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Happy Eyeballs Extension for ICE
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Abstract

This document provides guidelines on how to make ICE [RFC5245] conclude faster in IPv4/IPv6 dual-stack scenarios where broken paths exists.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on June 12, 2014.

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1. Introduction

There is a need to introduce more fairness in the handling of connectivity checks in dual-stack IPv4/IPv6 ICE scenarios. Section 4.1.2.1 of ICE [RFC5245] points to [RFC3484] for prioritizing among the different IP families. [RFC3484] is obsoleted by [RFC6724] but following the recommendations from the updated RFC will still lead to prioritization of IPv6 over IPv4 with the same candidate type. There can be a lot of ICE candidates belonging to one address family which results in user-noticable setup delays if the path for that address family is broken.

To avoid such user-noticable delays when the IPv6 path or IPv4 path is broken, this specification encourages earlier checking of the other address family. Greater IP address family fairness into ICE connectivity checks will lead to more sustained IPv6 deployment (so users will no longer have an incentive to disable IPv6), which incurs only a small penalty for the IPv4 connectivity checks.

1.1. Notational Conventions

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 [RFC2119].

This document uses terminology defined in [RFC5245].

2. Improving ICE Dual-stack Fairness

Candidates SHOULD be prioritized such that a long sequence of candidates belonging to the same address family be interleaved with

candidates from the alternate IP family. For example, promoting IPv4 candidates in the presence of many IPv6 addresses such that an IPv4 address candidate is always present after a small sequence of IPv6 addresses. This makes ICE connectivity checks more responsive to failures of an address family by reordering the candidates such that

IPv6 and IPv4 candidates get a fair chance during connectivity checks.

An ICE agent can choose an algorithm or a technique of its choice to promote IPv4 candidates.

3. Compatibility

ICE [RFC5245] section 4.1.2 states that the formula in section 4.1.2.1 SHOULD be used. Failing to do so may lead to ICE taking longer to converge as the checklist no longer will be coordinated. Therefore responsiveness of ICE candidate checks are improved when both sides support Happy-Eyeballs, both sides have the same number of candidate pairs, and both sides use the same Happy Eyeballs promotion algorithm.

If each ICE agent uses a different algorithm to promote IPv4 candidates, ICE connectivity checks will be as responsive as the least aggressive algorithm. This is because the MAX/MIN candiate-pair logic ensures that for a particular agent, a lower-priority candidate is never used (for media) until all higher-priority candidates have been tried.

If only one ICE agent supports Happy-Eyeballs, there is potentially no change in pacing of ICE connectivity checks and the situation is no worse than what exists today

4. IANA Considerations

None.

5. Security Considerations

STUN connectivity check using MAC computed during key exchanged in the signaling channel provides message integrity and data origin authentication as described in section 2.5 of [RFC5245] apply to this

use.

6. Acknowledgements

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7. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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[RFC5245] Rosenberg, J., "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols", RFC 5245, April 2010.

[RFC6724] Thaler, D., Draves, R., Matsumoto, A., and T. Chown, "Default Address Selection for Internet Protocol Version 6 (IPv6)", RFC 6724, September 2012.

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