New IPv6 Multicast Addresses for Switch ML

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Abstract

Recently, in-network aggregation to scale distributed machine learning (ML) has been presented. A network switch implementation uses IPv4 broadcast messages from switch to the hosts to send updates to all workers. IPv6 does not support broadcast addresses. This document proposes, IPv6 implementations use the IPv6 link-local all-nodes multicast address, until a new IPv6 link-local multicast address is assigned by IANA for switch to hosts multicast communications.

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1. 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].

2. Introduction

New computing in the network for ML uses IPv4 broadcast communications between switch to hosts. [Switch-ML]. With IPv6, multicast communications would be used. This document proposes a new well-known multicast address be defined for such communications. Until a new address is defined, the IPv6 link-local all-nodes multicast address may be used. By definition, a layer-2 switch operates in the link-local subnet. Thus, the IPv6 link-local multicast address defined by this document suffices for switch to host multicast communications.

3. Additional Information

It is common when new networking protocols such as RPL [RFC6550] and Babel [RFC6126] were developed, each protocol requested IANA for a new IPv6 link-local multicast address for use. Switch ML does not have a protocol defined by IETF just yet and may never define one. However, experiments in switch ML are already using IP or layer-2 broadcast communications. For IPv6, switch ML experiments should use IPv6 link-local multicast communications. A new IPv6 link-local multicast address for switch ML facilitates efficient filtering by hosts.
If a switch is configured in layer-3 mode and if switch ML communicates with hosts to another IPv6 subnet, an IPv6 Site-Local Scope Multicast address is recommended for communications.

4. Security Considerations

Use IPSec [RFC4301].

5. IANA Considerations

This document requests IANA to assign a new IPv6 link-local multicast address for use by network ML. This multicast address name is Switch_ML_Host. An interface on the host MUST join this well-known multicast address.

Additionally, IANA is requested to assign a new IPv6 Site-Local Scope Multicast address for switch ML to host communication across IPv6 subnets. If configured to do so, an interface on the host MUST join this well-known multicast address.

6. Acknowledgements

Thanks (in alphabetical order by first name) to Marco Canini for his review.

7. References

7.1. Normative References


7.2. Informative References

[Switch-ML]

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