Making Route Servers Aware of Data Link Failure at IXPs

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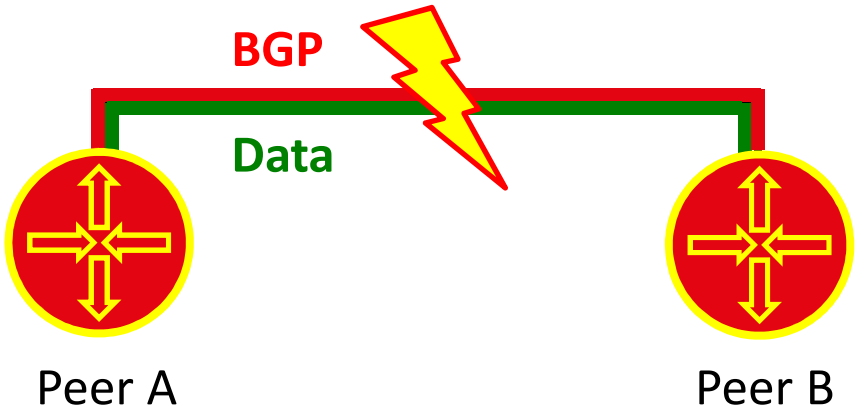
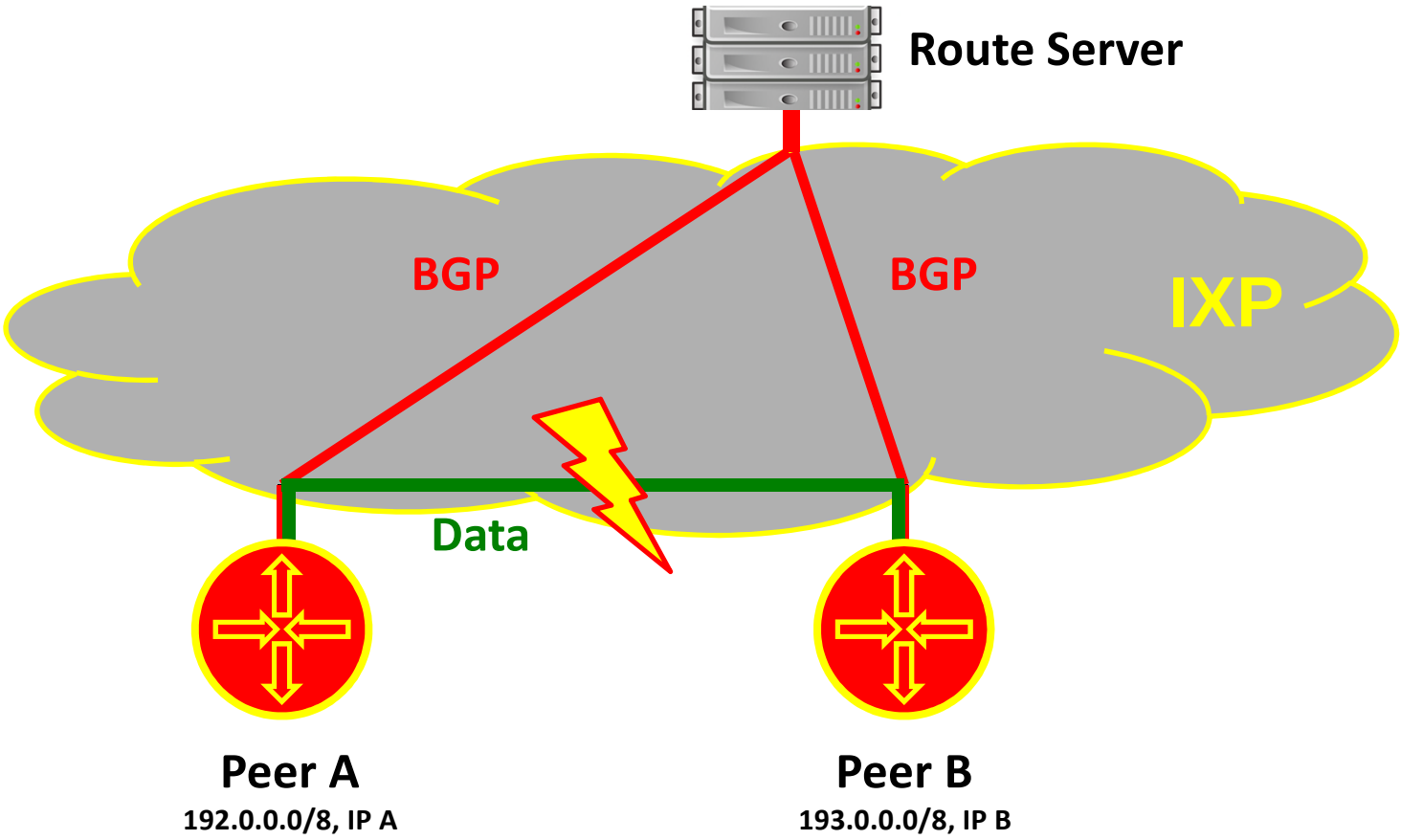
Typical Scenario: BGP Session



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

Challenge: Route Server at IXPs



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

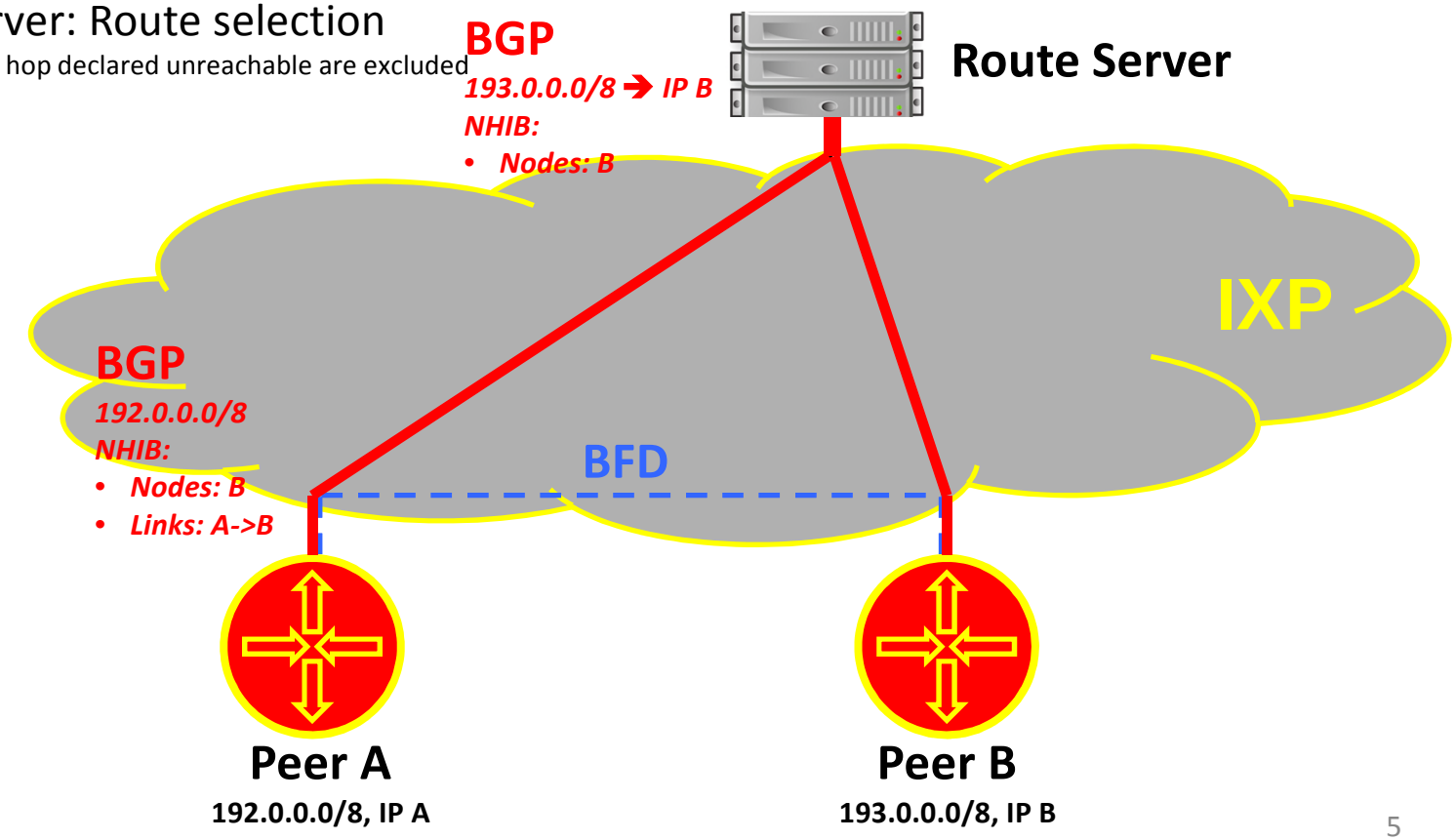
Solution

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

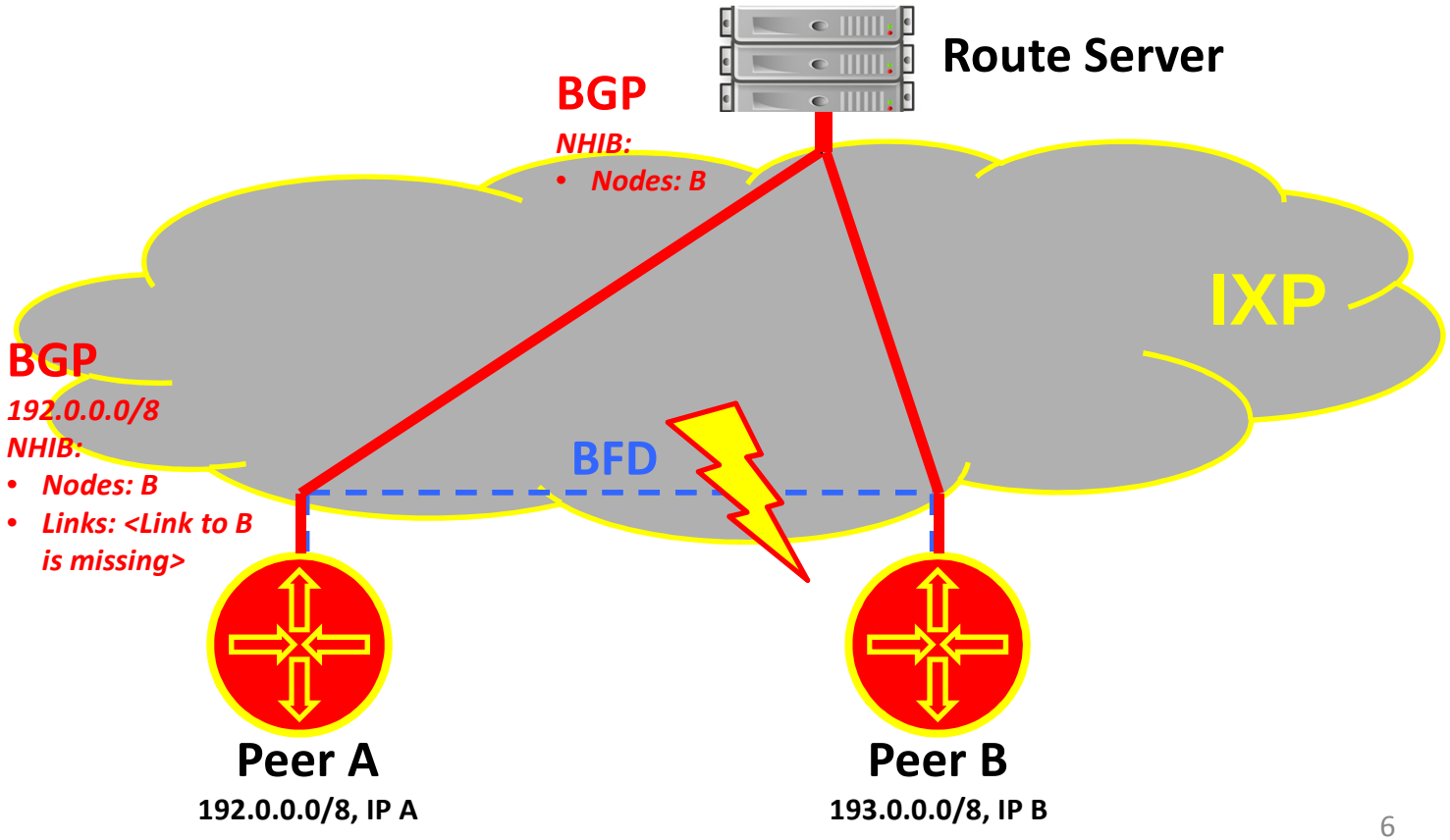
All routes with next hop declared unreachable are excluded



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



Status of Internet Draft

- IDR WG adoption achieved
- Version 00 -> 01: Switch from NH-Cost 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