OSPF loopback redistribution enhancement with route-map support

Presenters
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Overview

Reminder (before 10.8)

- Redistribution of local loopback has been introduced:
  - For **BGP** (IPv4/IPv6 AF) in **10.06.0001**, **with route-map** option
  - For **OSPFv2** and **OSPFv3** in **10.06.0010**, **without route-map** option

- Only local /32 IPv4 prefixes or /128 IPv6 prefixes related to loopback interfaces can be redistributed:

- Redistribution of Loopback IP address is important for:
  - In-band management for SSH/HTTPS/SNMP access to Loopback IP address
  - Traffic initiated from the switch (like NTP, syslog, RADIUS/TACACS…) that is predefined in Firewall rules with source IP address range being the allocated subnet for Loopback (usual best practice).
  - BGP EVPN fabric: loopback anycast IP address must be in BGP routing table for underlay VTEP reachability.

```bash
switch(config-ospf-1)# redistribute local loopback
Redistribute Local routes on loopback interfaces
```
Reminder on Redistribution

- The redistribution is divided in 2 parts:
  - Redistribute local loopback
  - Restrict this redistribution to loopback interface

- No other “local” prefixes besides those corresponding to loopback interfaces can be redistributed.

- The “redistribute connected” and “redistribute local loopback” commands are independent. “Redistribute connected” is still required to redistribute connected subnet, and is not a prerequisite for “redistribute local loopback” command.
10.8 Enhancement
route-map support for loopback redistribution

10.6 to 10.7

- The redistribution of local loopback in OSPF can not be controlled with a route-map:

```
router ospf 1
    redistribute local loopback
```

10.8

- The redistribution of local loopback in OSPF can now be controlled with an optional route-map:

```
router ospf 1
    redistribute local loopback route-map rtmap-name
```

- Configuration aspect:
  - No “redistribute local loopback route-map rtmap-name” will not remove redistribution of local loopback but remove just the route-map part.
  - No “redistribute local loopback” will remove redistribution of local loopback regardless there is a route-map configured.
Redistribution Best Practices

- Best practices are:

  1. redistribute both connected and loopback.

  2. Use route-map with prefix-list to strictly control the redistribution (to avoid human errors).

  3. Same route-map can be used for connected and local loopback to simplify administration.

```plaintext
text
interface loopback 0
  ip address 192.168.1.3/32
  ipv6 address fd00:192:168:1::3/128

! ip prefix-list endpoint seq 5 permit 192.168.1.0/24 ge 32
ip prefix-list endpoint seq 10 permit 10.1.0.0/16 le 32
ipv6 prefix-list v6-endpoint seq 5 permit fd00:192:168:1::/64 ge 128
ipv6 prefix-list v6-endpoint seq 10 permit fd00:10:1::/64 le 128

! route-map connected-ospf permit seq 10
  match ip address prefix-list endpoint
route-map connected-ospf permit seq 20
  match ipv6 address prefix-list v6-endpoint

! router ospf 1
  router-id 192.168.1.3
  passive-interface default
  redistribute connected route-map connected-ospf
  redistribute local loopback route-map connected-ospf
  area 0.0.0.0

! router ospfv3 1
  router-id 192.168.1.3
  passive-interface default
  redistribute connected route-map connected-ospf
  redistribute local loopback route-map connected-ospf
  area 0.0.0.0

```
## Platform Support

10.8 – enhancement of OSPF redistribution of local loopback with route-map

<table>
<thead>
<tr>
<th>OSPF</th>
<th>Simulator</th>
<th>6200</th>
<th>6300</th>
<th>6400</th>
<th>8360</th>
<th>8320</th>
<th>8325</th>
<th>8400</th>
</tr>
</thead>
<tbody>
<tr>
<td>redistribution local loopback route-map</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
# Caveats

Route-map match and set clauses for loopback redistribution in OSPF

## match

<table>
<thead>
<tr>
<th>Clause</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aspath-list</td>
<td>Match BGP AS path list</td>
</tr>
<tr>
<td>community-list</td>
<td>Match BGP community-list</td>
</tr>
<tr>
<td>extcommunity-list</td>
<td>Match BGP extended community list</td>
</tr>
<tr>
<td>interface</td>
<td>Match Interface</td>
</tr>
<tr>
<td>ip</td>
<td>IP information</td>
</tr>
<tr>
<td>ipv6</td>
<td>IPv6 information</td>
</tr>
<tr>
<td>local-preference</td>
<td>BGP local preference path attribute</td>
</tr>
<tr>
<td>metric</td>
<td>Match metric of route</td>
</tr>
<tr>
<td>origin</td>
<td>BGP origin code</td>
</tr>
<tr>
<td>route-type</td>
<td>Match route-type of a route</td>
</tr>
<tr>
<td>source-protocol</td>
<td>Match source protocol</td>
</tr>
<tr>
<td>tag</td>
<td>Match tag of route</td>
</tr>
</tbody>
</table>

- For OSPF local loopback, several match clauses will not apply: `aspath-list`, `community-list`, `extcommunity-list`, `local-preference`, `origin`, `route-type`, `tag`.
- Match `source-protocol` does not support local.
- Match `interface` is not supported yet for loopback.
- Scope for loopback is reduced to: match `ip`

## set

<table>
<thead>
<tr>
<th>Clause</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>as-path</td>
<td>Transform BGP AS_PATH attribute</td>
</tr>
<tr>
<td>community</td>
<td>Configure BGP community attribute</td>
</tr>
<tr>
<td>dampening</td>
<td>Enable route flap dampening</td>
</tr>
<tr>
<td>extcommunity</td>
<td>BGP extended community attribute</td>
</tr>
<tr>
<td>ip</td>
<td>IP information</td>
</tr>
<tr>
<td>ipv6</td>
<td>IPv6 information</td>
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<tr>
<td>local-preference</td>
<td>BGP local preference path attribute</td>
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<tr>
<td>metric</td>
<td>Match metric of route</td>
</tr>
<tr>
<td>origin</td>
<td>BGP origin code</td>
</tr>
<tr>
<td>route-type</td>
<td>Match route-type of a route</td>
</tr>
<tr>
<td>source-protocol</td>
<td>Match source protocol</td>
</tr>
<tr>
<td>tag</td>
<td>Tag value for destination routing protocol</td>
</tr>
<tr>
<td>weight</td>
<td>BGP weight for routing table</td>
</tr>
</tbody>
</table>

- For OSPF local loopback, several set clauses will not apply: `as-path`, `community`, `extcommunity`, `dampening`, `local-preference`, `origin`, `weight`.
- Set `ip/ipv6` is out of scope (PBR only).
- **Metric**, **metric-type**, **tag** can be applied.
Caveats

Route-redistribution change in 10.7

- When a routing protocol X redistributes routes from routing protocol Y, all the best routes from a routing protocol Y are redistributed into routing protocol X **irrespective of** if the route is selected for forwarding (added into FIB) or not.

- Since 10.7 with "route-redistribute active-routes-only" command, only the routes from other protocols **which are selected for forwarding** are considered for redistribution into OSPF; i.e. when a routing protocol X redistributes routes from routing protocol Y, only the routes from routing protocol Y that are selected for forwarding (added into FIB) are redistributed into routing protocol A.

- With "route-redistribute active-routes-only" configured, "redistribute ospf/ospfv3/RIP/RIPng" on any routing protocol will not redistribute the connected route on the ospf/ospfv3/RIP/RIPng enabled interfaces, and would **need explicit configuration of "redistribute connected or local" in case the connected or local subnets needs to be redistributed.**

- Without "route-redistribute active-routes-only", the ospf/ospfv3/RIP/RIPng enabled interface's connected/local subnets are also redistributed into other protocol with "redistribute ospf/ospfv3/RIP/RIPng" option alone.
Thank you

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