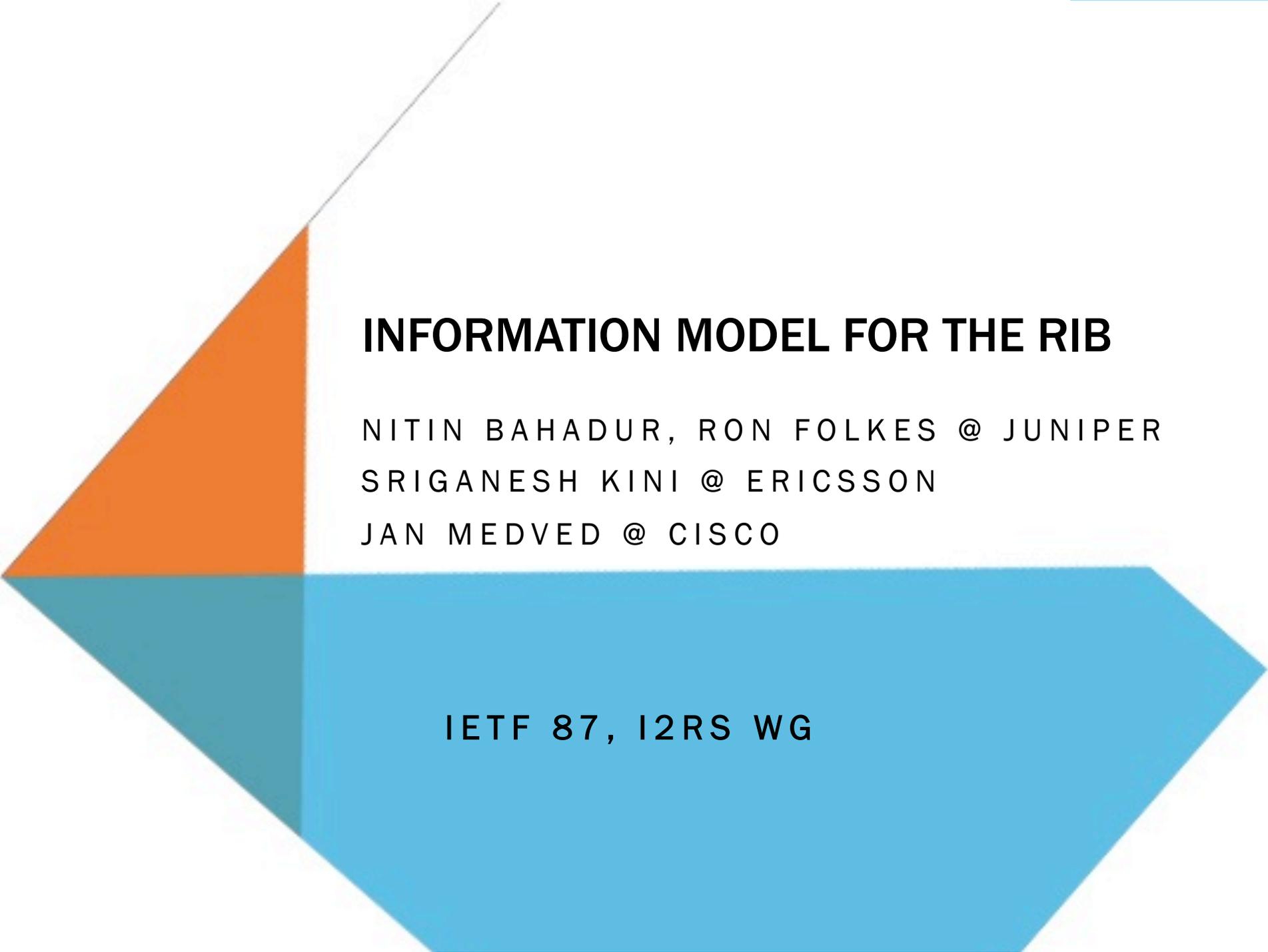# INFORMATION MODEL FOR THE RIB

NITIN BAHADUR, RON FOLKES @ JUNIPER

SRIGANESH KINI @ ERICSSON

JAN MEDVED @ CISCO

IETF 87, I2RS WG

INFORMATION MODEL FOR THE RIB

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BACKGROUND

- Number of i2rs use-cases require programmatic control to the routing sub-system. This draft addresses this requirement.

- Not restricted to network devices. Servers and hosts can also implement the same model.

- Types of operations needed:
  - Read
  - Write
  - Events & Notifications

- Draft is an INFO model and not a DATA model. For differences, please see RFC3444.
 - We do have a rough data-model if you are interested

READ DATA – WHAT GETS READ FROM THE RIB

- Routes and their associated next-hops

- Routing tables and other higher level abstractions that allow one to make sense of the routes
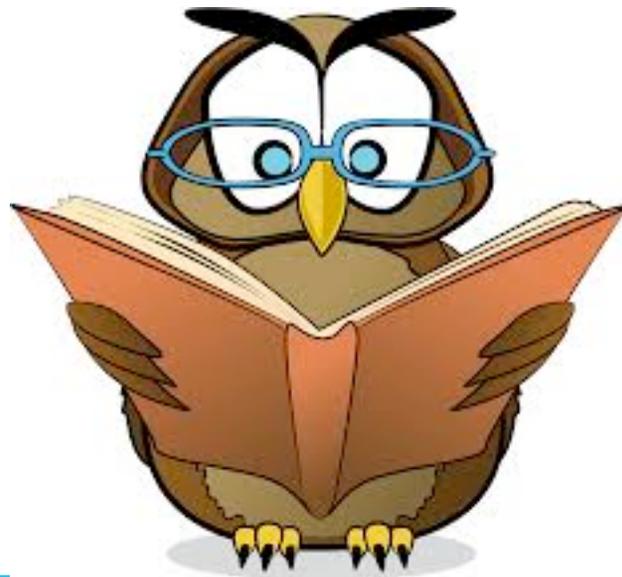
WRITE DATA – WHAT GETS WRITTEN INTO THE RIB

- *No direct programming of the FIB*

- Routes are programmed into the RIB
    - Unicast
    - Multicast
    - MPLS

- Route points to next-hops

- RIB manager MAY do next-hop resolution
    - E.g. Next-hop specified by i2RS may specify egress point, but not the transport to reach that point
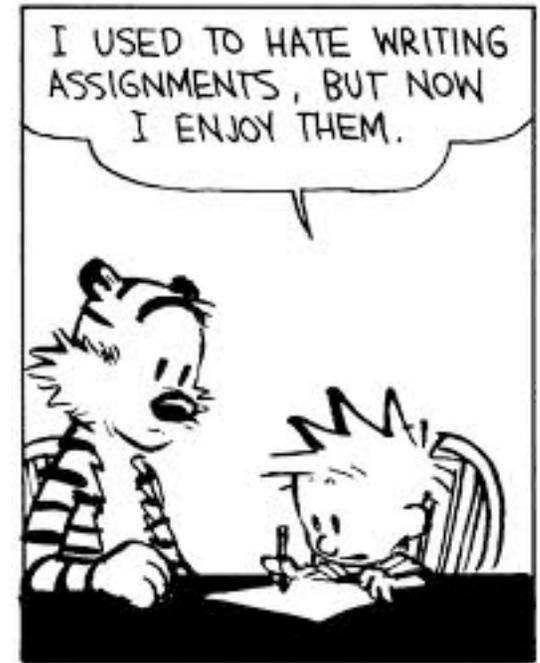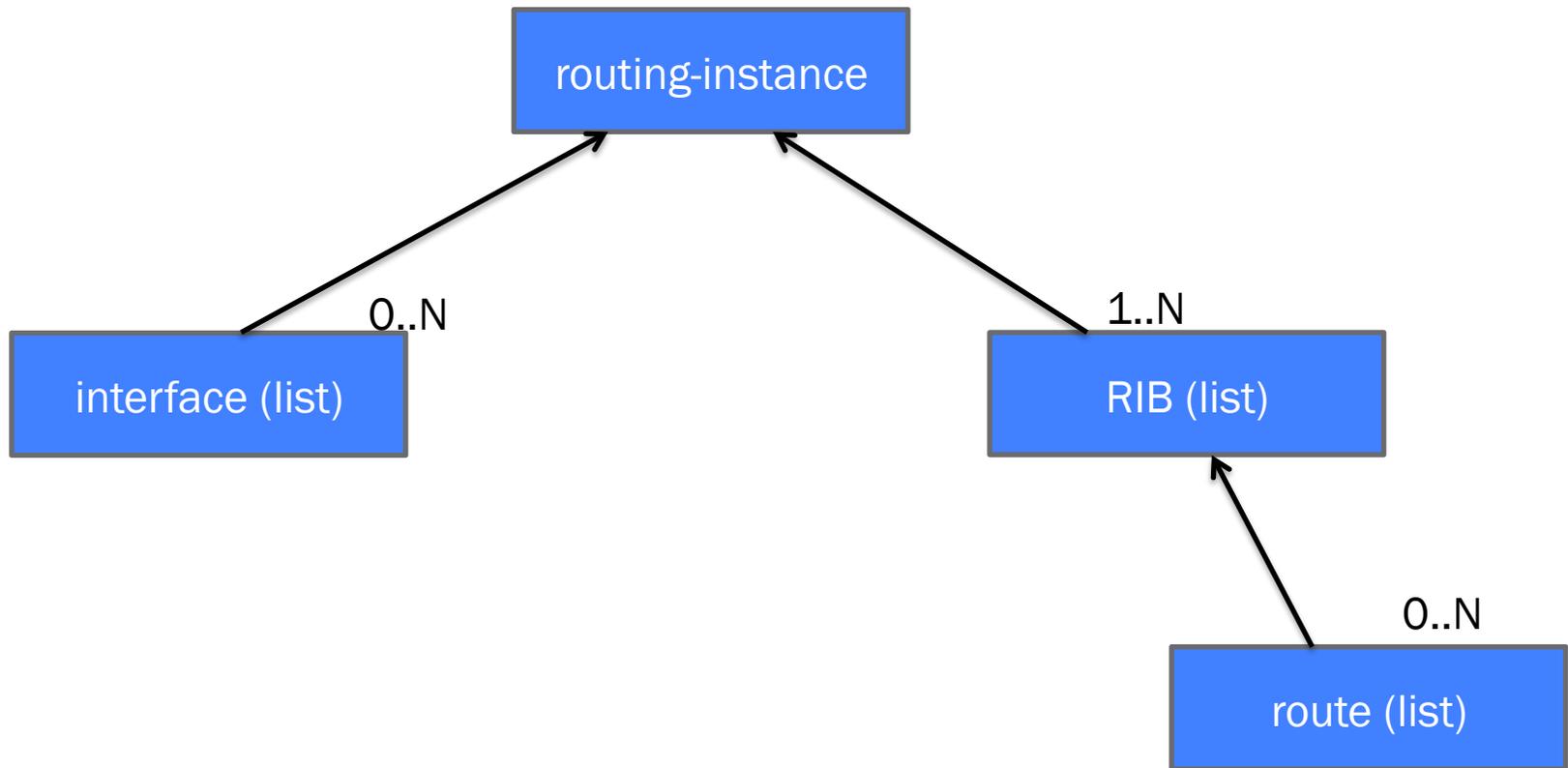
WHAT HAPPENS WHEN ROUTES ARE PROGRAMMED?

- Each route programming results in a response containing:

  - Installed – Yes/No (route got installed in FIB?)

  - Active – Yes/No (route is fully resolved and is a candidate for selection?)

  - Reason (E.g. Not authorized)

ASYNC NOTIFICATIONS

- Async notifications are sent by i2RS agent to Controller on a RIB change
  - Route change notification (route installed?)

  - Route resolution status (resolved/unresolved?)
  - Reason for notification

- RIB change event examples
  - Active route is no longer active because of a better admin-distance route by protocol FOO
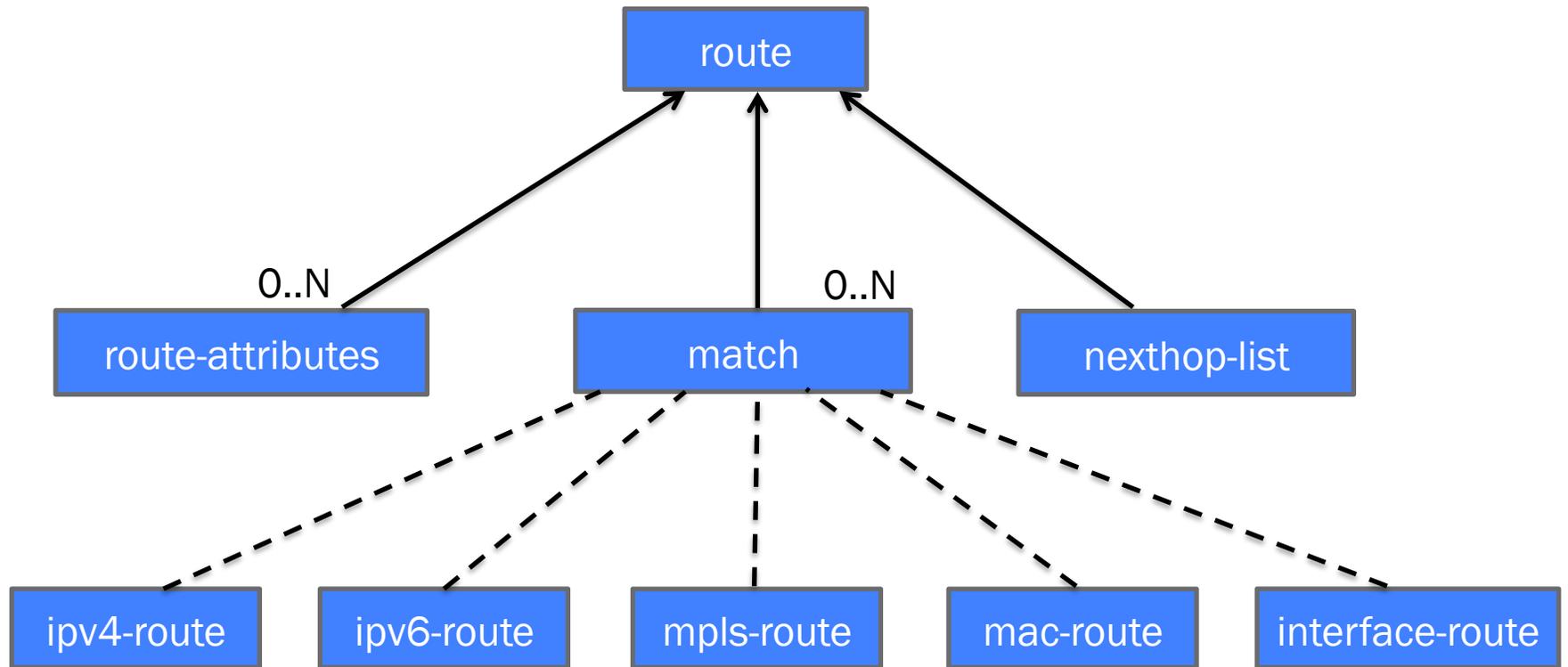 - Inactive route became active as a side-effect of transport LSP coming UP

Push Notification Service

MODELING A BASIC ROUTING INSTANCE

```
                    ┌─────────────────────┐
                    │  routing-instance   │
                    └─────────────────────┘
                      ╱                 ╲
                0..N ╱                   ╲ 1..N
      ┌──────────────────┐        ┌──────────────────┐
      │  interface (list) │        │    RIB (list)    │
      └──────────────────┘        └──────────────────┘
                                           ╲
                                            ╲ 0..N
                                   ┌──────────────────┐
                                   │   route (list)   │
                                   └──────────────────┘
```
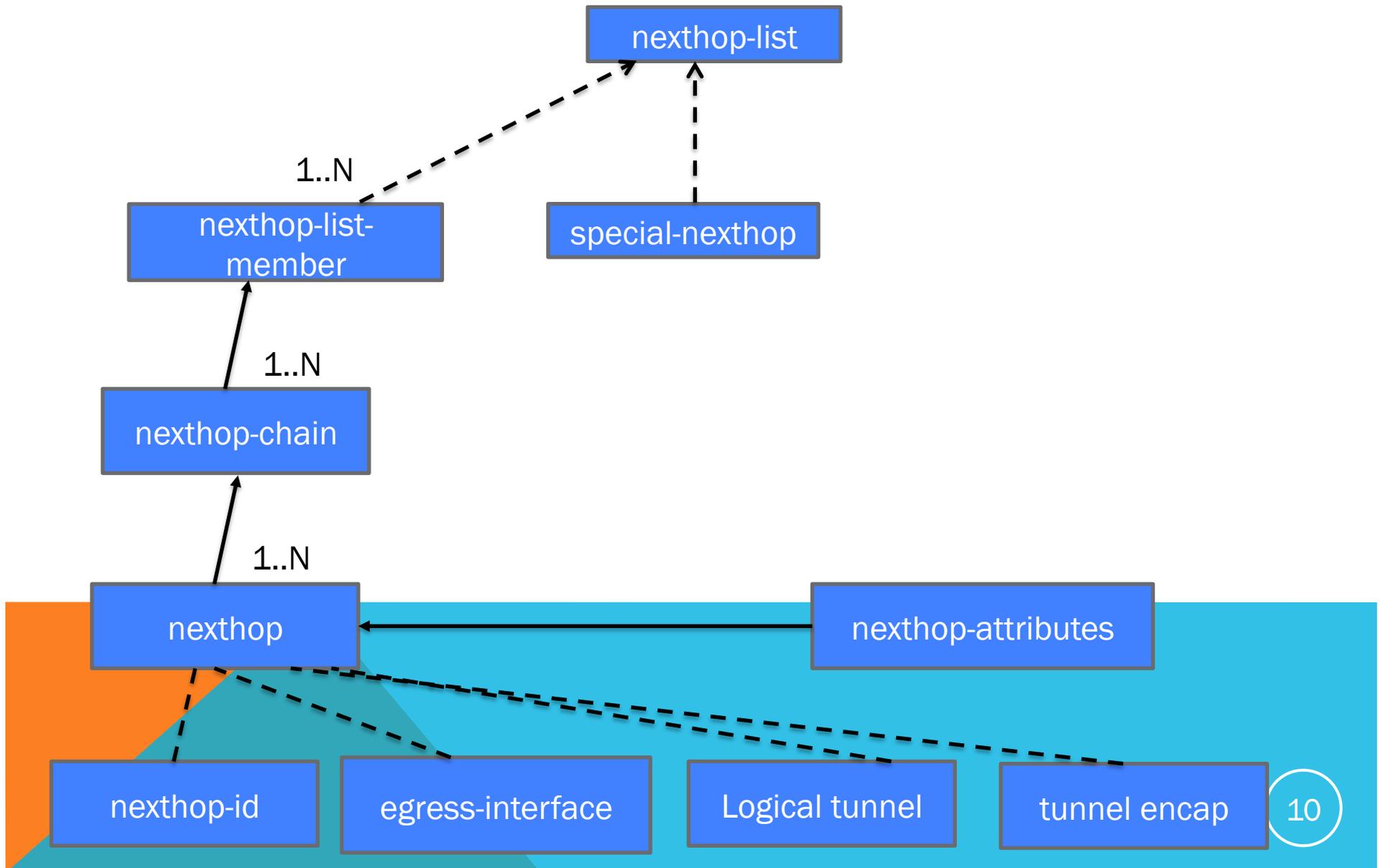
- Removed RIB as an encapsulating object for routing instance

- IETF community needs to decide on name for encapsulating routing-instance object for I2RS overall

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MODELING A ROUTE

MODELING A NEXTHOP

DEVIL IS IN THE DETAILS

- Draft tries to address complex ways of programming the RIB

- Why?
  - Simplistic use-case is a lab experiment, not a deployment
  - Router vendors have enough experience with multiple deployments, so RIB usage is typically known

SOLVING USE-CASES

- Preventing DDOS attacks by installing better preferred routes

- Dynamically creating replication lists (for multicast) …based of offline receiver information

- Optimizing end-to-end load-balancing of traffic across multiple edge devices

- Lots of good feedback on the list

- Resolve terminology and address review comments

- Resubmit draft and re-issue call for WG adoption