# Making Route Servers Aware of Data Link Failure at IXPs
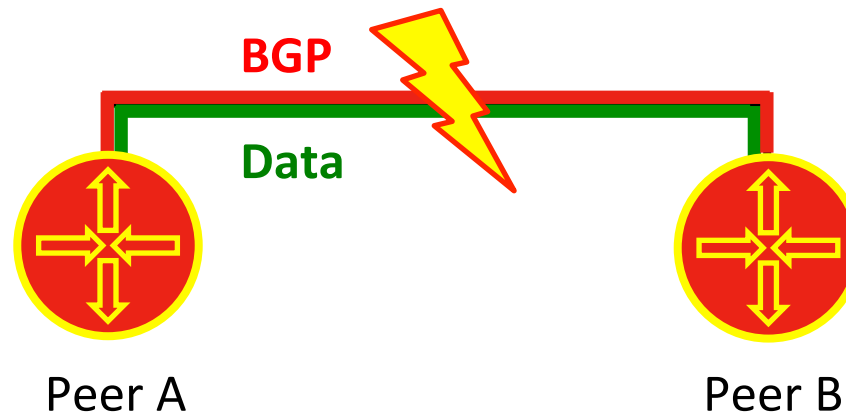
Discussion: Internet Draft

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# Typical Scenario: BGP Session



If the **data plane** breaks, the **control plane** is able to detect this.

# Challenge: Route Server at IXPs

**Route Server**

**BGP**  **BGP**  **IXP**

**Data**

**Peer A**
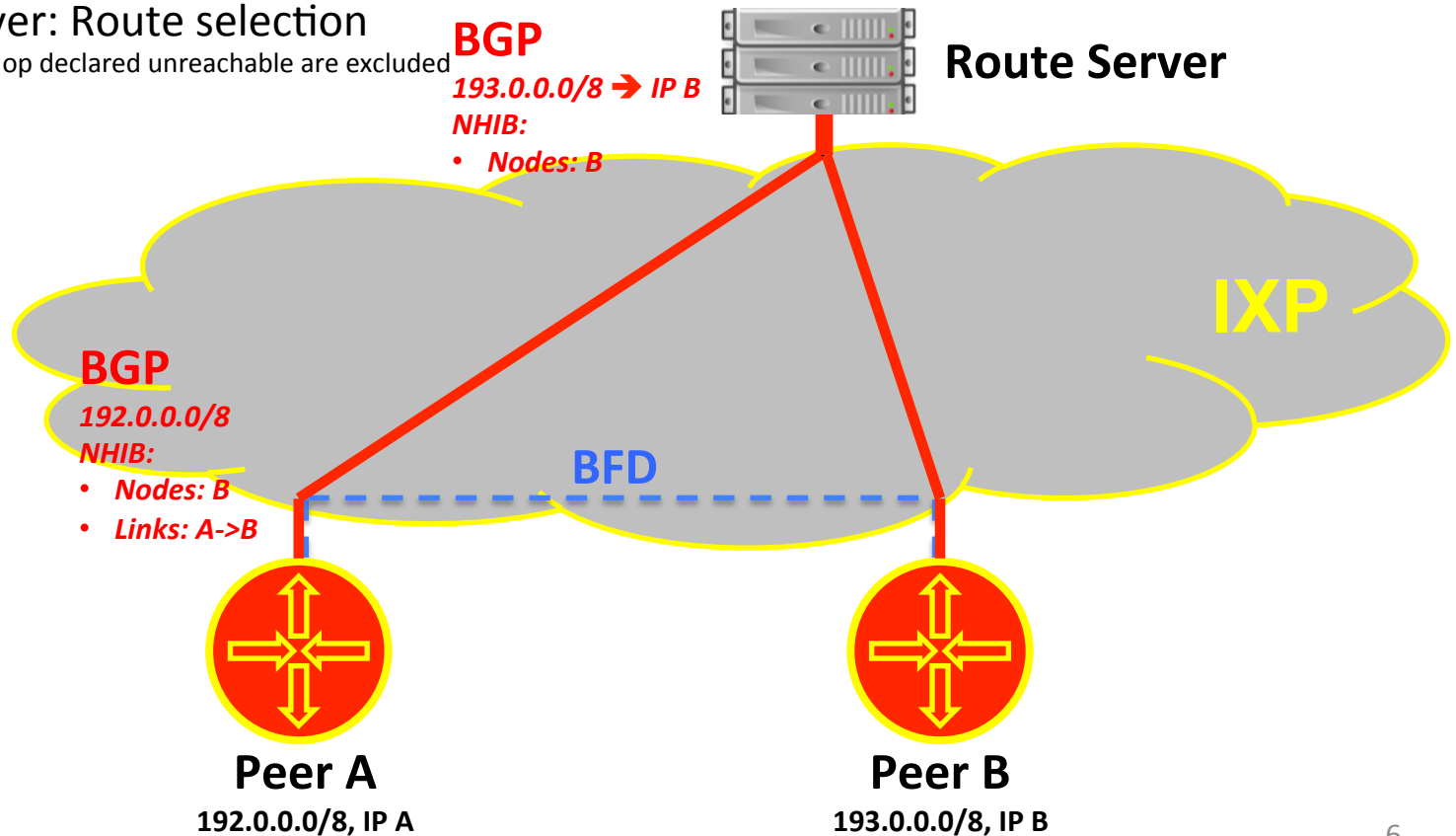192.0.0.0/8, IP A

**Peer B**
193.0.0.0/8, IP B
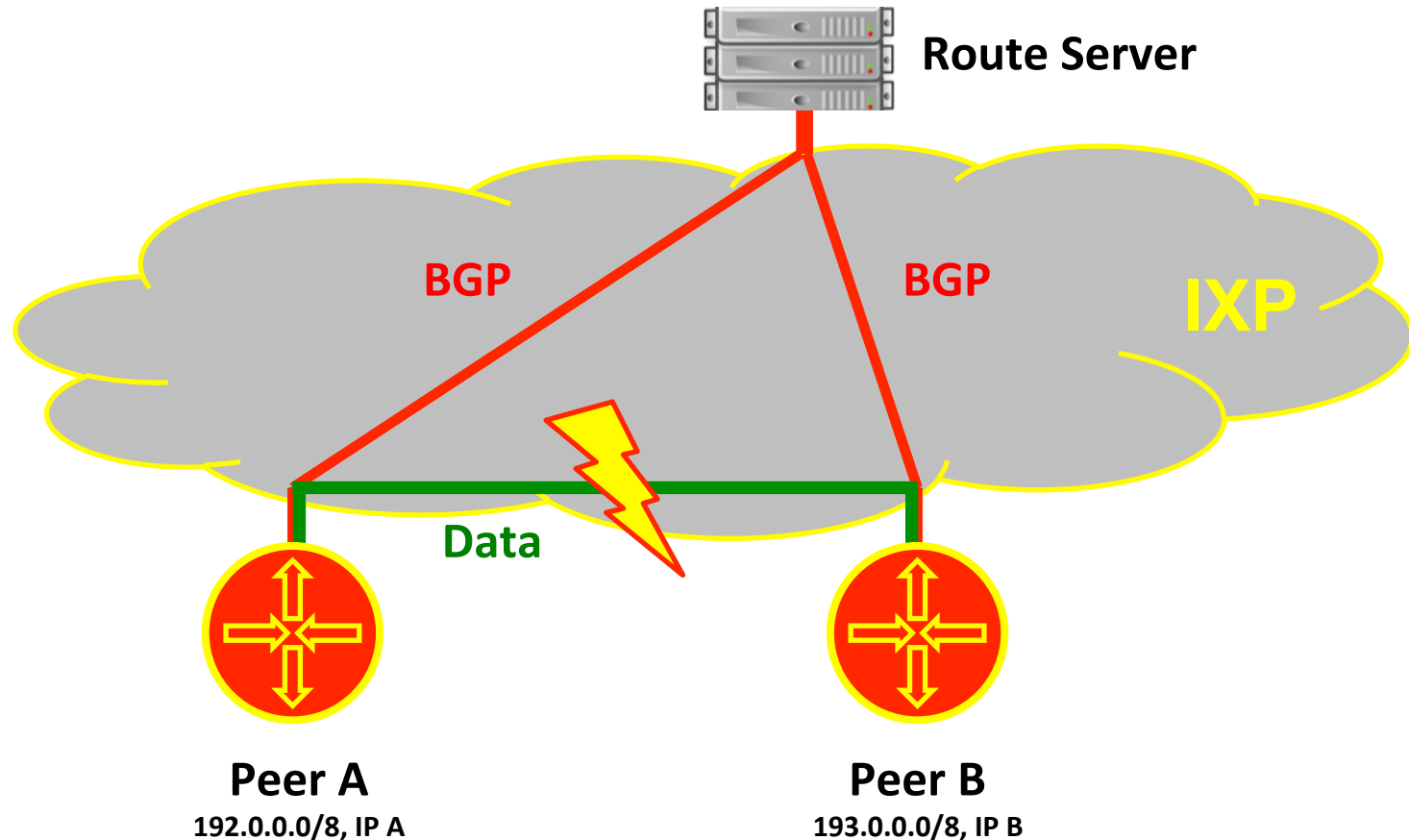
*Problem:* If the **data plane** breaks, the **control plane** is not able to detect this. Data traffic is lost!

# Solution

1. Client routers must have a means of verifying connectivity amongst themselves
   → **Bidirectional Forwarding Detection, RFC 5880**

2. Client routers must have a means of communicating the knowledge so gained back to the route server
   → **North-Bound Distribution of Link-State and TE Information using BGP, Draft**

- Bidirectional Forwarding Detection (BFD):
  - Hello packets are exchanged between two client routers (comparable to BGP Hello)
  - Asynchronous mode (default)
  - Rate: 1 packet / second, detection after 3 missing packets
- North-Bound Distribution of Link-State and TE Information using BGP (BGP-LS):
  - Model IXP network as nodes (client routers and route server) and links (data plane reachability)
  - Per peer: Next-Hop Information Base (NHIB) stores reachability for all next-hops
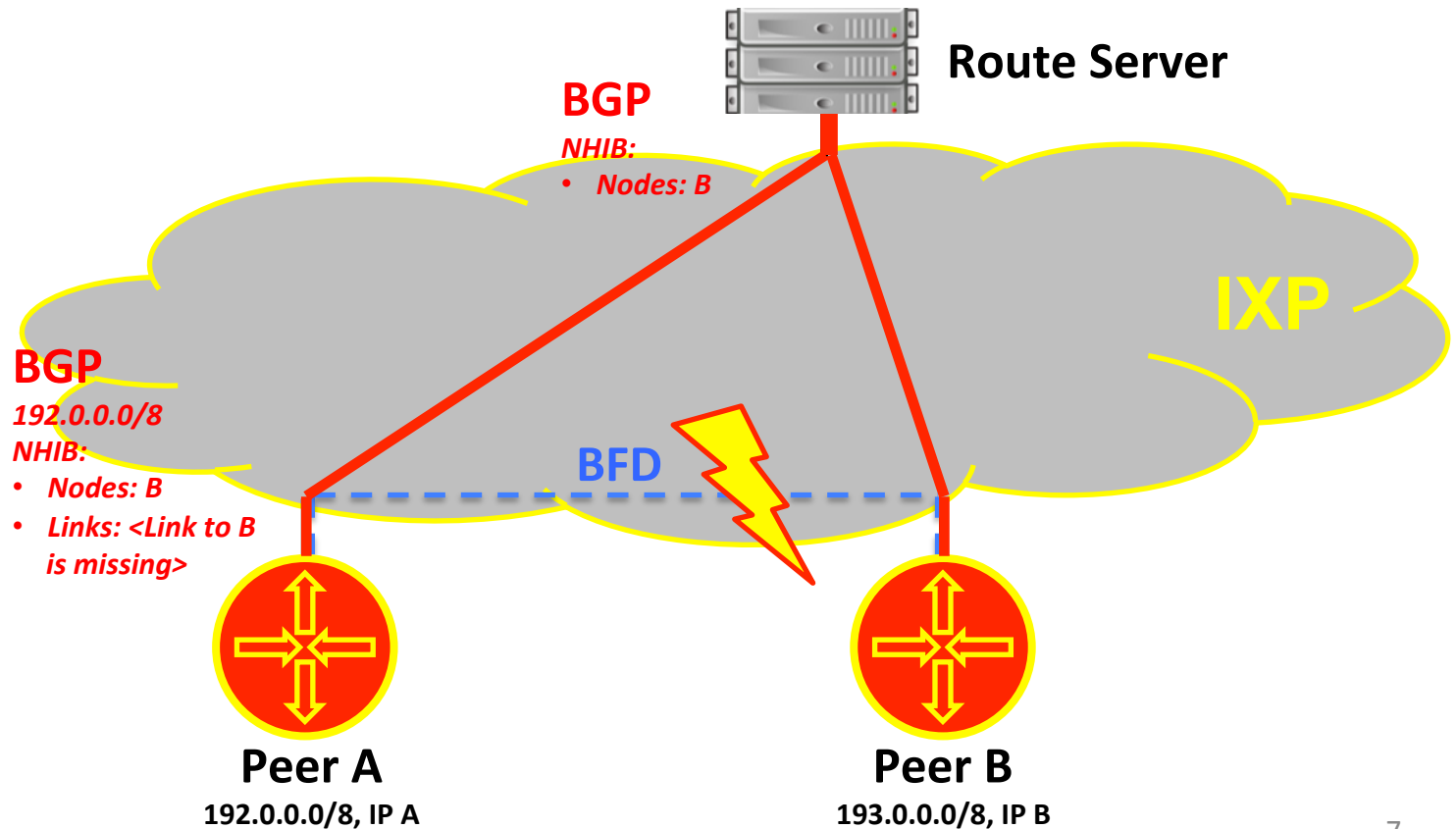
# Solution

1. Route Server: NHIB updated

2. Client Router: Verify connectivity
BFD connections are setup automatically

3. Client Router: NHIB updated

4. Route Server: Route selection
All routes with next hop declared unreachable are excluded

**BGP**
*193.0.0.0/8 ➔ IP B*
*NHIB:*
- *Nodes: B*

**Route Server**

**IXP**

**BGP**
*192.0.0.0/8*
*NHIB:*
- *Nodes: B*
- *Links: A->B*

**BFD**

**Peer A**
**192.0.0.0/8, IP A**

**Peer B**
**193.0.0.0/8, IP B**

# Data Link Breakage

1. Client Router: Data link break detected

2. Client Router: NHIB updated

3. Route Server: Route selection

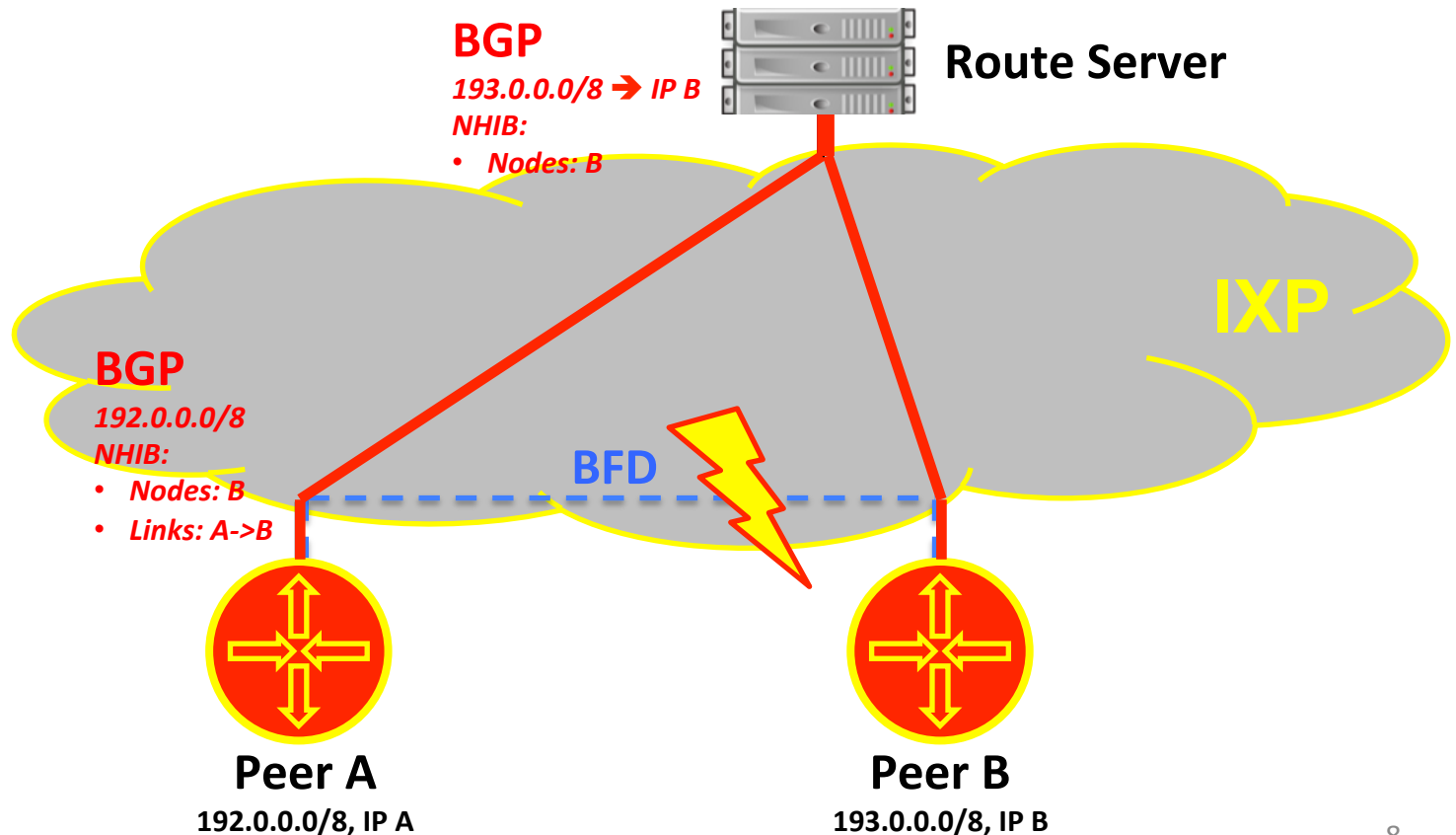All routes with next hop declared unreachable are excluded



**Route Server**

**BGP**

*NHIB:*
- *Nodes: B*

**IXP**

**BGP**

*192.0.0.0/8*
*NHIB:*
- *Nodes: B*
- *Links: <Link to B is missing>*

**BFD**

**Peer A**
**192.0.0.0/8, IP A**

**Peer B**
**193.0.0.0/8, IP B**

# Data Link Healing

1. Client Router: Re-establishing BFD session
2. Client Router: NHIB updated
3. Route Server: Route selection
All routes with next hop declared reachable are included

# Status of Internet Draft

- Inter Domain Routing Working Group adoption achieved
- **http://datatracker.ietf.org/doc/draft-ymbk-idr-rs-bfd/**
- Feedback highly appreciated: Inter Domain Routing (IDR) mailing list: **https://www.ietf.org/mailman/listinfo/idr**
- We switched from "Carrying next-hop cost information in BGP" to BGP-LS?
  - NH-Cost Internet Draft is inactive and not supported by router vendors
  - BGP-LS provides similar mechanisms and is / will be implemented by router vendors
  - Any comments on this?

# Questions, Comments, Feedback?

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**Thank you!**