IS-IS Route Preference for Extended IP and IPv6 Reachability

draft-ginsberg-isis-route-preference-00.txt

Les Ginsberg (ginsberg@cisco.com)
Stephane Litkowski(stephane.litkowski@orange.com)
Stefano Previdi (sprevidi@cisco.com)

90th IETF, Toronto, July 2014

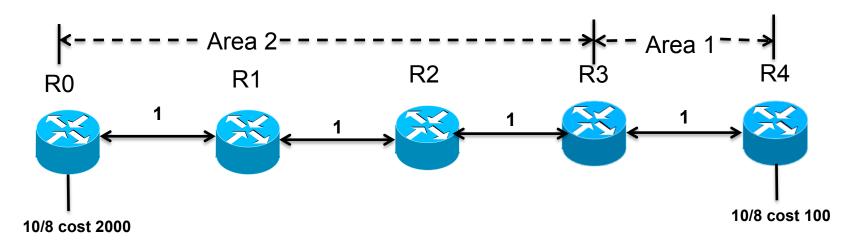# What prompted us to write this draft?

`draft-litkowski-isis-ip-route-preference-issue-00`
documented an interoperability issue with the Up/Down bit in L2 LSPs –
requested revision of existing RFCs (5302, 5305, 5308) to resolve this issue

Example has been incorporated as an Appendix into this draft.
Solution defined.

Stephane joined as co-author

This draft will go forward - `draft-litkowski-isis-ip-route-preference-issue-00` will be abandoned

Multi-Vendor Interoperability Issue

R0   R1   R2   R3   R4

Area 2 ————————————————— Area 1

10/8 cost 2000

10/8 cost 100

All routers are L2
R3 runs two instances:
    R3- Area 1 redistributes into R3- Area 2

R0 advertises 10/8 cost 2000
R3-Area2 advertises 10/8 cost 101 Up/Down bit set

R1 prefers path w lowest cost – sends traffic ->R2
R2 prefers path w Up/Down bit = 0 – sends traffic ->R1

Route Preference from RFC 5302 (TLVs 128/130)

1. **L1 intra-area routes with internal metric; L1 external routes with internal metric**

2. **L2 intra-area routes with internal metric; L2 external routes with internal metric; L1->L2 inter-area routes with internal metric; L1->L2 inter-area external routes with internal metric**

3. **L2->L1 inter-area routes with internal metric; L2->L1 inter-area external routes with internal metric**

4. **L1 external routes with external metric**

5. **L2 external routes with external metric; L1->L2 inter-area external routes with external metric**

6. **L2->L1 inter-area external routes with external metric**

NOTE: External routes have same preference as internal routes when metric type is the same

Routes in RED have up/down bit set to 1

Inferred Route Preference for
(TLVs 135/235)

1. **L1 intra-area routes ~~with internal metric~~; L1 external routes ~~with internal metric~~**

2. **L2 intra-area routes ~~with internal metric~~; L2 external routes ~~with internal metric~~; L1->L2 inter-area routes ~~with internal metric~~; ~~L1->L2 inter-area external routes with internal metric~~**

3. **L2->L1 inter-area routes ~~with internal metric; L2->L1 inter-area external routes with internal metric~~**

4. ~~**L1 external routes with external metric**~~

5. ~~**L2 external routes with external metric; L1->L2 inter-area external routes with external metric**~~

6. ~~**L2->L1 inter-area external routes with external metric**~~

Internal/External Metric NOT Supported

External Route Encoding Not Supported (but sources can be defined)

Inferred Route Preference for (TLVs 135/235)

1. **L1 intra-area routes; L1 external routes**
2. **L2 intra-area routes; L2 external routes; L1->L2 inter-area routes;**
3. **L2->L1 inter-area routes**

Down Bit in L2 LSPs
RFC 5302

Up/down bit set when route leaked downwards
With two levels, not possible to have bit set in L2 LSPs

"…up/down bit MUST NOT be set in L2 LSPs"

But…RFC 5302 anticipated additional levels…

"...it is RECOMMENDED that implementations ignore the up/down bit in L2 LSPs, and accept the prefixes in L2 LSPs regardless of whether the up/down bit is set."

Down Bit in L2 LSPs
RFC 5305

RFC 5305 addressed multiple virtual routers running IS-IS in different areas. If redistribution occurs between the virtual routers then L1<->L1 redistribution could result in multiple L2 routers advertising same prefix into the L2 sub-domain

"If a prefix is advertised from one area to another at the same level, then the up/down bit SHALL be set to 1."

This can lead to up/down bit set in L2 LSPs.

Revised Route Preference for
(TLVs 135/235)

1. **L1 intra-area routes; L1 external routes**
2. **L2 intra-area routes; L2 external routes; L1->L2 inter-area routes; L2->L2 inter-area routes**
3. **L2->L1 inter-area routes; L1->L1 inter-area external routes**

Added types for redistribution from another instance at the same level (RFC 5305)

Route Preference for IPv6
(TLVs 236/237)

RFC 5308

1. **Level 1 up prefix**
2. **Level 2 up prefix**
3. **Level 2 down prefix**
4. **Level 1 down prefix**

Conflicts w RFC 5302 ("ignore up/down bit in L2 LSPs)

NOTE: External Routes supported for IPv6 – but does not affect route preference

Revised Route Preference
(TLVs 236/237)

1. L1 intra-area routes; L1 external routes

2. L2 intra-area routes; L2 external routes; L1->L2 inter-area routes; L1->L2 external routes; L2-L2 inter-area routes; L2-L2 inter-area external routes

3. L2->L1 inter-area routes; L2->L1 external routes; L1->L1 inter-area routes; L1->L1 inter-area external routes

Request to become WG item

Positioned as clarification of RFC 5302/5305.
Correction of RFC 5308.