CFM in 802.1aq

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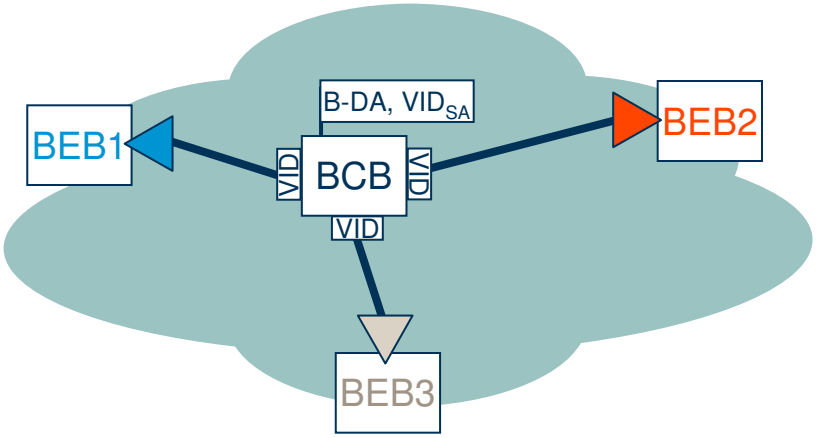
TAKING YOU FORWARD

CFM

- 802.1ag
  - Defines the monitoring of a VLAN service
  - CCM DA: Group MAC address according to Table 8-9
  - LTM DA: Group MAC address according to Table 8-10
  - LBM, LBR, LTR DA: Individual MAC address
- 802.1Qay extensions
  - Define the monitoring of a TESI
  - CCMs: use the addressing information corresponding to the monitored TESI: (<ESP-DA, ESP-SA, ESP-VID>)
  - LBMs and LTMs: use the same rule as CCMs
  - PBB-TE MIP TLV: LBRs and LTRs use parameters of the reverse direction component ESP. The PBB-TE MIP TLV sent in the corresponding LBMs and LTMs provide MIPs with reverse MAC and VID.

Shortest Path Backbone Bridging (SPBB) Format A

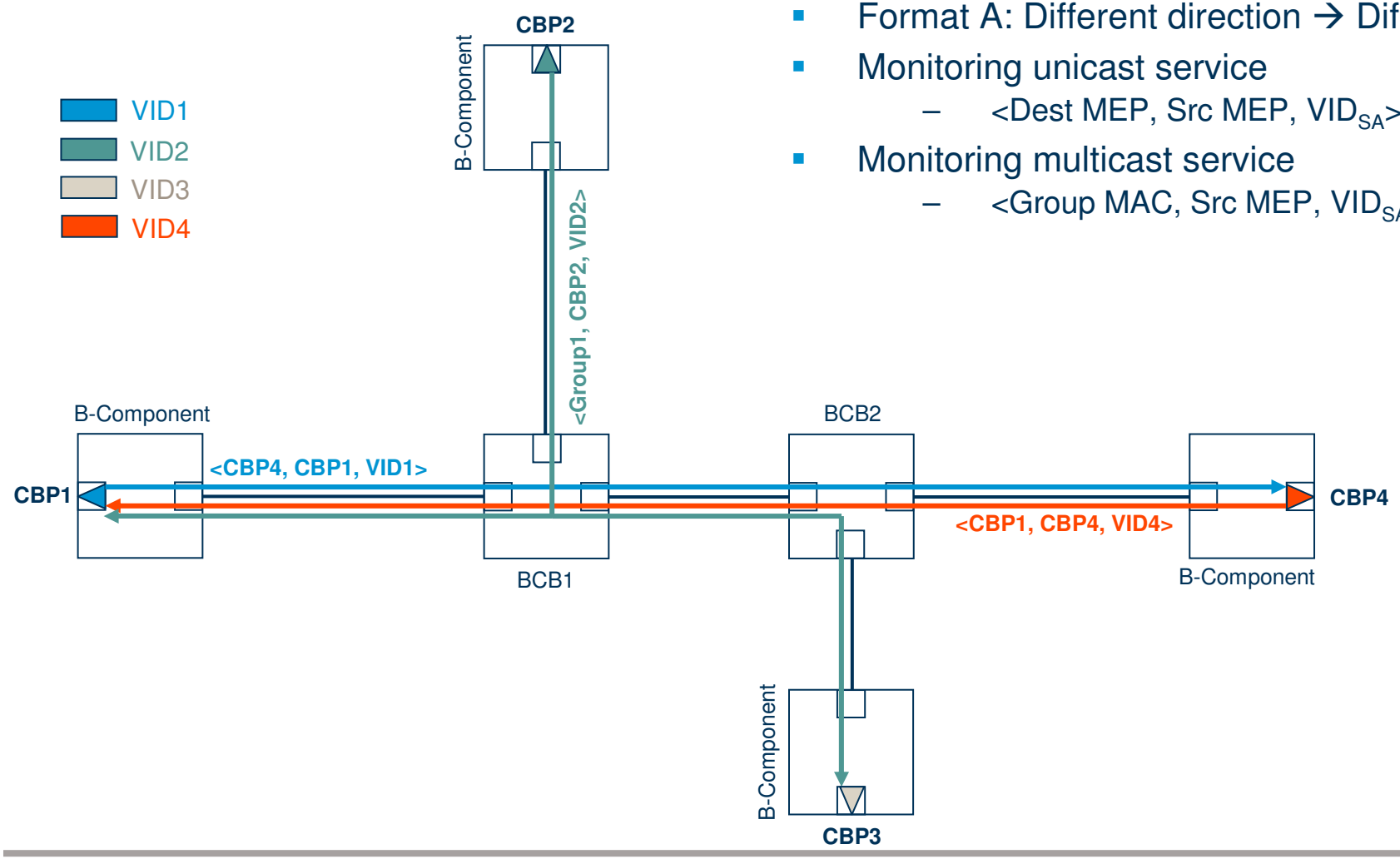
- IS-IS controls the forwarding
  - Managed addresses
  - Individual and Group MAC addresses are configured
  - Non-learning
- SPT ID = VID_{SA} (SPVID)
- Forwarding is based on: B-DA, VID_{SA}
- Ingress Checking is based on: VID_{SA}



CFM

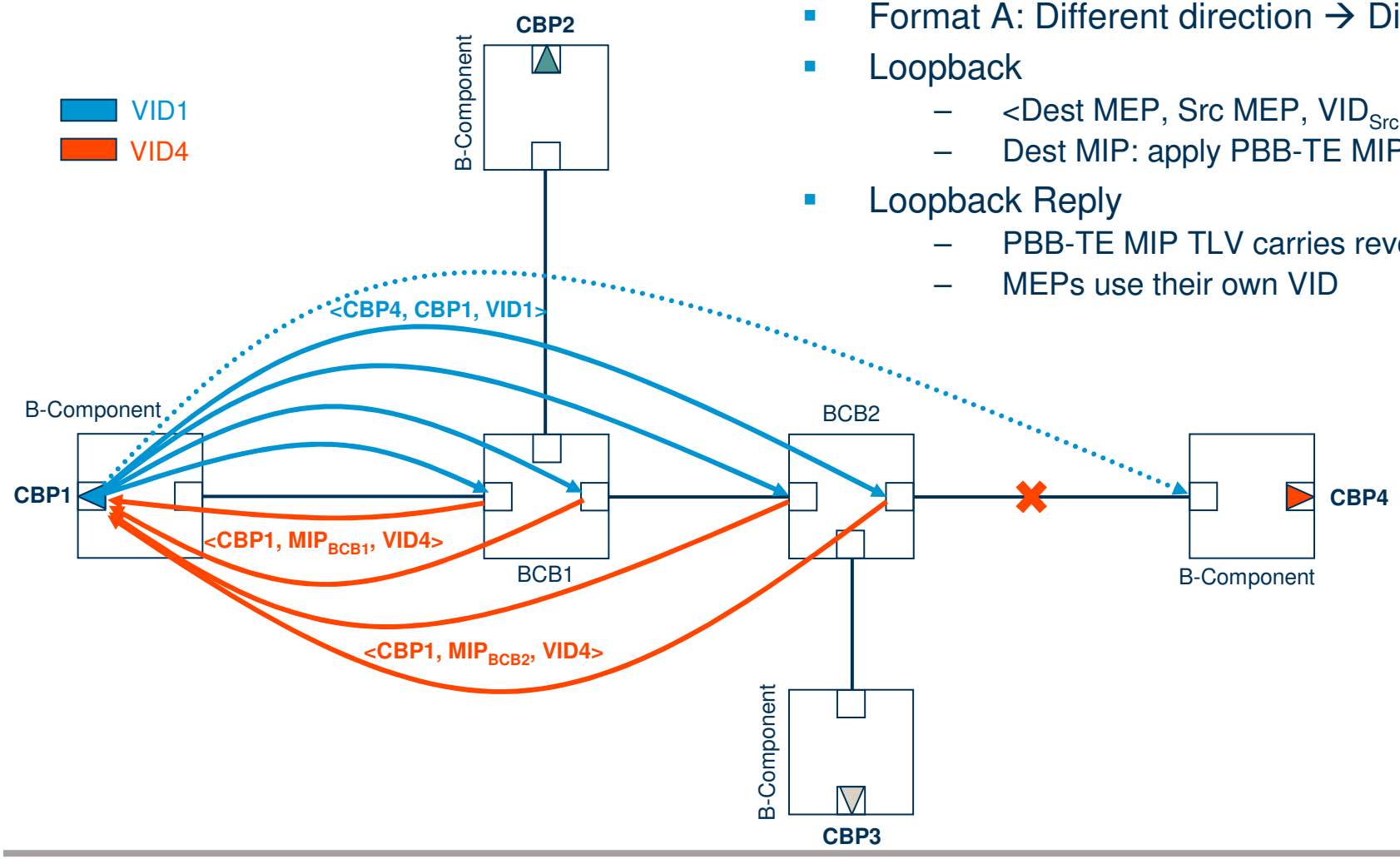
- Both Individual and Group MAC addresses have to be monitored
- CCM DA: BEB B-DA or Group B-DA
- LTM DA: BEB B-DA or Group B-DA
- LBM DA: BEB B-DA
- CCM, LTM, LBM VID = VID_{SA}
- LTR and LBR: What is the VID?
  - Reverse VID is carried in PBB-TE MIP TLV of LBM and LTM (SPVID of LTM or LBM DA)

SPBB Format A Continuity Check protocol



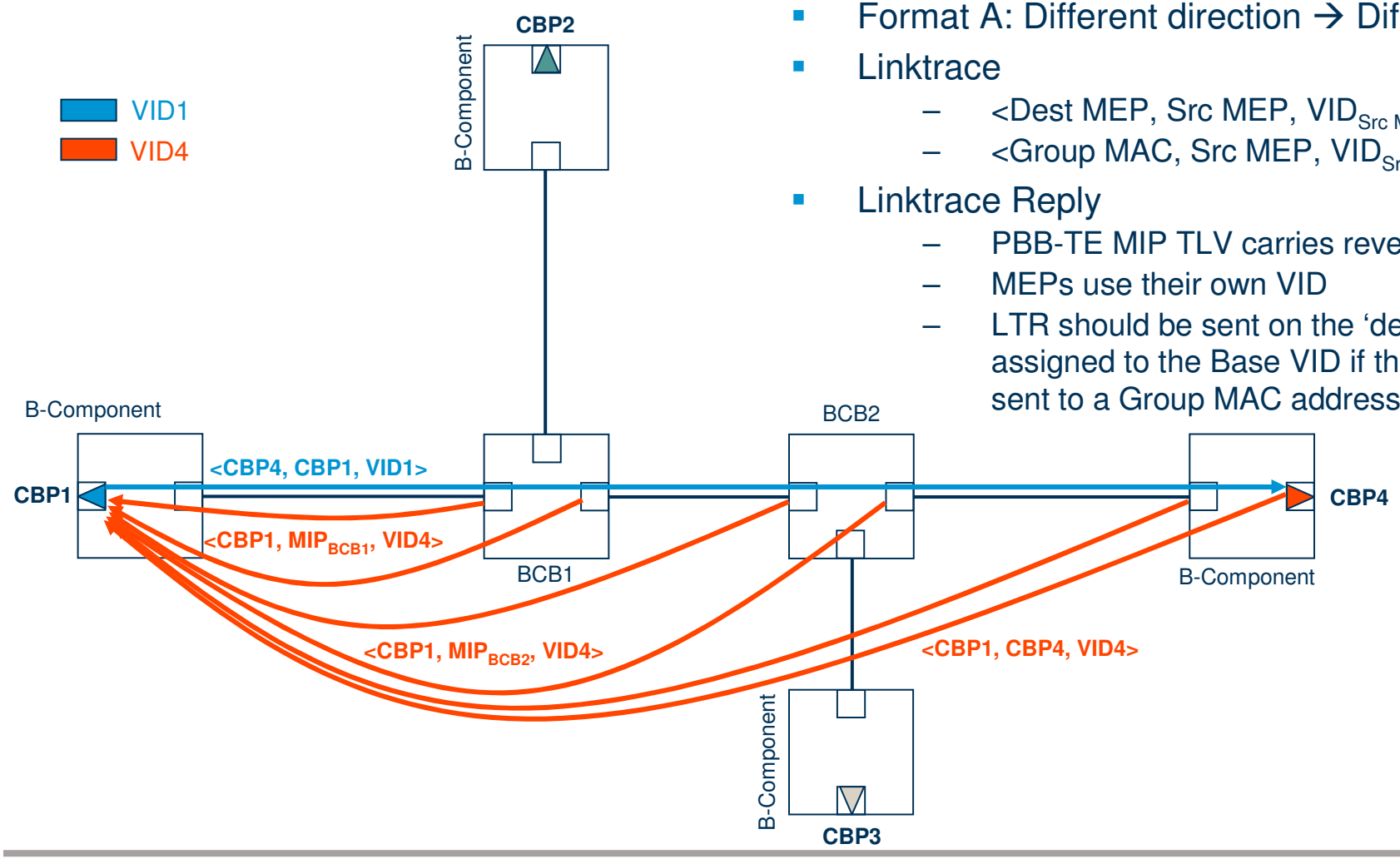
- Format A: Different direction → Different VID
- Monitoring unicast service
  - <Dest MEP, Src MEP, VID_{SA}>
- Monitoring multicast service
  - <Group MAC, Src MEP, VID_{SA}>

SPBB Format A Loopback protocol



- Format A: Different direction → Different VID
- Loopback
  - <Dest MEP, Src MEP, VID$_{Src\ MEP}$>
  - Dest MIP: apply PBB-TE MIP TLV
- Loopback Reply
  - PBB-TE MIP TLV carries reverse VID
  - MEPs use their own VID

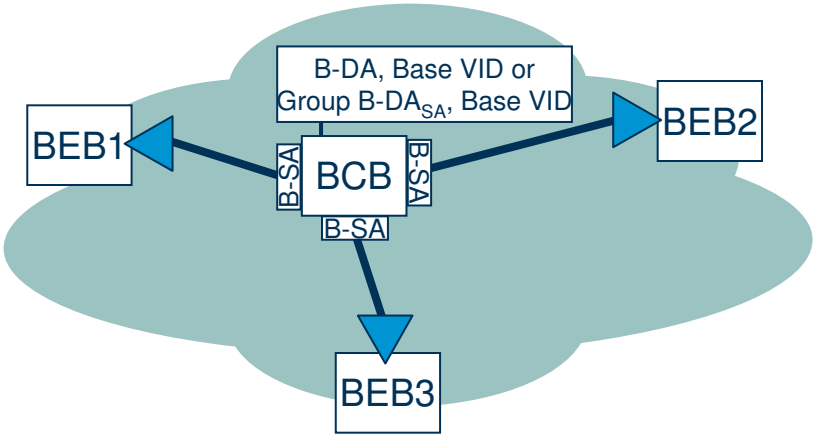
SPBB Format A Linktrace protocol



- Format A: Different direction → Different VID
- Linktrace
  - <Dest MEP, Src MEP, $VID_{Src\ MEP}$>
  - <Group MAC, Src MEP, $VID_{Src\ MEP}$>
- Linktrace Reply
  - PBB-TE MIP TLV carries reverse VID
  - MEPs use their own VID
  - LTR should be sent on the 'default' tree assigned to the Base VID if the LTM is sent to a Group MAC address

Shortest Path Backbone Bridging (SPBB) Format B

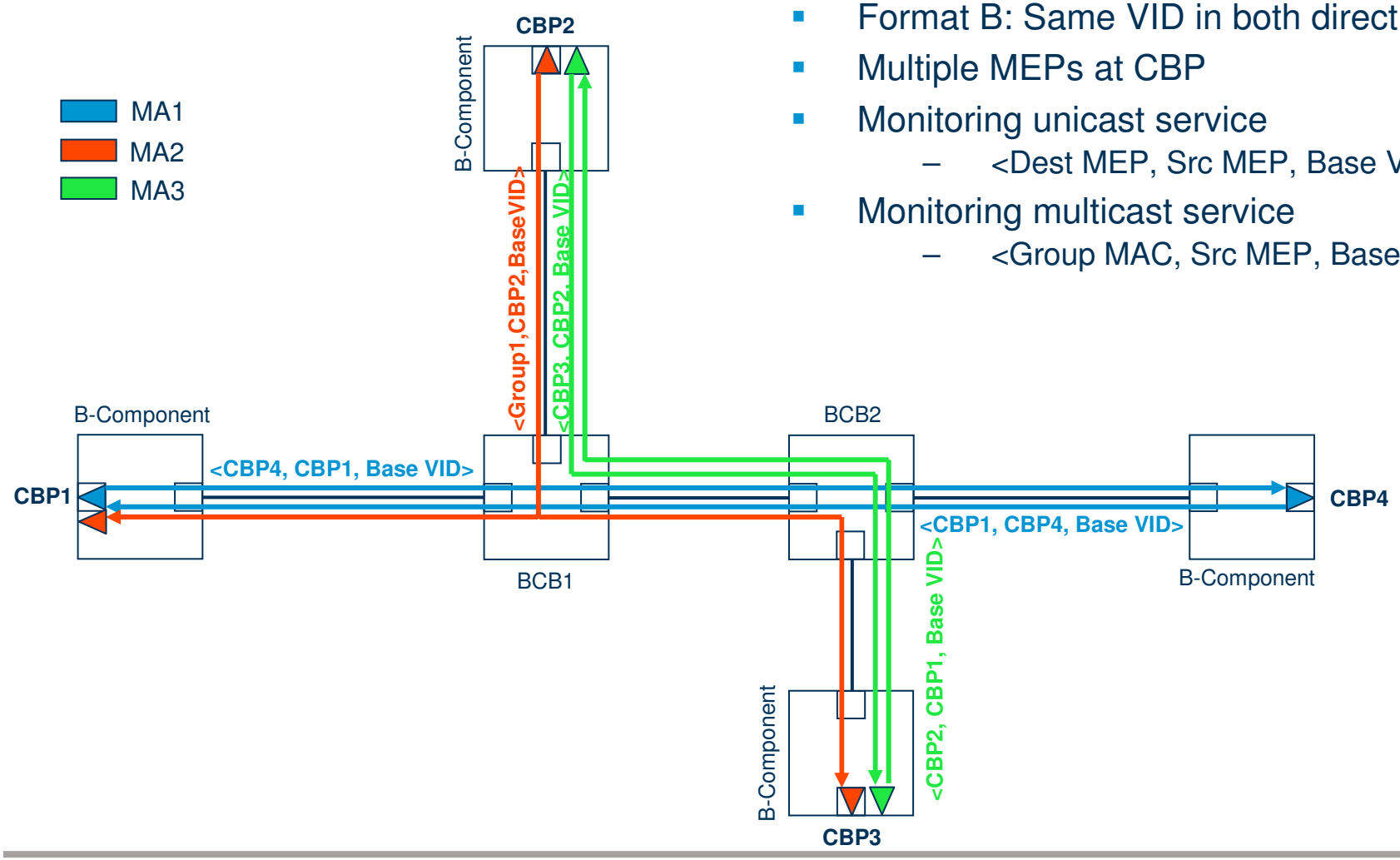
- IS-IS controls the forwarding
  - Managed addresses
  - Individual and Group MAC addresses are configured
  - Non-learning
- SPT ID = B-SA, Group B-DA_{SA}
- Forwarding is based on:
  - Unicast: B-DA, Base VID
  - Multicast: Group B-DA_{SA}, Base VID
- Ingress Checking is based on: B-SA



CFM

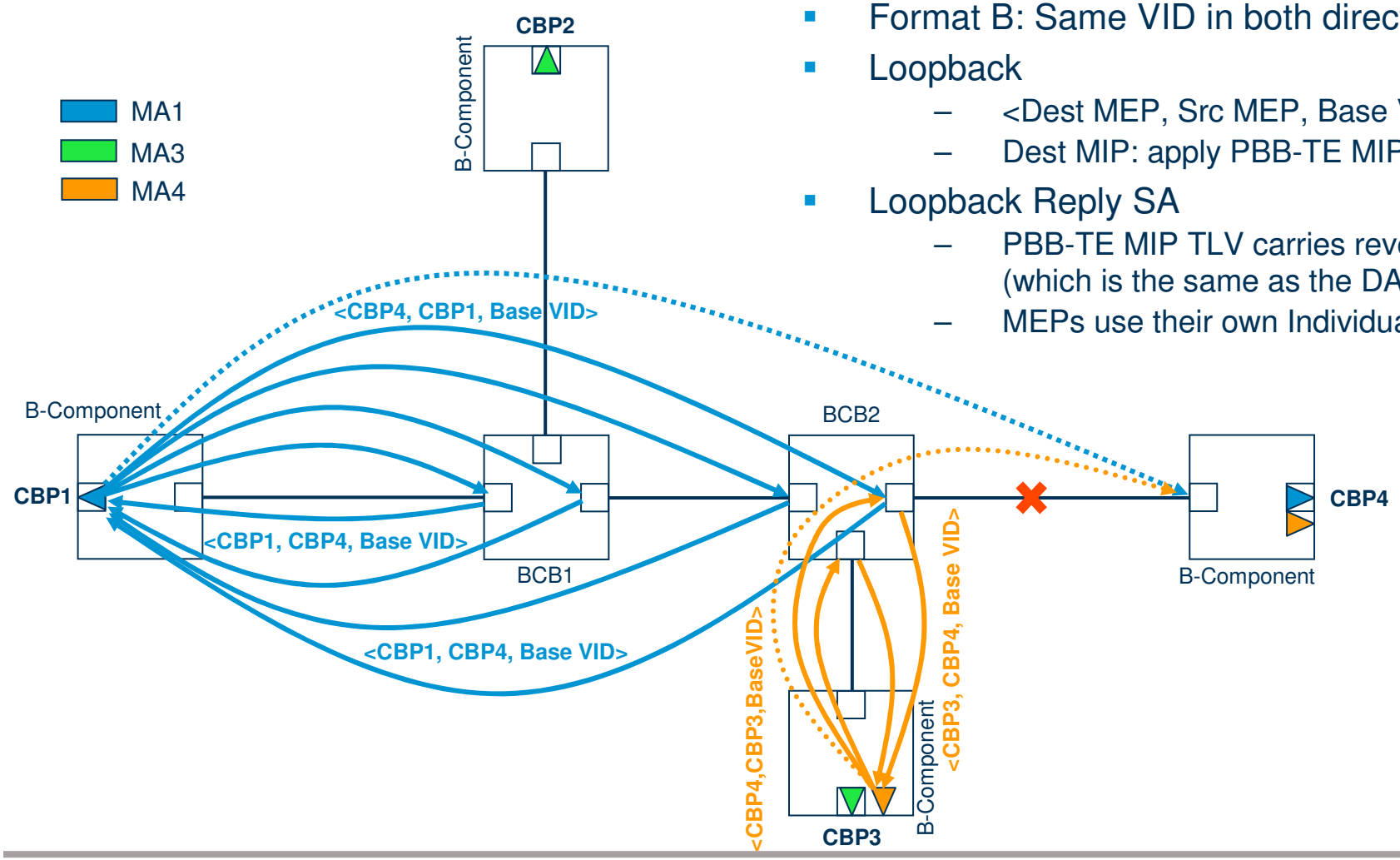
- Both Individual and Group MAC addresses have to be monitored
- CCM DA = BEB B-DA or Group B-DA
- LTM DA = BEB B-DA or Group B-DA
- LBM DA = BEB B-DA
- CCM, LTM, LBM VID = Base VID
- LTR and LBR: What is the SA of the responding BCB?
  - Reverse SA is carried in PBB-TE MIP TLV of LBM and LTM (same as LTM or LBM DA)

SPBB Format B Continuity Check protocol



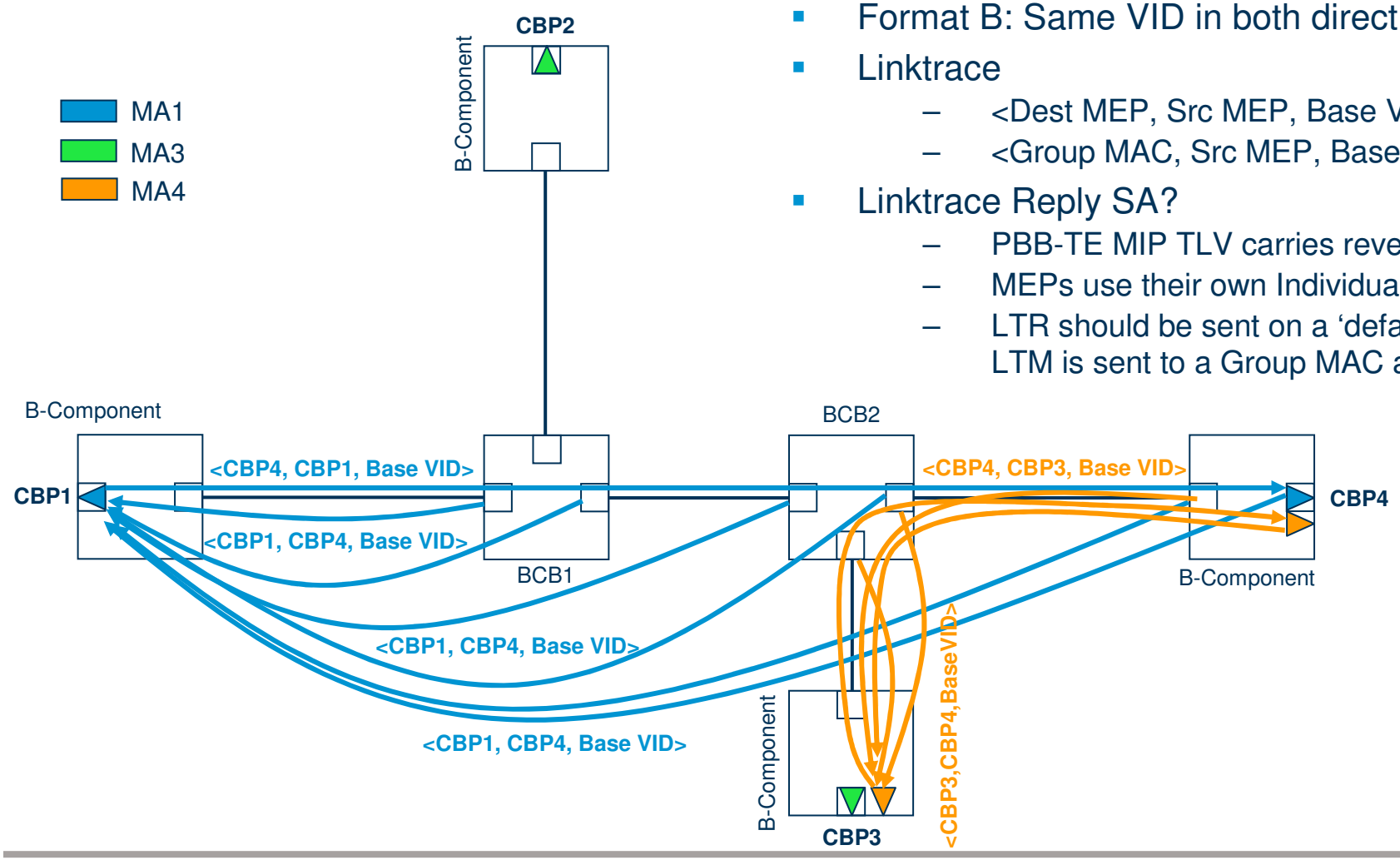
- Format B: Same VID in both directions
- Multiple MEPs at CBP
- Monitoring unicast service
  - <Dest MEP, Src MEP, Base VID>
- Monitoring multicast service
  - <Group MAC, Src MEP, Base VID>

SPBB Format B Loopback protocol



- Format B: Same VID in both directions
- Loopback
  - <Dest MEP, Src MEP, Base VID>
  - Dest MIP: apply PBB-TE MIP TLV
- Loopback Reply SA
  - PBB-TE MIP TLV carries reverse SA, (which is the same as the DA of LBM)
  - MEPs use their own Individual address

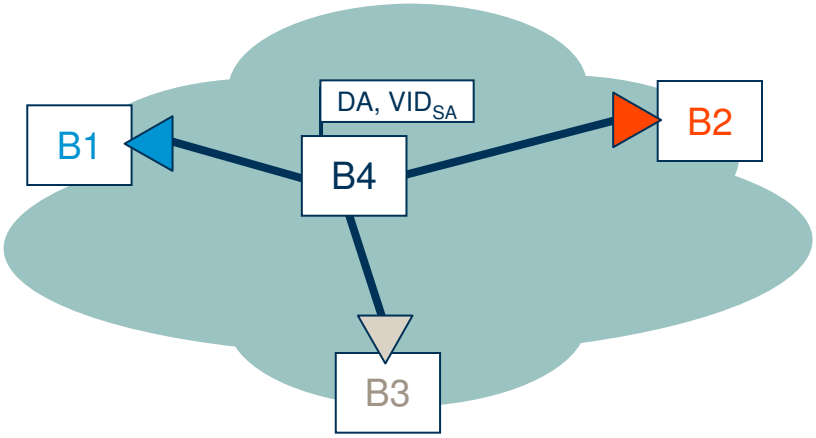
SPBB Format B Linktrace protocol



- Format B: Same VID in both directions
- Linktrace
  - <Dest MEP, Src MEP, Base VID>
  - <Group MAC, Src MEP, Base VID>
- Linktrace Reply SA?
  - PBB-TE MIP TLV carries reverse SA
  - MEPs use their own Individual address
  - LTR should be sent on a 'default' tree if the LTM is sent to a Group MAC address

Shortest Path Bridging (SPB)

- Learning
- Shortest Path Tree (SPT) ID: VID_{SA} (SPVID)
- Forwarding: DA, VID_{SA}

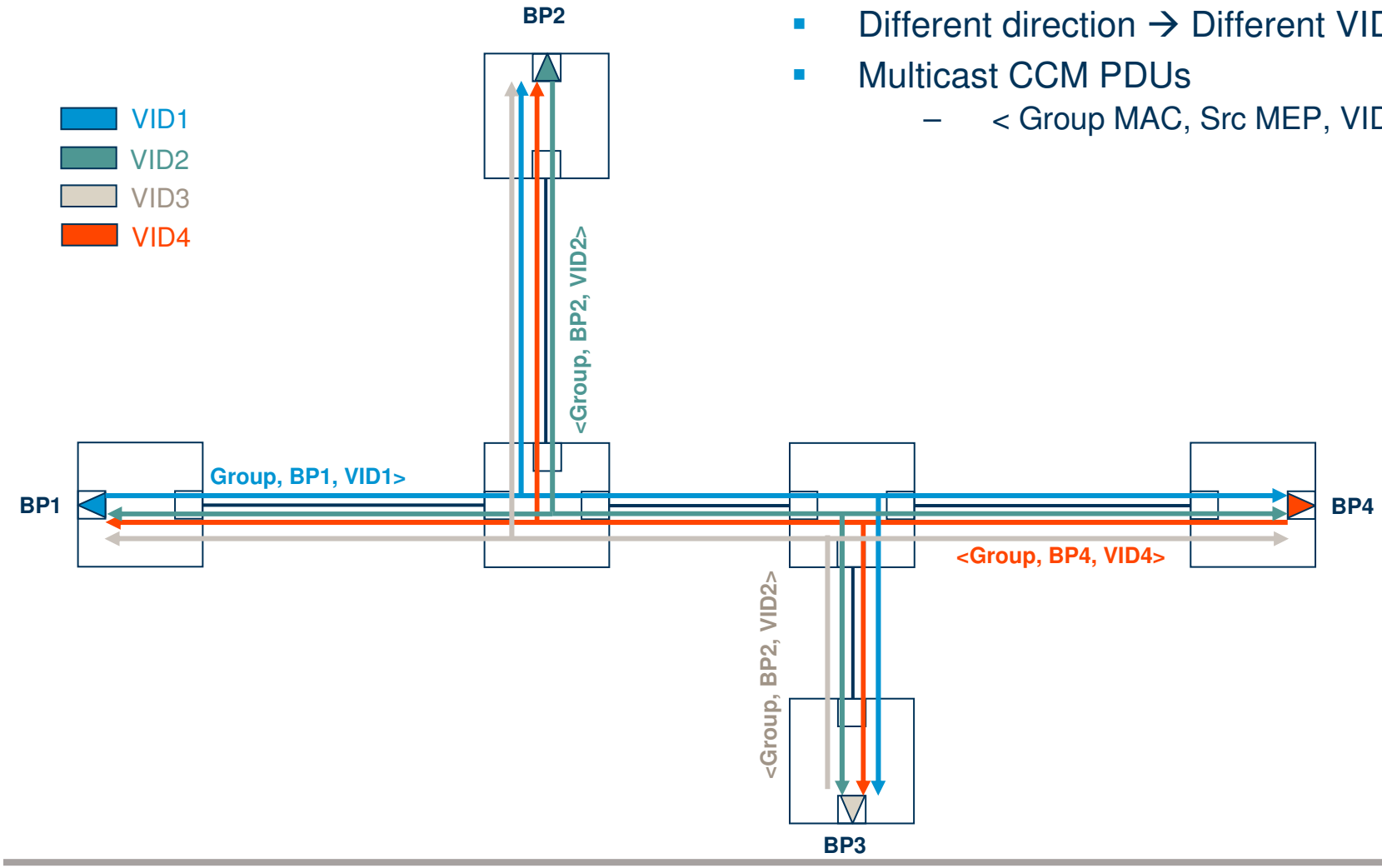


CFM

- CCM DA: Group MAC address
- LTM DA: Group MAC address
- LBM DA: Individual MAC address

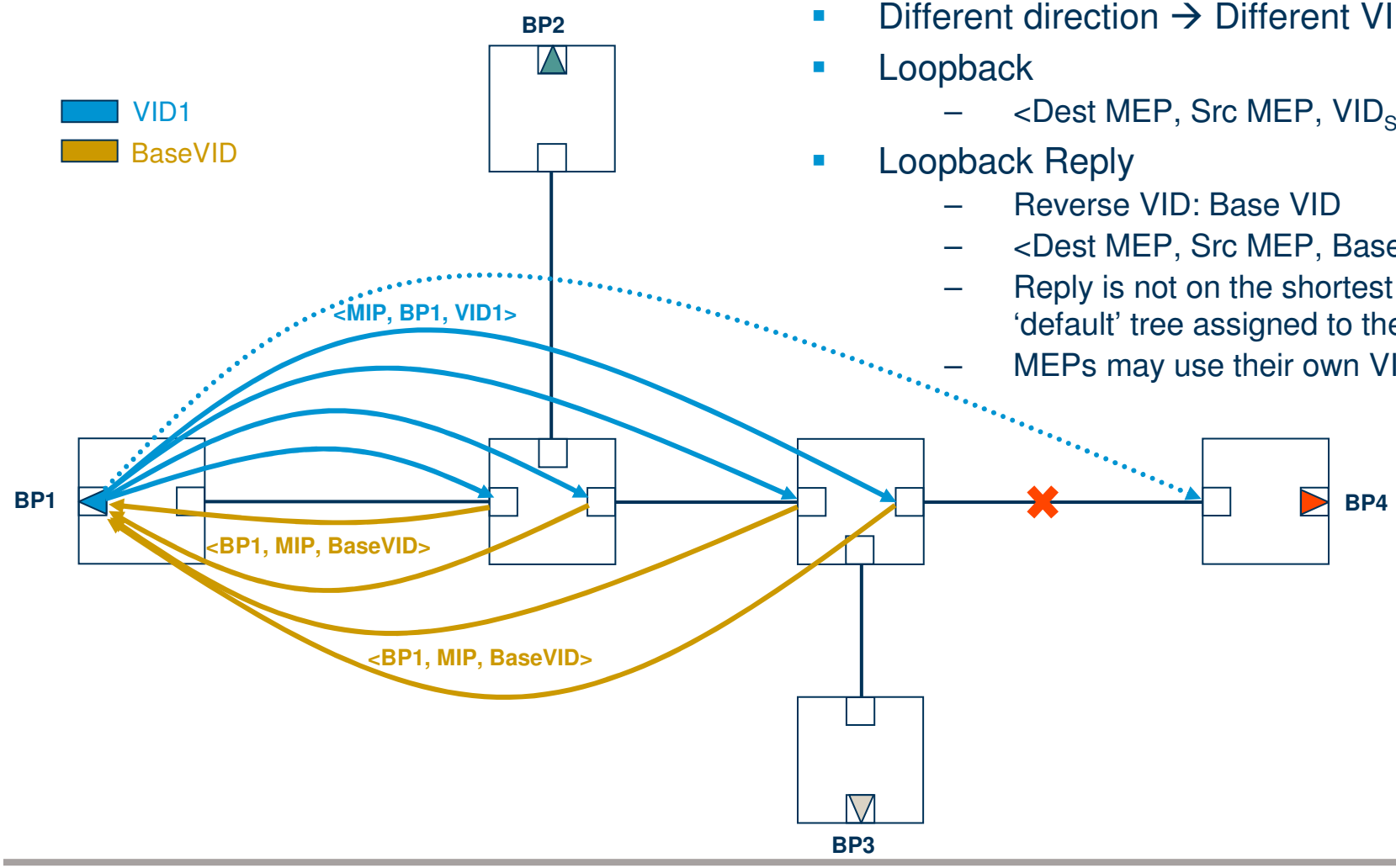
- Which VID should be applied for LTRs and LBRs?
  - Base VID (assigned to MSTI 1 or IST)
  - VID of responder bridge

SPB
Continuity Check protocol



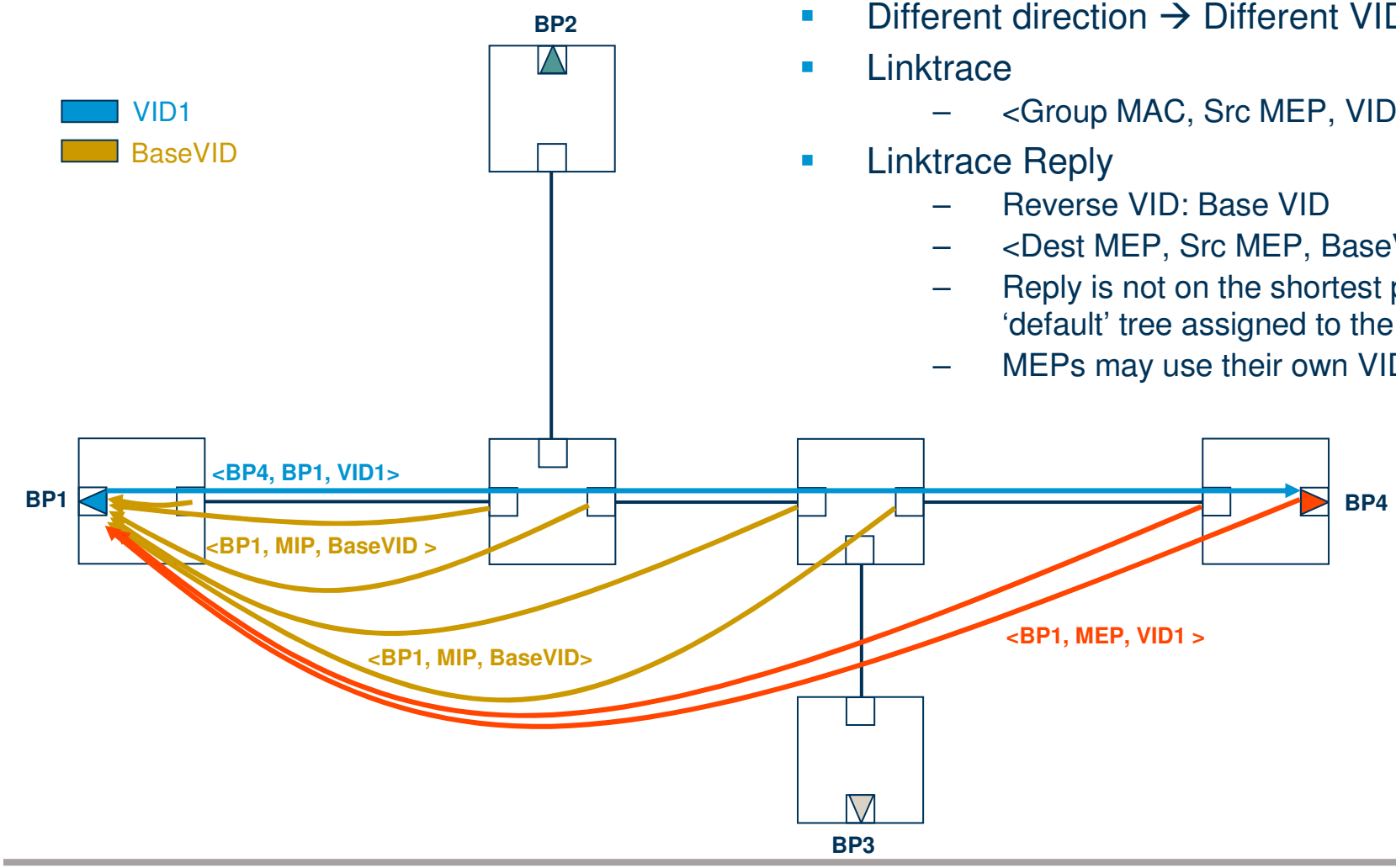
- Different direction → Different VID
- Multicast CCM PDUs
  - < Group MAC, Src MEP, VID_{SA}>

SPB
Loopback protocol



- Different direction → Different VID
- Loopback
  - <Dest MEP, Src MEP, $VID_{Src\ MEP}$>
- Loopback Reply
  - Reverse VID: Base VID
  - <Dest MEP, Src MEP, BaseVID>
  - Reply is not on the shortest path but on a 'default' tree assigned to the Base VID
  - MEPs may use their own VID

SPB
Linktrace protocol



- Different direction → Different VID
- Linktrace
  - <Group MAC, Src MEP, $VID_{Src\ MEP}$>
- Linktrace Reply
  - Reverse VID: Base VID
  - <Dest MEP, Src MEP, BaseVID>
  - Reply is not on the shortest path but on 'default' tree assigned to the Base VID
  - MEPs may use their own VID

Summary

- SPB
  - Use CFM as defined in 802.1ag
  - LTR and LBR should be sent on ’default’ tree (MSTI 1 or IST)
- SPBB
  - Use the CFM extensions defined in 802.1Qay
  - PBB-TE MIP TLV carries necessary information for MIPs to construct LTR and LBR
  - If LTM is sent to a Group MAC address, then LTRs sent by MIPs should be transmitted on the ’default’ tree (PBB-TE MIP TLV carried in LTM cannot contain reply information for each individual MIP)