Protect your peering edge - review

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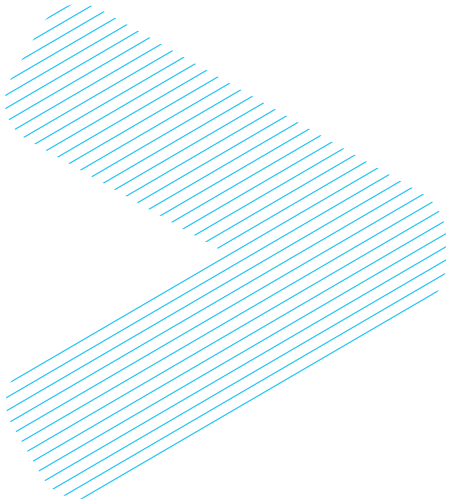

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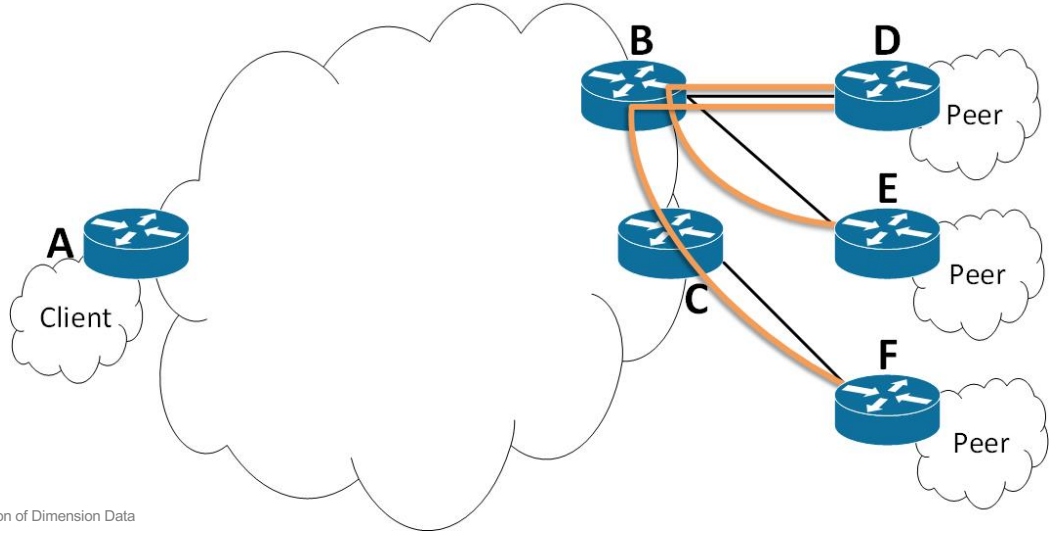
Why?

- You will receive traffic not destined for you or your clients.
- To limit the risk of becoming an unintended transit provider.



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Option 1: “First steps”

- No valid 0/0.
- Partial advertisements from RRs.
- iACLs.
- Split transit and peering layers.

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Advantages of this approach?

- ✓ Easy to implement.
- ✓ Covering the majority of cases.

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Disadvantages of this approach?

- ✕ Manual approach.
- ✕ Error prune.
- ✕ No multiservice edge approach.
- ✕ “Trickier” relationships.

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Option 2: QPPB (QoS Policy Propagation via BGP)

- Cisco, Huawei: QPPB.
- Juniper: SCU/DCU.
- Alcatel, Nokia: QPPB.

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What is QPPB?

- QPPB: QoS Policy Propagation via BGP.
- BGP advertisement classification.
- The BGP advertisement inherits the classification of the associated BGP session.
- **Any ingress packet will get the same classification as the destination.**

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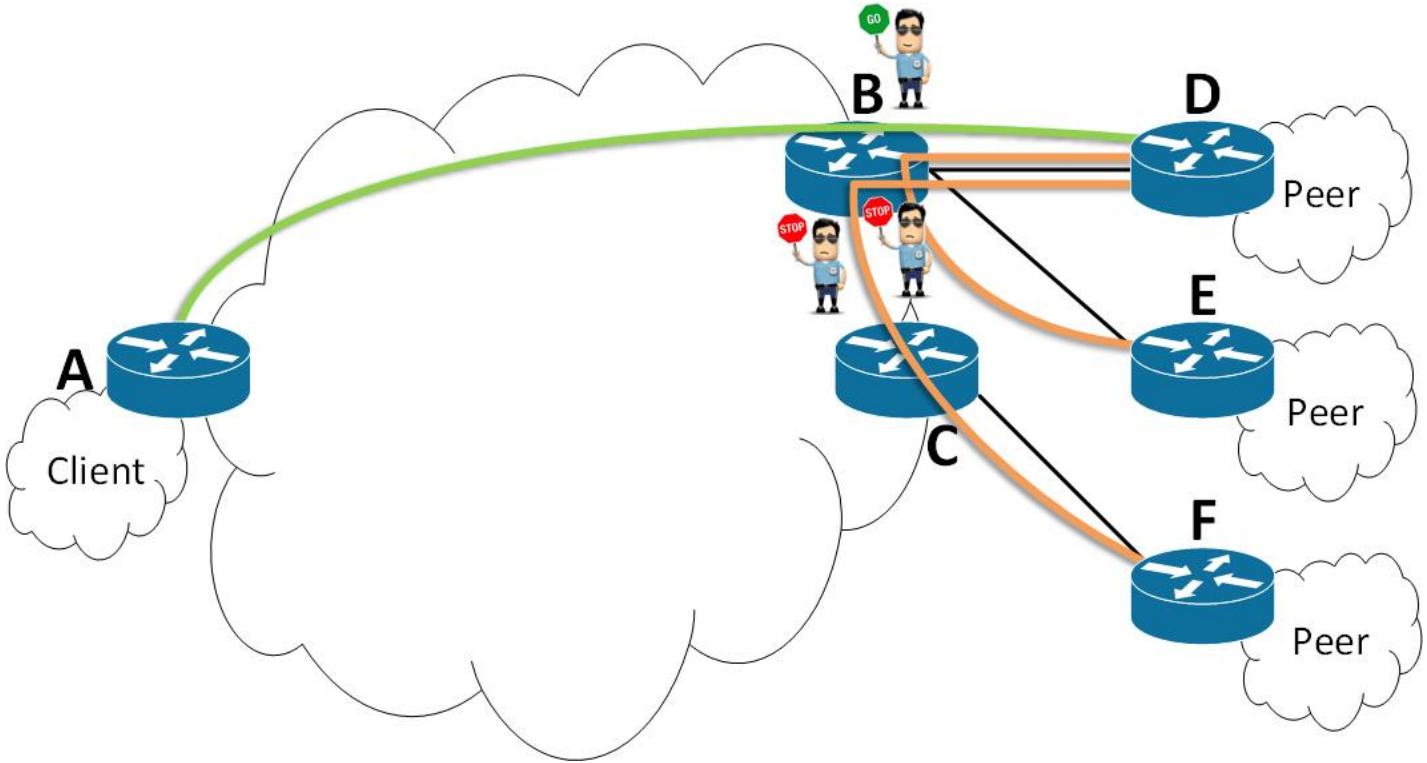
What is QPPB? (2)



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How does QPPB work?

Step 1: Tag peer prefixes uniquely within BGP and FIB tables.

- Mark peer prefixes with community attribute (P) and tag (P).
- Mark transit prefixes with community attribute (P) and tag (P).
- Mark client prefixes with community attribute (C) and tag (C).

```
route-policy qosgroup_map
if community matches-any P-comm
then
set qos-group 7
else
set qos-group 1
endif
end-policy
!
router bgp <your ASN>
address-family ipv4 unicast
table-policy qosgroup_map
```

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How does QPPB work? (2)

Step 2: Tag external packets at peering locations based upon longest prefix matching within FIB.

- Received from peer/transit and destined to peer/transit: tag as (P).
- Received from peer/transit and destined to client: tag as (C).

int gi0/0/0
ipv4 bgp policy propagation input qos-group destination

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How does QPPB work? (3)

Step 3: Packet classification via MQC.

```
class-map match-any EXT
 match qos-group 7
 end-class-map
!
policy-map qppb_set_dscp
 class EXT
  police rate percent 1
   conform-action drop
  !
 class class-default
  set dscp af11
 end-policy-map
!
int gi0/0/0
service-policy input qppb_set_dscp
```

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Advantages of QPPB?

- ✓ Sustainable option.
- ✓ Multiservice functionality can be done.
- ✓ No need to do filtering on RRes.

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Disadvantages of QPPB?

- Difficult to understand.
- Still prune to configuration errors (”human factor”):
  - Blackholing.
  - Missing enforcement.
- Only granular to a BGP level.

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Option 3: BGP EPE

- Based on a Segment Routing (SR) implementation.
- SR will bring you benefits such as the following:
  - Less protocols.
  - Programmability.
  - Scaling.
  - Better granular control.
- Tutorials on SR: http://www.segment-routing.net/tutorials/

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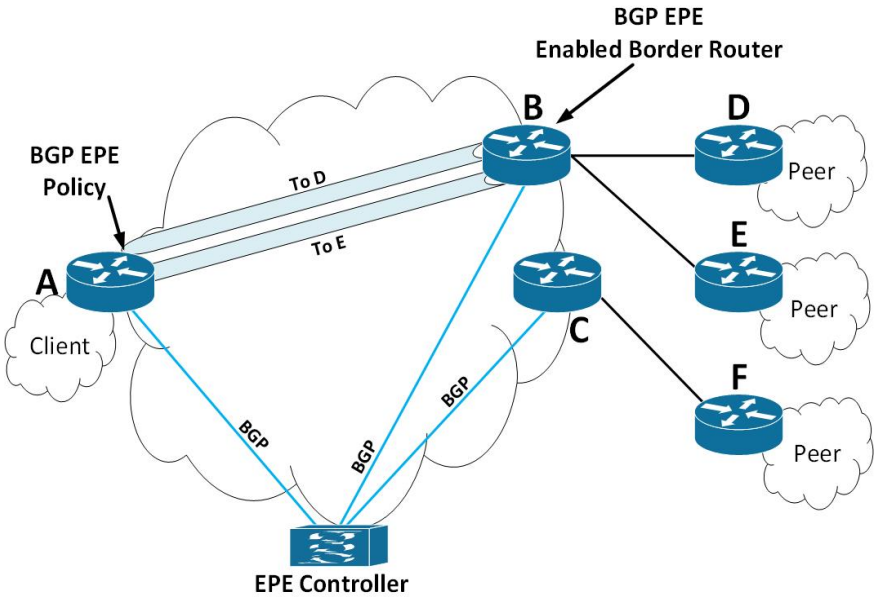
BGP EPE (Egress Peer Engineering)

- Problem statement (RFC7855): “A centralized controller should instruct ingress PE to use a specific egress PE.”
- ”**How To**”: draft-ietf-spring-segment-routing-central-epe.



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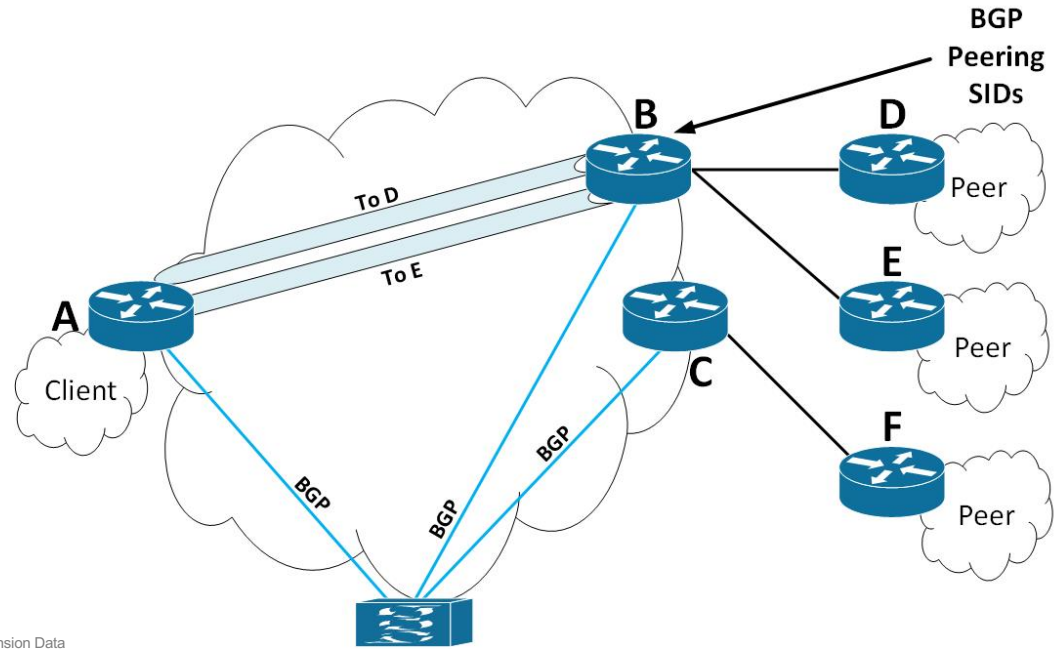
BGP EPE (2)

- BGP Peering SIDs.
  - Locally assigned labels to identify eBGP peers.



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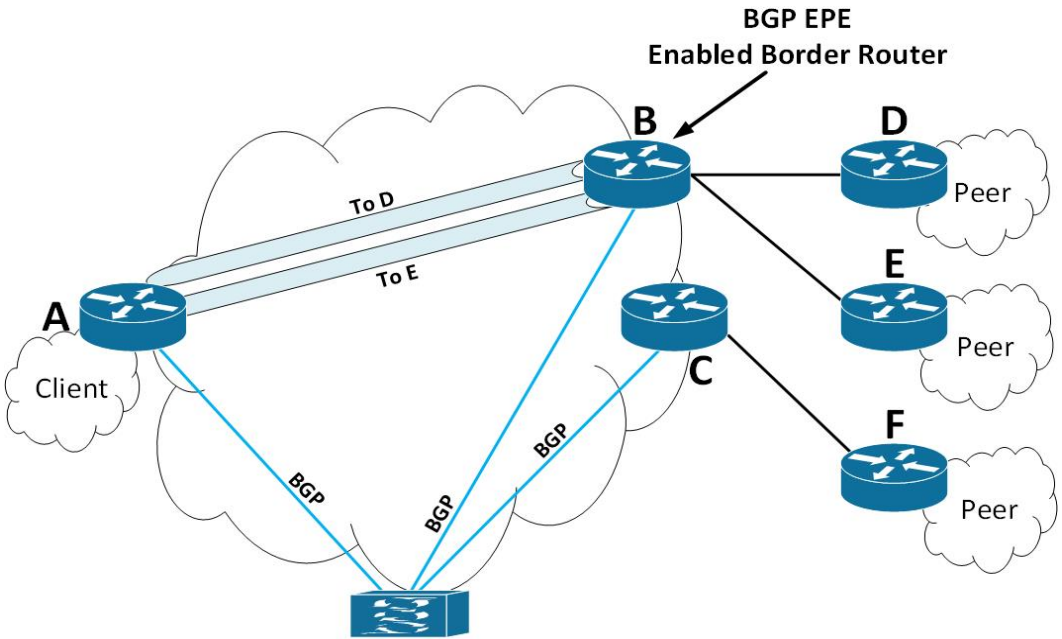
BGP EPE (3)

- BGP EPE enabled border routers.
  - Border device compiling the BGP Peering SIDs.



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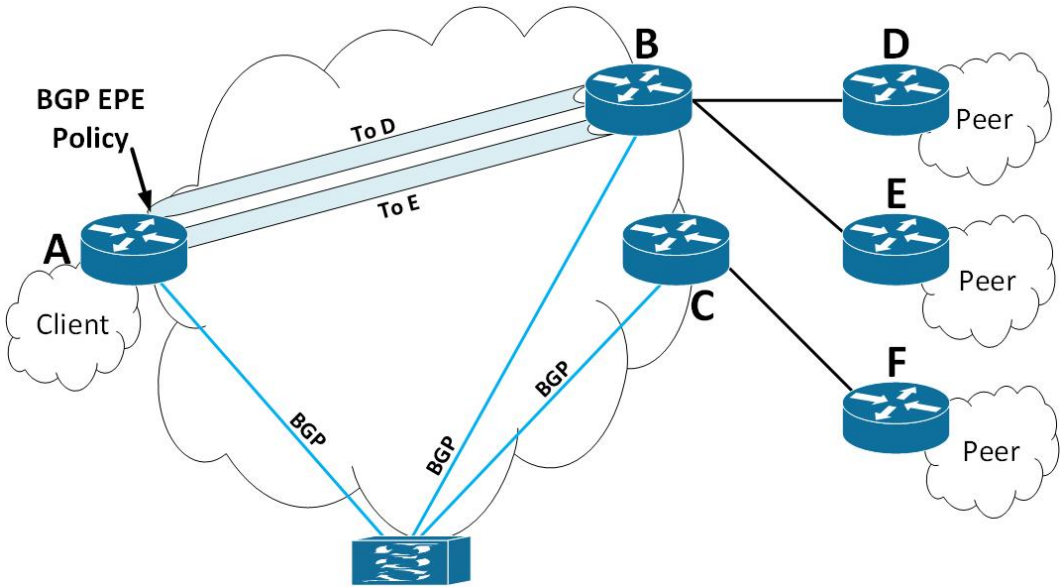
BGP EPE (4)

- BGP EPE ingress policy.
  - Program path to BGP EPE edge router.



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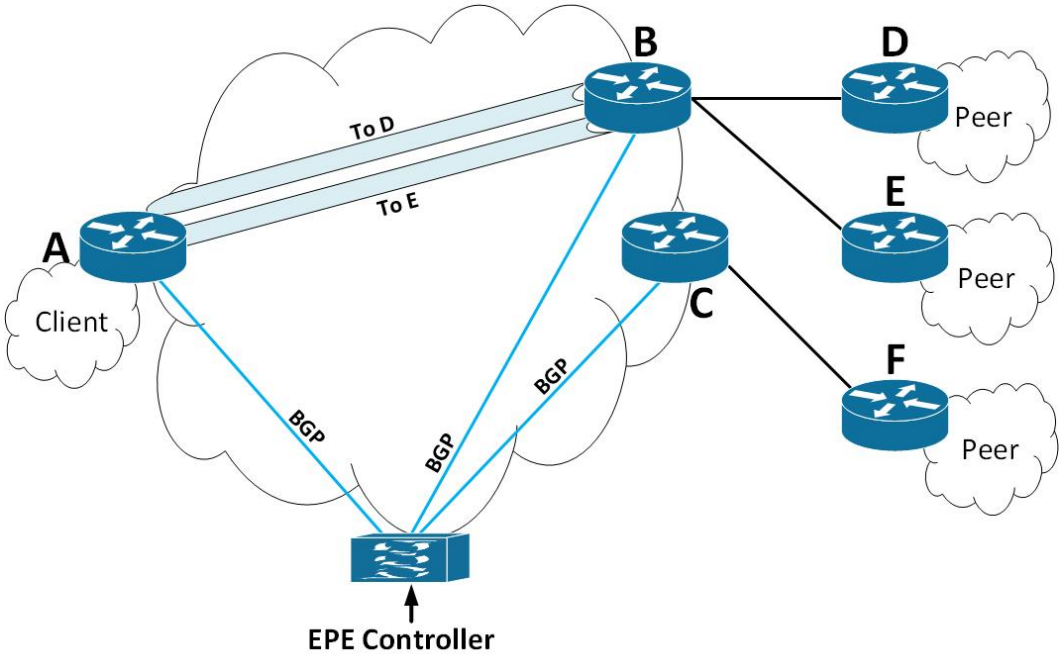
BGP EPE (5)

- BGP EPE Controller.
  - PCE based.



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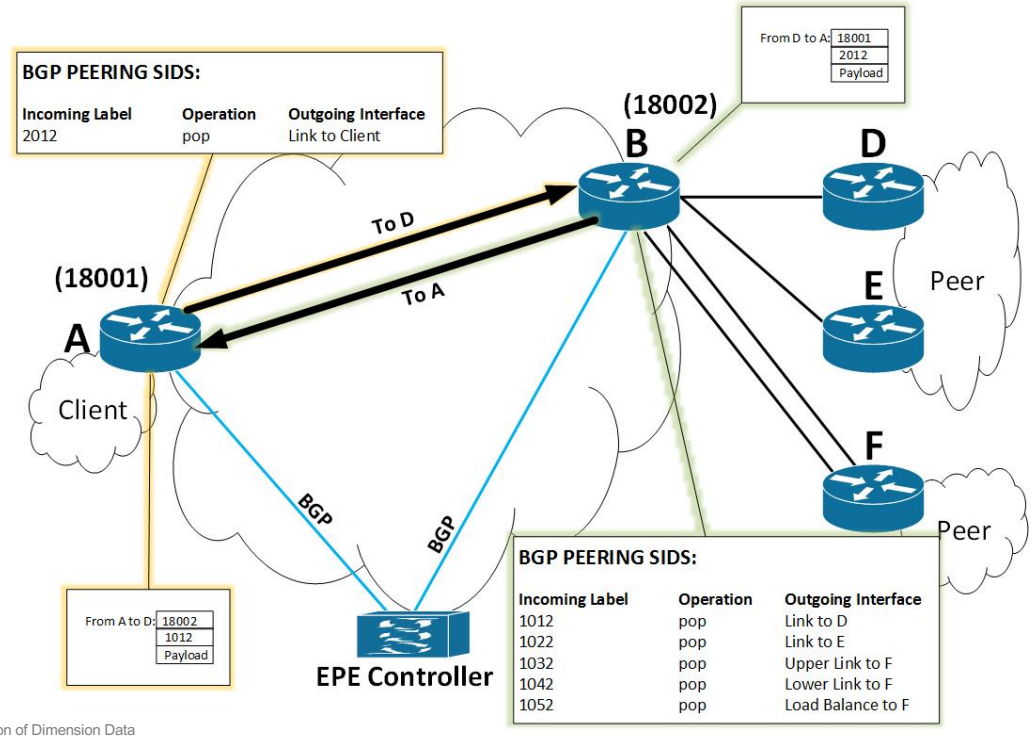
BGP EPE (6)

- Example 1: Traffic from A to D.



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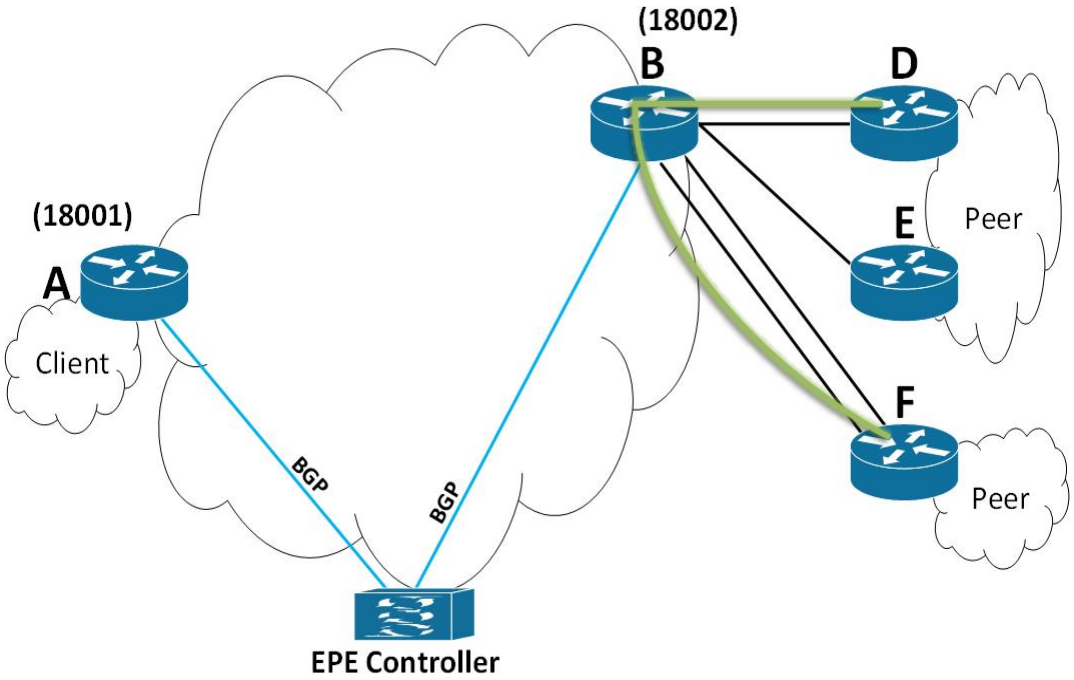
BGP EPE (7)

- Example 2: Traffic from D to F.



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Advantages of BGP EPE

- ✓ No longer solely dependent on the classification of BGP.
- ✓ Controller is responsible for classification.
- ✓ Flexibility to override general rules.

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Disadvantages of BGP EPE

- Does need a controller.
- Complexity is moved from network to a controller.
- SR needs to be in use by operator.
- Only limited efficiency (i.e. when labels can be imposed).

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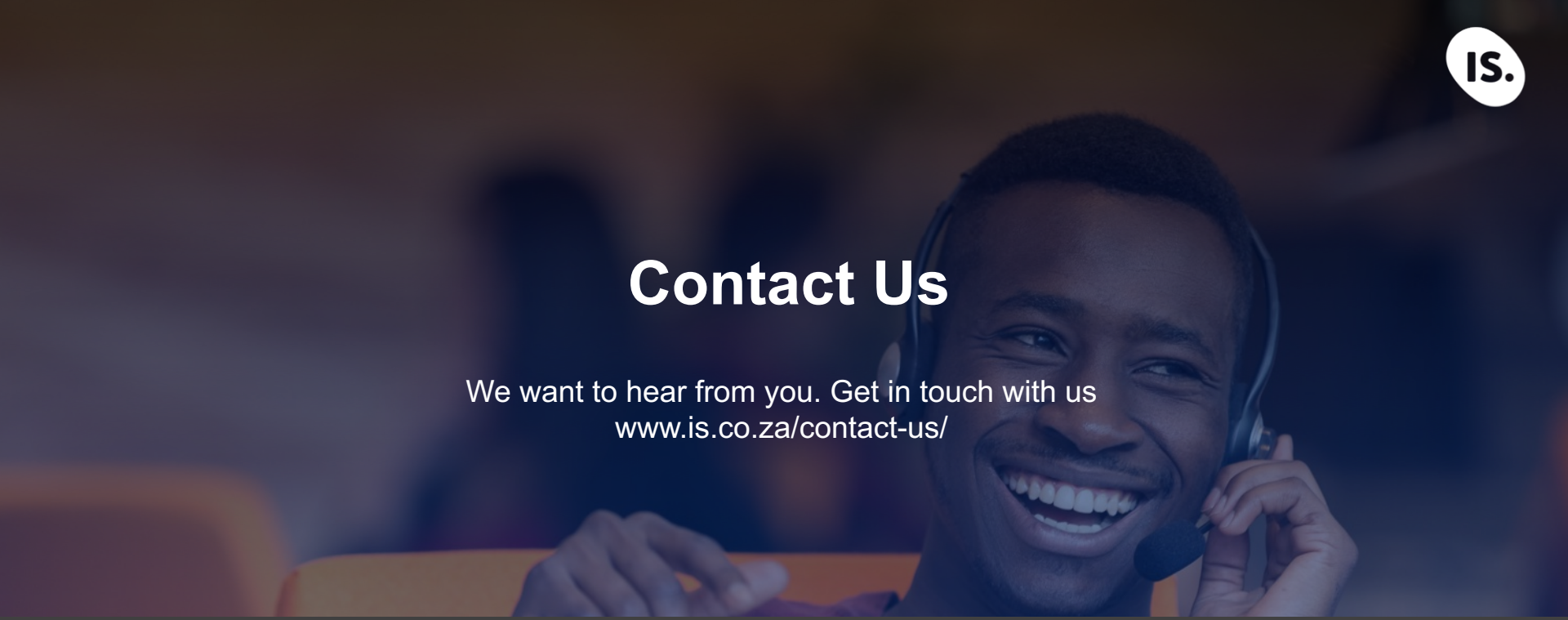
Summary

- BGP EPE:
  - More suitable for typical traffic steering implementation.
- QPPB:
  - Currently the best option for protecting your peering edge.



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