Motivations

• Add-paths introduces the ability for BGP speakers to advertise multiple paths for the same prefix/NLRI
  – Faster failover, better loadsharing, reduced routing churn…

• draft-ietf-idr-add-paths-03 describes the protocol mechanics but lacks detail about use cases

• New draft provides best practice recommendations for add-path implementers and network planners
  – Ease multi-vendor interoperability
  – Ensure nodal and network impacts are understood and manageable
Typical Add-Paths Deployment Scenario

- **AS 100**
  - RR
  - PE1
  - PE2
  - PE3
  - PE4

- **AS 200**
  - ASBR

Routing prefixes used:
- 10.0.0.0/24[A]
- 10.0.0.0/24[B]

Add-paths negotiated:
- PE1 to ASBR
- PE2 to ASBR
- PE3 to ASBR
- PE4 to ASBR

Add-paths not negotiated:
- PE1 to RR
- PE2 to RR
- PE3 to RR
- PE4 to RR

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Add-paths negotiated

Add-paths not negotiated
Node/Network Impacts of Add-Paths

• Node
  – More avg. paths per prefix = more memory
  – RIB-OUT complexity: need to keep track of all peers to which path X:prefix Y has been advertised

• Network
  – Less routing churn: adv -> withdraw -> adv etc.
Key Question #1

- How to limit the number of paths per prefix to manage resource/memory impact?
  - Globally, per peer, per prefix
  - Send limit vs. receive limit

- Routing consistency is important
  - Need flexibility to advertise different number of paths to different peers without increasing the risk of routing loops
Key Question #2

• Which paths to advertise?
  – N best, full BGP decision process at each iteration
  – All best (subject to multipath constraints) + all second-best (subject to multipath constraints)
  – All best (subject to multipath constraints) + single second-best
  – etc.

• Need to consider the application
  – Fast failover, loadsharing, route oscillation mitigation
Questions?