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J. Dong
M. Chen
Huawei Technologies
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**Distribution of MPLS Traffic Engineering (TE) LSP State using BGP
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Abstract

This document describes a mechanism to collect the Traffic Engineering (TE) LSP information using BGP. Such information can be used by external components for path reoptimization, service placement and network visualization.

Requirements Language

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](#) [[RFC2119](#)].

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Table of Contents

- [1. Introduction](#) [3](#)
- [2. Carrying LSP State Information in BGP](#) [4](#)
 - [2.1. LSP Identifier Information](#) [4](#)
 - [2.2. LSP State Attribute](#) [6](#)
- [3. IANA Considerations](#) [7](#)
- [4. Security Considerations](#) [7](#)
- [5. Acknowledgements](#) [7](#)
- [6. References](#) [7](#)
 - [6.1. Normative References](#) [7](#)
 - [6.2. Informative References](#) [8](#)
- [Authors' Addresses](#) [8](#)

nodes. An external component may further need to collect the LSP information from all the PCEs in the network to get a global view of the LSP states in the network.

In some networks, a centralized controller is used for service placement. Obtaining the TE LSP state information is quite important for making appropriate service placement decisions with the purpose of both meeting the application's requirements and utilizing the network resource efficiently.

The Network Management System (NMS) may need to provide global visibility of the TE LSPs in the network as part of the network visualization function.

BGP has been extended to distribute link-state and traffic engineering information and share with some external components [[I-D.ietf-idr-ls-distribution](#)]. Using the same protocol to collect other network layer information would be desired by the external components, which avoids introducing multiple protocols for network information collection. This document describes a mechanism to distribute the TE LSP information to external components using BGP.

2. Carrying LSP State Information in BGP

2.1. LSP Identifier Information

The TE LSP Identifier information is advertised in BGP UPDATE messages using the MP_REACH_NLRI and MP_UNREACH_NLRI attributes [[RFC4760](#)]. The "Link State NLRI" defined in [[I-D.ietf-idr-ls-distribution](#)] is extended to carry the TE LSP information. BGP speakers that wish to exchange TE LSP information MUST use the BGP Multiprotocol Extensions Capability Code (1) to advertise the corresponding (AFI, SAFI) pair, as specified in [[RFC4760](#)].

The format of the Link State NLRI is shown in the following figure.

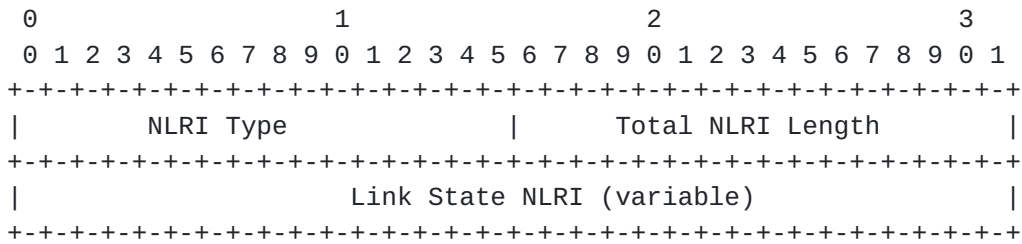


Figure 2. Link State NLRI Format

Two new "NLRI Type" are defined for TE LSP Identifier Information as following:

- o NLRI Type = 5: IPv4 LSP NLRI
- o NLRI-Type = 6: IPv6 LSP NLRI

If the NLRI Type value is set to 5, the Link State NLRI field is the IPv4-LSP-IDENTIFIER structured as below:

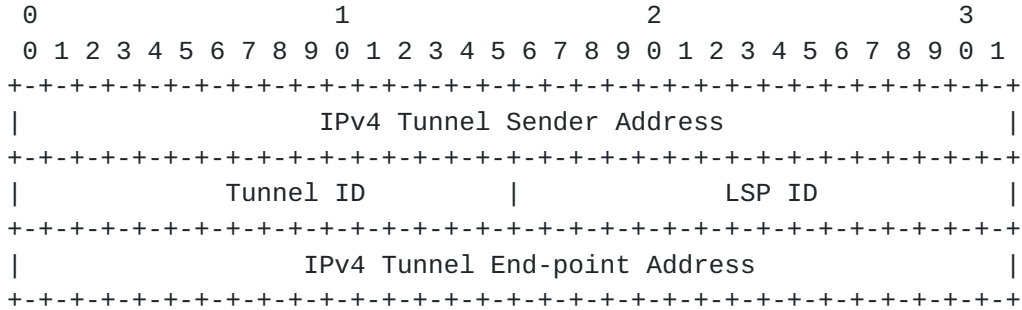


Figure 3. IPv4-LSP-IDENTIFIER

If the NLRI Type value is set to 6, the Link State NLRI field is the IPv6-LSP-IDENTIFIER structured as below:

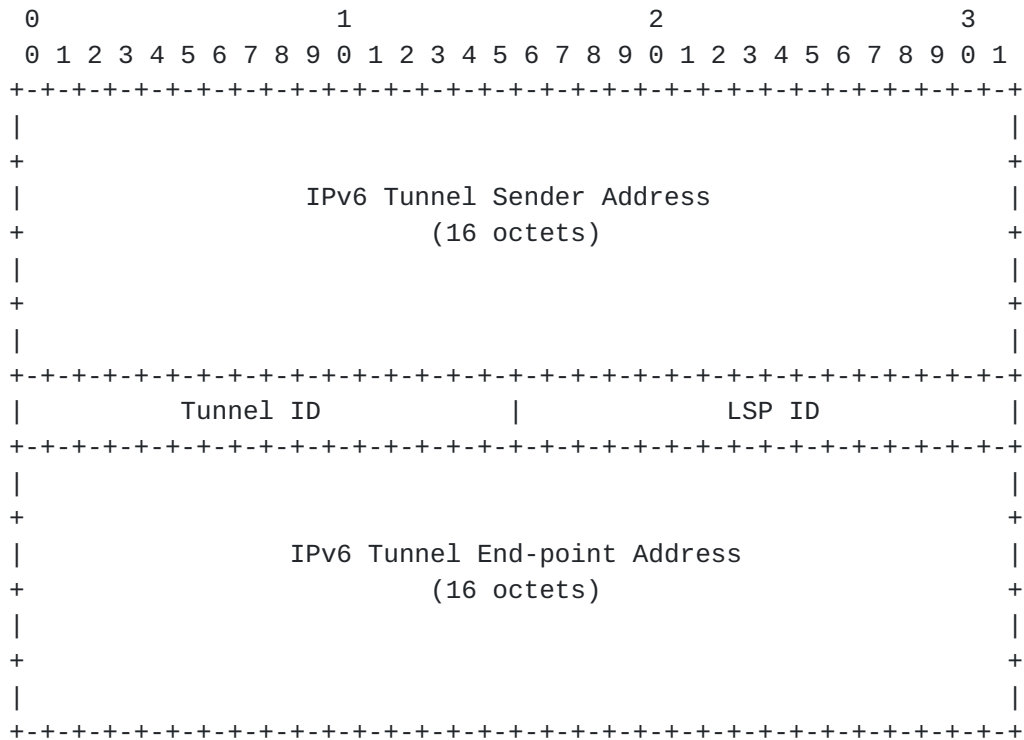


Figure 4. IPv6-LSP-IDENTIFIER

The fields in the IPv4-LSP-IDENTIFIER and IPv6-LSP-IDENTIFIER are the same as specified in [RFC3209].

2.2. LSP State Attribute

The LSP State Attribute is an optional non-transitive BGP attribute which is used to describe the characteristics of the LSPs. The LSP State Attribute consists of a set of objects defined in [RFC3209], [RFC3473] and [RFC5440]. This Attribute SHOULD only be used with IPv4/IPv6 LSP NLRI.

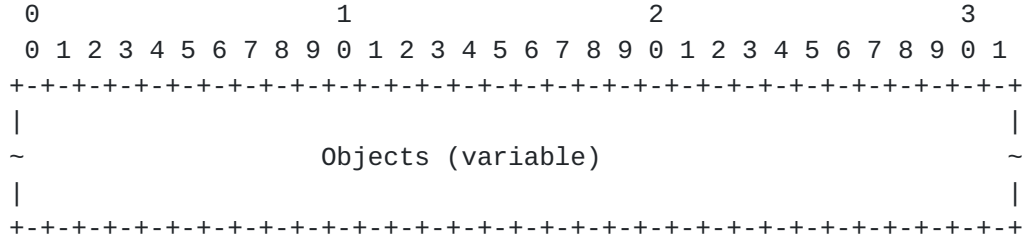


Figure 5. LSP State Attribute

Currently the Objects that can be carried in the LSP State Attribute include:

- o LSP Attributes (LSPA) Object
- o Explicit Route Object (ERO)
- o Record Route Object (RRO)
- o BANDWIDTH Object
- o METRIC Object
- o Protection Object
- o Admin Status Object

Other objects may also be carried in the LSP State Attribute, which would be specified in a future version.

3. IANA Considerations

IANA needs to assign a new code point for the LSP State Attribute from the "BGP Path Attributes" registry.

4. Security Considerations

TBD

5. Acknowledgements

TBD

6. References

6.1. Normative References

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Authors' Addresses

Jie Dong
Huawei Technologies
Huawei Building, No. 156 Beiqing Rd.
Beijing 100095
China

Email: jie.dong@huawei.com

Mach(Guoyi) Chen
Huawei Technologies
Huawei Building, No. 156 Beiqing Rd.
Beijing 100095
China

Email: mach.chen@huawei.com

