

BIER

Bit Indexed Explicit Replication

Traffic Engineering

draft-eckert-bier-te-arch-01

IETF BIER-WG Prague 07/2015

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BIER-TE reminder

- BitPositions indicate not only “leafs” but also intermediate adjacencies (links, nodes(loopback),...)
- Every BFR BIFT only populated with BitPositions “adjacent” to it.
Enables easy forwarding rules: Copy for all BPs in BIFT AND BitString
BPs in BitString normally reset after used for forwarding to avoid loops
Could mostly only happen when BitString indicates more than a “tree” (loops)
 - If every link/node is given BP, no IGP needed.
IGP only used for “routed adjacencies”
 - Minimizing #BPs needed is the trick
Various extensions/options for “adjacencies” associated with BPs.

BIER-TE -01

- New co-author

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- CLI is not evil, but should be supported

Before embarking into YANG model for Controller->BIER-TE in routers, CLI best to explore and refine API.

Mission specific deployment may be possible even without controller, but purely manual config.

- SI – Set Identifier

Equally useable in TE as in BIER.

All BPs needed to build a tree must be in one SI (like BIER)

If trees to leafs in different SIs share same intermediate hop BPs, these BPs need to be assigned to both SIs -> BP waste. Subject to right design/controller logic to minimize/avoid this problem.

BIER-TE -01

- Encap

Need “something” to distinguish BIER from BIER-TE packet

Different forwarding rules for BitString.

MPLS encap proposal:

Separate label from “BIER” label – allows BFR to then select BIER/BIER-TE forwarding logic.

- ECMP

Why separate ECMP mechanism in BIER-TE over BIER ?

Not directly useable, tied to BIER/IGP. But leverage entropy from BIER header.

BIER-TE wants to support explicit “per-hop” engineering of ECMP alternatives (eg: via different order of alternatives across multiple hops).

BIER-TE -01

- BIER-TE vs. Segment Routing

SR is lightweight replacement of RSVP-TE

Multicast equivalent ? BIER-TE ?!

Loose Source-route hops for traffic engineering - via routed adjacencies.

Need BPs for “steering” (non-replicating) and replicating intermediate hops.

Need “labels” for “steering” hops in SR.

IPTV / contribution network use case examples (Text TBD in doc):

BIER-TE FRR improves recovery. BIER-TE with dual transmission.

Explicitly managed load splitting over alternate paths.

Cost reduction via “steiner” trees.

- FRR

BIER-TE FRR (unchanged): Powerfull but “complex”

Added explanation that existing MPLS FRR can be used instead if available.

Set up “Routed adjacencies” that are MPLS-FRR “protected adjacencies”

BIER-TE -02/03

- 02 – fix up typos/leftover from 00. Sorry
- 03 –
- Encap/Forwarding:
 - What non-MPLS encap is relevant ?
 - Should standardize BIER-TE encap for them as well.
 - FRR
 - Can we generalize BIER-TE FRR to also be used with BIER ?



Bead inside rim creates turbulence to release flavor and aromas as beer enters mouth.

Narrowing the glass at the top retains the hop aroma and sustains the head.

Rounded shape collects aromas.

Laser etchings on bottom create bubbles for constant aroma release.

BIER

TE

Outward turned lip delivers beer to front of tongue where sweetness (malt) is tasted.

Thinner walls and rounded shape maintain proper beer temperature longer.

Questions ?

!! NEW !!

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