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The Reason for Abandoning the UPA Draft
draft-wang-lsr-reasons-of-abandon-upa-proposal-04

Abstract

[I-D.ietf-lsr-igp-ureach-prefix-announce] (UPA draft) proposes the solution to announce the prefix unreachable information within the IGP domain.

It utilizes the LSInfinity concept that is introduced in [RFC2328], without analyzing the dormant and flawed design.

The proposal doesn’t work even in simple scenario, is based on one flawed feature, lacks the explicit withdrawn procedures.

This document analyzes the above issues, suggests the IETF commuity abandon the UPA draft, replace it with other more comprehensive document [I-D.wang-lsr-prefix-unreachable-annoucement](Founder Draft), to provide the IETF community the more optimal solution.

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 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

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 19 December 2025.

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1. Introduction

[I-D.ietf-lsr-igp-ureach-prefix-announce] (UPA draft) describes one proposal that tries to announce the prefix unreachable information within the IGP domain.

It explores one seldom used LSInfinity feature that is defined in [RFC2328] for OSPF(with the value set as the 24-bit binary value of all ones:0xFFFFFF), MAX_PATH_METRIC in "IS-IS Extensions for Traffic Engineering" [RFC5305]and MAX_V6_PATH_METRIC in "Routing IPv6 with IS-IS" [RFC5308], with the value set as 0xFE000000(the 32-bit binary, 2^32 - 2^25)

The proposal doesn't work even in very simple scenario and lacks the key consideration of the the explicit withdraw method.

The other parts of the document describe how to control the advertisement of unreachable information on ABR, its consideration with the area partition etc, which are first and throughly described clearly and more throughly in [I-D.wang-lsr-prefix-unreachable-annoucement](Founder Draft).

After analyzing these issues, this document recommends the IETF community to abandon the forwarding of UPA draft, replace it with Founder Draft, which is one far earlier and more comprehensive solution.

2. UPA Proposal Doesn’t Work in Simple Scenario

UPA proposal doesn’t work even in simple scenario. Such issues can be illustrated in the following example:

In Figure 1, PE1 and PE2 locate in different areas, which are connected via the backbone area 0, via ABR1 and ABR2 respectively.

When one prefix P0 on PE2 become unreachable, according to the UPA proposal, ABR2 will signal the UPA, flood it within area 0, with the metric of the summary LSA set to LSInfinity.

When such UPA signal reaches ABR1, according to the description in section 12.4.3("Summary-LSAs") of [RFC2328]:

"......, if the routing table cost equals or exceeds the value LSInfinity, a summary-LSA cannot be generated for this route."

There will be no summary LSA generated for the received UPA signal. It is to say, UPA signal can’t cross area border.

PE1 which locates in area 1 can’t know the P0 on PE2 is unreachable as expected. Any application switchover on PE1 will never happen.

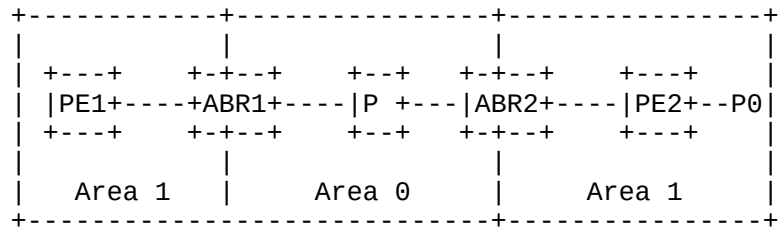

Figure 1: UPA Signal Can’t Cross Area Border

The UPA procedure is broken in such scenario.

3. LSInfinity Feature is Flawed

[RFC2328] defines the LSInfinity feature, but doesn't give any reasonable explanation.

Actually, using the LSInfinity value for one prefix to indicate the prefix is unreachable is problematic even in the simple topology that illustrated below:

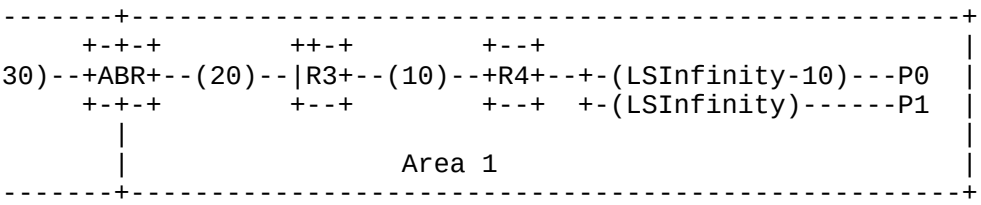

Figure 2: LSInfinity defined in RFC2328 Is Flawed

In Figure 2, the value between the router is the cost of the link.

Suppose the Router R4 has two prefixes, one is P0, with the metric set to (LSInfinity-10); another is P1, with the metric set to LSInfinity.

R4 advertises these two prefixes within the Area1, with two different LSAs.

When R3 receives the LSA for prefix P0, according to the description in RFC 2328, it will treat the prefix P0 as reachable, because the cost within the LSA for prefix P0 is lower than LSInfinity.

When R3 receives the LSA for prefix P1, according to the description in RFC 2328, it will treat the prefix P1 as unreachable, because the cost within the LSA for prefix P1 is LSInfinity.

But on R3, the total cost to P0 and P1 are all LSInfinity, but one is reachable, another is unreachable, results in Fist contradiction conclusion.

When the above LSAs reach to ABR, ABR will take the similar treatment, that, it should treat prefix P0 as reachable, and prefix P1 as unreachable.

But according to the description in RFC 2328, "if the routing table cost equals or exceeds the value LSInfinity, a summary-LSA cannot be generated for this route", then ABR can’t generate the summary LSA, neither for prefix P0(reachable, but total cost exceed LSInfinity), nor for prefix P1(Unreachable).

The routers within area0, R1 and R2 can’t reach prefix P0 then. This is Second contradiction conclusion.

From the above examples, we can know the LSInfinity feature described in [RFC2328] is flawed. Such analysis can also apply to the MAX_PATH_METRIC in [RFC5305] and MAX_V6_PATH_METRIC in [RFC5308] used for the same purpose.

The IETF community should erase such flawed features, instead of exploiting it to signal unreachable information.

Then section 3 and section 4 of UPA draft should be removed.

4. No Explicit UPA Withdrawn Method

The UPA document specifies that the UPA must be withdrawn when the prefix is reachable again, but gives no explicit UPA withdrawn method.

The author declares that stopping advertising UPA is equal to UPA withdrawn, actually it doesn’t. The following are the detail analysis:

There are at least two reasons to stop advertising UPA:

1) Case A is that the UPA has been advertised for enough time to let the receiver accomplish the related application switchover

2) Case B is the specific prefix is reachable again.

For Case A, when the receiver stop receiving UPA signal, it doesn’t represent the prefix is reachable again.

If there is no explicit UPA withdrawn method, the network can’t recover to the normal state before the UPA triggered switchover.

Explicit UPA Withdrawn Method is necessary.

5. Conclusion

The UPA proposal doesn’t work even in simple scenario, is based on the flawed feature, lacks explicit withdraw signal.

Then, the IETF community should abandon the UPA draft, put forward to the Founder Draft instead.

6. Security Considerations

The mechanism described in this document does not raise any new security issues for the IGP protocols.

7. Acknowledgement

TBD.

8. IANA Considerations

None.

9. References

9.1. Normative References

[I-D.ietf-lsr-igp-ureach-prefix-announce]
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[I-D.wang-lsr-prefix-unreachable-annoucement]
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9.2. Informative References

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