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C. Dearlove
BAE Systems ATC
T. Clausen
LIX, Ecole Polytechnique

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Routing MPR Optimization for the Optimized Link State Routing Protocol version 2 (OLSRv2)
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Abstract

This specification updates the Optimized Link State Routing Protocol version 2 (OLSRv2) with an optimization to improve the selection of routing MPRs. The optimization retains full interoperability between implementations of OLSRv2 with and without this optimization.

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1. Introduction

The Optimized Link State Routing Protocol, version 2 [OLSRv2] is a proactive link state routing protocol designed for use in mobile ad hoc networks (MANETs) [RFC2501]. This document improves one area of that specification.

One improvement included in OLSRv2, compared to its predecessor described in [RFC3626], is the use of link metrics, rather than minimum hop routing. A rationale for how link metrics were included in OLSRv2 is documented in [RFC6966-to-be]. However, one aspect of the use of link metrics described in [RFC6966-to-be], the removal of some unnecessarily selected routing MPRs, was not included in [OLSRv2]. This specification updates OLSRv2 to include this optimization.

Note that an implementation using this optimization is not strictly compliant with the current specification [OLSRv2], but is fully interoperable with implementations not using this optimization. This specification updates [OLSRv2] to specify that an implementation using this removal is compliant with the protocol OLSRv2.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

Additionally, this document uses the terminology of [OLSRv2].

3. Applicability Statement

This specification updates [OLSRv2]. As such it is applicable to all implementations of this protocol. The optimization presented in this specification is simply permissive, it allows an additional optimization, and there is no requirement for any implementation to include it. However inclusion of this optimization is advised, it can, in some cases, create smaller and fewer messages, without ever having the opposite effect.

[OLSRv2] defines the properties for the selection of routing MPRs (multipoint relays) from among a router's symmetric 1-hop neighbors as properties that correspond first to that the selected MPRs consist of a set of symmetric 1-hop neighbors that cover all the symmetric 2-hop neighbors, and second that they do so retaining a minimum

distance route (1-hop, if present, or 2-hop) to each symmetric 2-hop neighbor. The discussion in the latter part of Section 6.2 of [RFC6966-to-be] indicates that this requirement is over-prescriptive for routing MPR selection. The update to [OLSRv2] described in this specification permits a router to use the described optimization, while still being considered compliant.

Note that, whether considered compliant or not, a router that implements the optimization, described in this specification, will interoperate successfully with routers not implementing this optimization.

4. Routing MPR Selection

A set of routing MPRs created as specified in [OLSRv2] MAY be optimized in the following manner. Note that this uses the notation of Section 18.3 of [OLSRv2]:

1. If there is a sequence x_0, ..., x_n of elements of N1 such that:

   * x_0 is a routing MPR,

   * x_1, ... , x_n have corresponding elements y_1, ..., y_n of N2, and

   * d1(x_0) + d2(x_0,y_1) + ... + d2(x_m-1,y_m) < d1(x_m) for m = 1, ... , n,

   then x_1 to x_n may be removed from the set of routing MPRs, if selected.

Note that "corresponding elements" in N1 and N2 means that these elements represent the same router. All of this information is available from information gathered by NHDP [RFC6130].

It is RECOMMENDED that all OLSRv2 routers use this optimization.

5. IANA Considerations

This document has no actions for IANA.

6. Security Considerations

The update to [OLSRv2] does not introduce any new protocol signals, compared to the already published specifications of the protocol, nor

does it change the processing of any received protocol signals.

This update to [OLSRv2] permits a compliant implementation of OLSRv2 to (potentially) eliminate some redundant information from the routing MPR sets otherwise generated by the algorithms described in [OLSRv2], and therefore also eliminate the need for including that information in generated TC messages. Because this information is not used when included, this update to [OLSRv2] does not present any additional security considerations, beyond those described in [OLSRv2].

7. Acknowledgments

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8.1. Normative References

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8.2. Informative References

[RFC2501] Macker, J. and S. Corson, "Mobile Ad hoc Networking (MANET): Routing Protocol Performance Issues and Evaluation Considerations", RFC 2501, January 1999.

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Authors' Addresses

Christopher Dearlove
BAE Systems Advanced Technology Centre
West Hanningfield Road
Great Baddow, Chelmsford
United Kingdom

Phone: +44 1245 242194
Email: chris.dearlove@baesystems.com
URI: http://www.baesystems.com/

Thomas Heide Clausen
LIX, Ecole Polytechnique

Phone: +33 6 6058 9349
Email: T.Clausen@computer.org
URI: http://www.ThomasClausen.org/