IGP Multicast Architecture

draft-yong-pim-igp-mutlicast-arch-01

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Motivation

- Single IGP to support both unicast and multicast routing
  - Better meet the emerging market requirements.
  - Reduce complexity of network operation & management.
  - Easy migration from unicast-only network to support multicast based
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- Leverage IGP's advanced extensions over the years.
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- Beneficial to some scenarios – e.g., data centers
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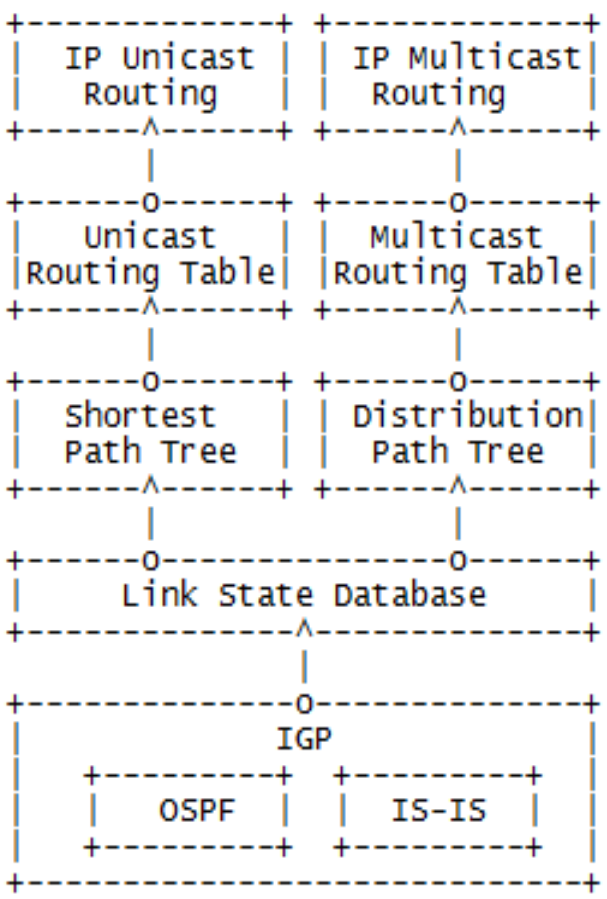
IGP Multicast Architecture (1)



- Use a single IGP: IS-IS or OSPF.
- Information in LSDB is used for routing IP unicast packets and multicast packets.
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- Multicast routing is within IGP's paradigm.
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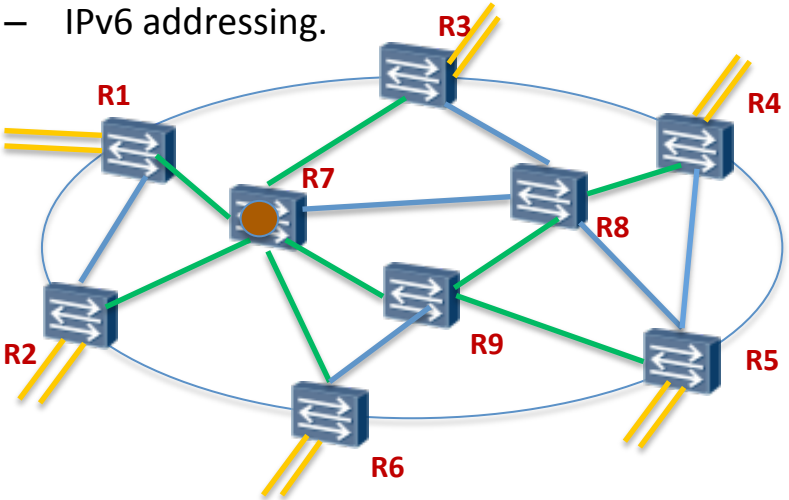
    inter-area multicast routing.
- No change required in IS-IS/OSPF except the extensions to advertise IP multicast addresses.
- No change required for existing hardware.

IGP Multicast Architecture (2)

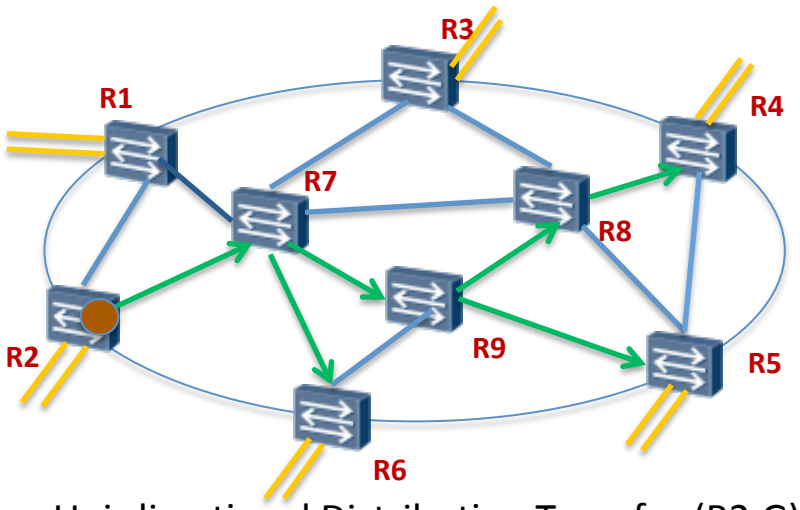
- Edge router communicates with local hosts using IGMP/MLD.
- Edge router maintains a local multicast forwarding database.
- Attachment of IP multicast membership are advertised by edge routers throughout a single IGP area.
  - Require extensions to IS-IS and OSPF.
- A multicast distribution tree is used to forward IP multicast packets.
- Intra-area multicast routing
  - Participating routers use the same algorithm to construct the tree based on the LSDB generated by IS-IS or OSPF.
  - A root (Rendezvous Point) is provisioned or auto-elected.
  - All participating routers calculate an optimized path to the root.
  - The tree is pruned based on the association between edge routers and the IP multicast address.
- Inter-area multicast routing
  - Multicast membership information may also be advertised across IGP area boundary by border nodes based on policy or service.
  - IGP border node performs some tree root functions.

IGP Multicast Architecture (3)

- Multicast packets are forwarded along the tree in an IGP network
  - Forwarded to all routers with multicast membership within an area.
  - Also forwarded across IGP area boundary by IGP area borders for subscribed members.
- A multicast distribution tree can be bi-directional or uni-directional.
  - Multicast packet is delivered from one leaf to all other leaves along a bi-directional tree.
  - Multicast packet is delivered from the root to all leaves along a uni-directional tree.
- Multiple distribution trees may be built:
  - A single distribution tree is used for one or multiple (*, G)
  - One (*, G) can use more than one distribution tree for redundancy.
- Multicast routing using IGP inherits:
  - Traffic engineering and constraints based path selection.
  - IPv6 addressing.



Bi-directional Distribution Tree for (*,G)



Uni-directional Distribution Tree for (R2,G)

Next Step

- Solicit comments and suggestions on
  - draft-yong-pim-igp-multicast-arch-01
- Request PIM WG to work on this architecture
- The solution draft is coming soon.
- Working on two other drafts - extensions to IS-IS and OSPF respectively.