protection path. .

3.3. recovery mechanism for Dual-node and Single-node mixed interconnected-ring

For the mixed interconnected-ring scenrio, As the single-node interconnection scenario should be avoided. if we only consider segment protection between two rings, the solution is the same as dual-node interconnected-ring. .

3.4. recovery mechanism for Dual-node and Chained mixed interconnected-ring

. for the mixed interconnected-ring scenrio, each interconnection nodes or shared interconnection link will be protected by setting up segment protection path seperately. in addition, it may still use end to end multi-ring protection path to protect multiple interconnection nodes or shared interconnection link failure.

3.5. recovery mechanism for Single-node and Chained mixed interconnected-ring

for the mixed interconnected-ring scenrios, As the single-node interconnection scenario should be avoided. if we only consider segment protection between two rings, the solution is the same as chained interconnected-ring.

3.6. recovery mechanism for Dual-node ,Single-node and Chained mixed interconnected-ring

for the mixed interconnected-ring scenrios, As the single-node interconnection scenario should be avoided. here we can consider the protection solution maybe like solution of dual-node and chained mixed interconnected-ring scenario.

4. Security Considerations

TBD

5. IANA Considerations

TBD.

6. Acknowledgments

TBD .

7. References

7.1. Normative References

[RFC 5654]
IETF, "IETF RFC5654(MPLS-TP requirement)", September 2009.

[RFC 5921]
IETF, "IETF RFC5654(MPLS-TP framework)", July 2010.

[RFC 6372]
N. Sprecher, A. Farrel, "Multiprotocol Label Switching Transport Profile Survivability Framework", September 2011.

[RFC 6378]
S. Bryant, N. Sprecher, A. Fulignoli Y. Weingarten, "MPLS transport profile Linear Protection", September 2011.

7.2. Informative References

[MPLS-TP Ring Protection]
Y. Weingarten, "Multiprotocol Label Switching Transport Profile Ring Protection", Sep 2011.

7.3. URL References

[MPLS-TP-22]
IETF - ITU-T Joint Working Team, "", 2008, <http://www.example.com/dominator.html>.

Authors' Addresses

Liu guoman
ZTE Corporation
No.50, Ruanjian Road, Yuhuatai District
Nanjing 210012
P.R.China

Phone: +86 025 52871606
Email: liu.guoman@zte.com.cn

Yaacov Weingarten
34 Hagefen St Karnei
Shomron 44853
Israel

Phone: +972-9-775 1827
Email: wyaacov@gmail.com