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**OSPF Graceful Restart Enhancements**  
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**Abstract**

This document describes enhancements to the OSPF graceful restart procedures to improve routing convergence in some OSPF network deployments. This document updates [RFC 3623](#) and [RFC 5187](#).

**Status of This Memo**

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## [1.](#) Introduction

This document describes the enhancements to the current OSPF [[RFC2328](#)] and OSPFv3 [[RFC5340](#)] graceful restart procedures as respectively defined in OSPF Graceful Restart [[RFC3623](#)] and OSPFv3 Graceful Restart [[RFC5187](#)] to improve routing convergence in certain OSPF network deployment scenarios. The goal is for both the restarting OSPF node and the helper OSPF node to terminate the OSPF graceful restart procedure faster and not wait for the grace period expiry in those network scenarios and hence improve the overall OSPF network convergence.

## [2.](#) Conventions used in this document

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 [BCP 14](#) [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here.

## [3.](#) Graceful Restart Enhancements

### [3.1.](#) Stub-Link Network Scenarios



Figure 1: OSPF topology with Graceful Restart



As graphically depicted in figure 1, Router-2 is an area border router (ABR) with OSPF links in 2 areas. Furthermore, Router-2 has formed full adjacencies only in Area 0. In Area 1, Router-2 has an OSPF link enabled but Router2 could not form an adjacency either because Router-3 is down or Router-3 does not have OSPF enabled. Hence, Router-2 will only have a stub link in Area 1.

On restart, the ABR router Router-2, having only a stub link in the Area 1, will never receive its pre-restart LSA in this area and will never form an adjacency and will have to wait for the grace period expiry leading to slower OSPF routing convergence.

For this scenario, if no OSPF control packets are received within the dead interval on a link in Area 1 as per the above network scenario, Router-2 MUST mark the link as stub and MUST not wait for the grace period to form an adjacency on this link to successfully Exit GR.

### **[3.2.](#) Multiple Failure Scenarios**

In scenarios where more than one router is restarting at the same time in the same OSPF area and StrictLSAChecking is disabled, restarting OSPF routers will end up waiting the entire grace interval to exit GR. If the restarting routers receive a Grace Link State Advertisement (LSA) from another router in a given area after restart, and the helper routers receive grace LSAs from more than one router, this will indicate that there have been multiple failures. Therefore, the helper and restarting routers MUST terminate GR and avoid any unnecessary delay in OSPF routing convergence.

## **[4.](#) Security Considerations**

The security considerations in OSPF Graceful Restart [[RFC3623](#)] and OSPFv3 Graceful Restart [[RFC5187](#)] are applicable. This document does not introduce any additional security considerations.

## **[5.](#) IANA Considerations**

This specification doesn't require any IANA assignments.

## **[6.](#) Acknowledgements**

TBD

## **[7.](#) References**



### **7.1. Normative References**

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
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- [RFC5187] Pillay-Esnault, P. and A. Lindem, "OSPFv3 Graceful Restart", [RFC 5187](#), DOI 10.17487/RFC5187, June 2008, <<https://www.rfc-editor.org/info/rfc5187>>.
- [RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in [RFC 2119](#) Key Words", [BCP 14](#), [RFC 8174](#), DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.

### **7.2. Informative References**

- [RFC2328] Moy, J., "OSPF Version 2", STD 54, [RFC 2328](#), DOI 10.17487/RFC2328, April 1998, <<https://www.rfc-editor.org/info/rfc2328>>.
- [RFC5340] Coltun, R., Ferguson, D., Moy, J., and A. Lindem, "OSPF for IPv6", [RFC 5340](#), DOI 10.17487/RFC5340, July 2008, <<https://www.rfc-editor.org/info/rfc5340>>.

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