

TRILL OAM- Status, Updates and Next Steps

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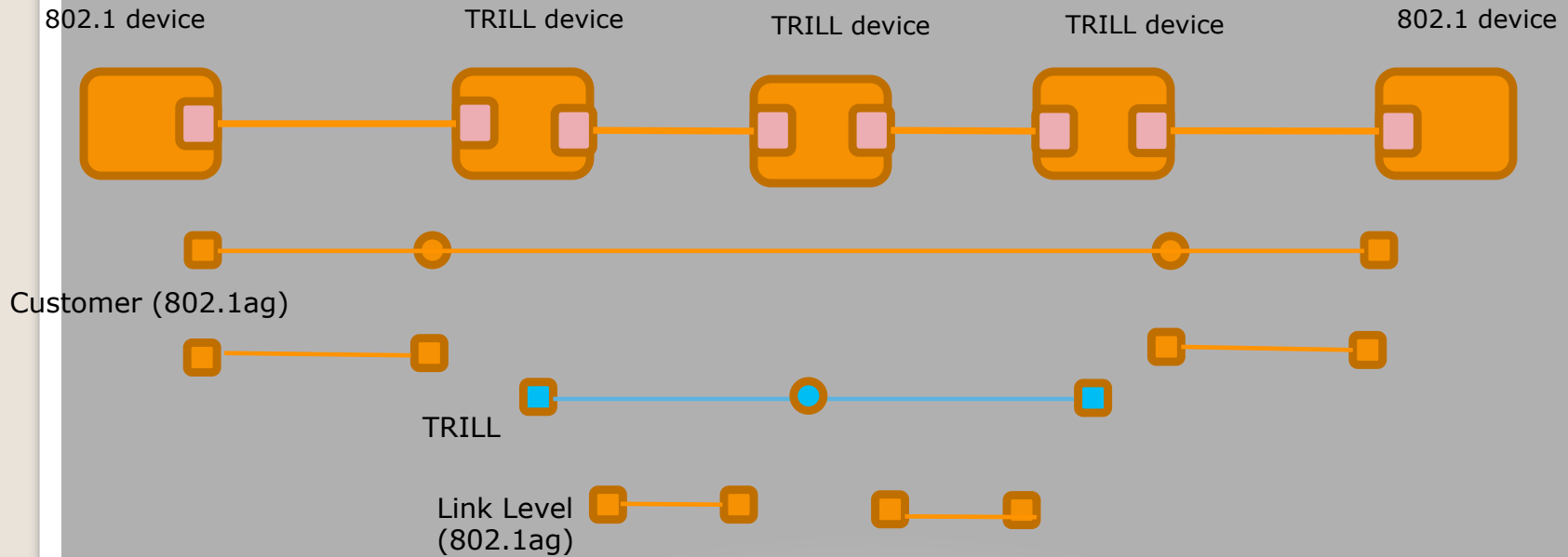
Status Vancouver to Atlanta

- Requirement document completed last call
- Framework document in call to move to Working group status
- Presented use of 802.1ag for TRILL at IEEE 802.1 interim meeting in Santa Cruz
 - Feedback received to reuse the same opcodes as in 802.1ag in TRILL, wherever possible.


Correction to the presentation in Vancouver

- We presented in Vancouver “as agreed between IEEE volunteers”.
- We like to correct this as
 - “Reviewed by IEEE volunteers”
- Subsequent to that, Steve Haddock has opted out of the volunteer list.

OAM Layering in TRILL



 **MEP for TRILL RBridge**

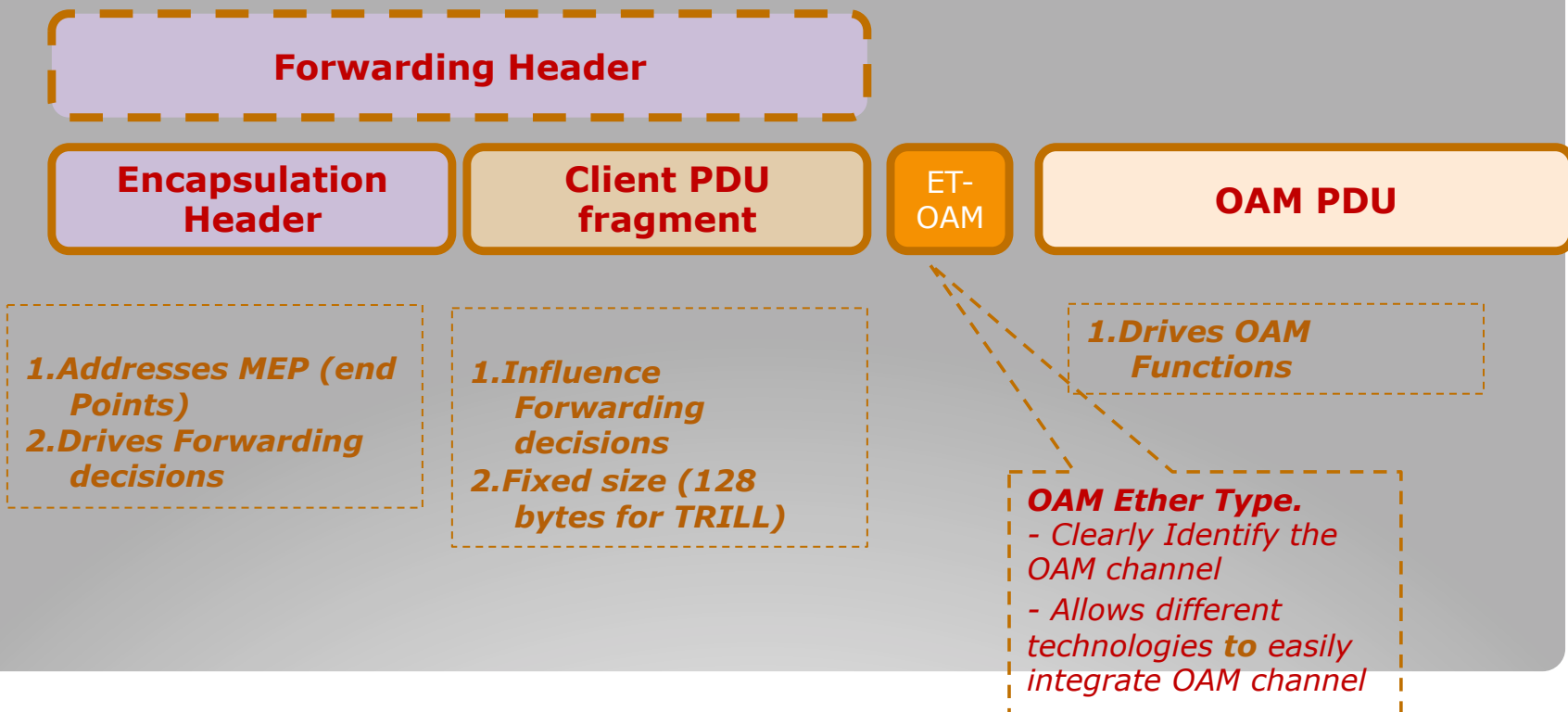
 **MIP for 802.1 bridge**

 **MEP for 802.1 bridge**

 **MIP for TRILL RBridge**

TRILL OAM Frame Structure

- Below is the proposed TRILL OAM frame structure
- Client PDU fragment, may or may not be present based on the technology



Identification of TRILL OAM packets

- Use One of the reserved bits of the TRILL header to differentiate OAM packets from normal data packets
- Multicast TRILL OAM packets are copied to the CPU and also forward along the normal path
- Unicast TRILL OAM packets that has egress RBridge nickname as the local nickname are redirected to the CPU
- TRILL OAM packets are never de capsulated and forwarded as native packets

TRILL OAM Frame identification

Receive Processing

If M==1 and R(OAM) ==1 then
Copy to CPU AND Forward normally
Else if R(OAM) ==1 and (egree nickname is local) then
It is an OAM frame; AND redirect to CPU, DO NOT FORWARD
Else
Forward normally

Transmit Processing

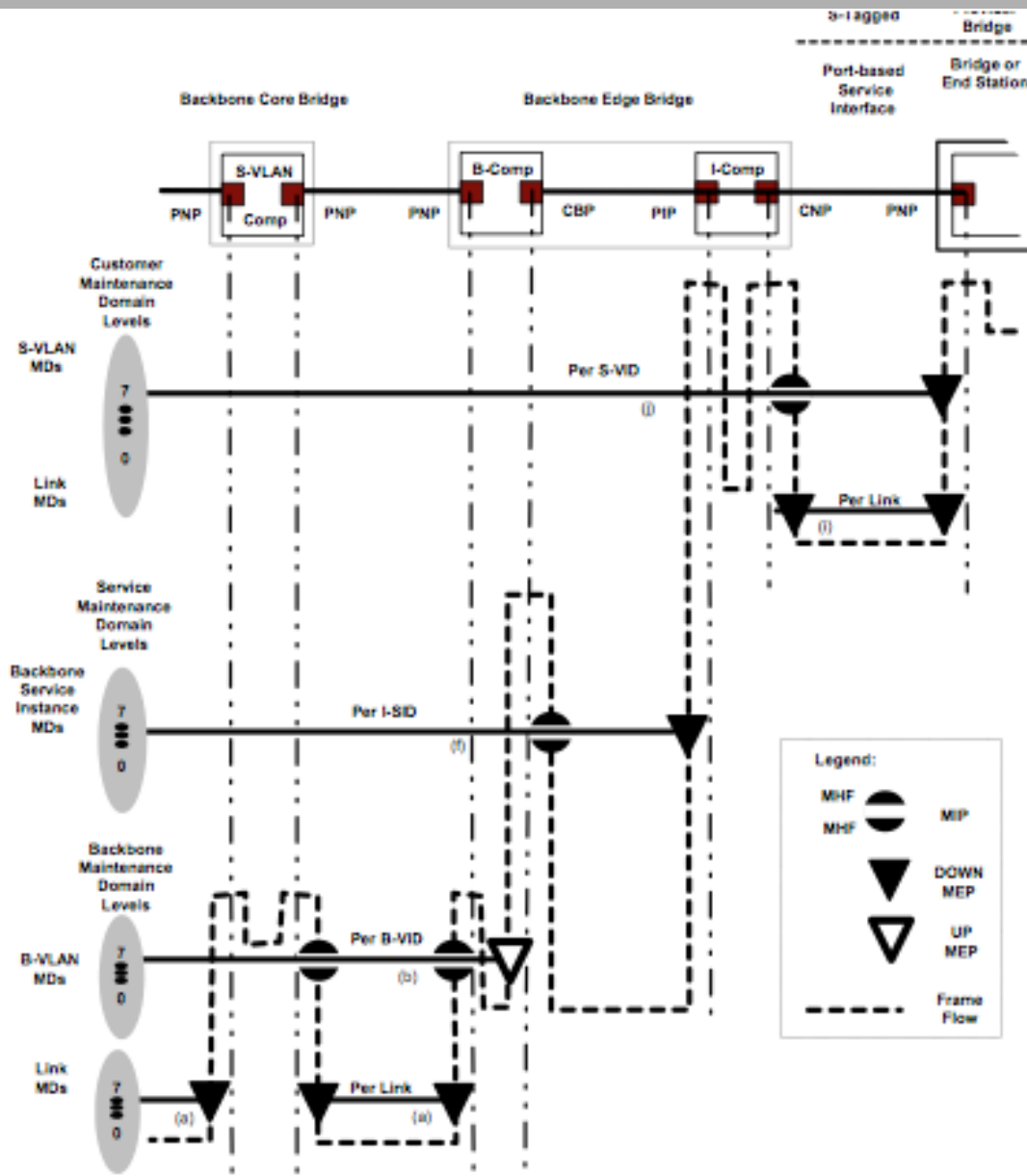
If R(OAM) ==1 then
Do NOT de-capsulate and forward as a native frame.
As applicable may be forwarded as a TRILL encaped frame

CPU Further validate packet to be OAM;
By presence of Ethertype OAM at Client fragment
offset

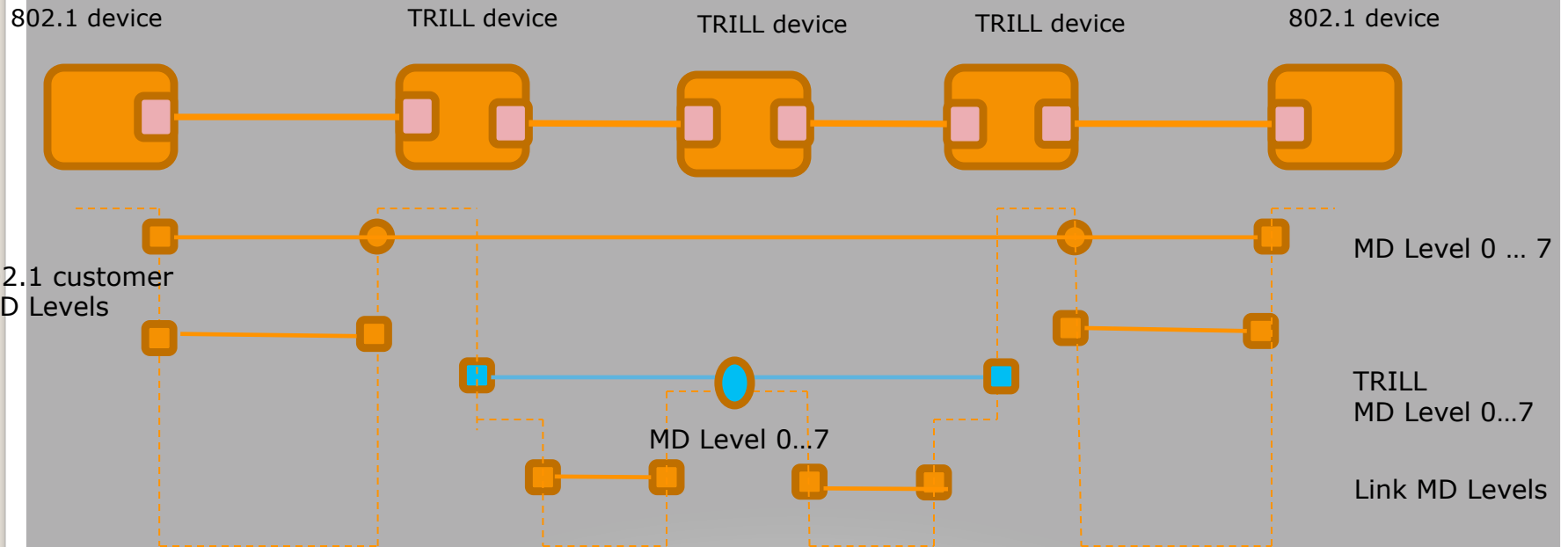
Our Goal

- Utilize 802.1ag OAM framework
- Utilize 802.1ag OAM messages where applicable
 - Re-use LBM (Loopback Message), CCM (Connectivity and Continuity Monitoring) .
 - New TRILL specific additions: Path Trace, Multicast Tree Verification
- This allow customers and end users to perform nested "OAM tests" to easily troubleshoot connectivity problems across networks of different technologies.


802.1 nested MEP (from 802.1ah spec)



Nested MP Interaction



 **MEP for TRILL RBridge**

 **MIP for 802.1 bridge**

 **MEP for 802.1 bridge**

 **MIP for TRILL RBridge**

Questions

- How can we reuse .1ag CCM messages in TRILL ?
- How can we initiate an LBM from any RBridge to any other RBridge ?
- Lets get to the details.

CFM PDUs

Table 21-15—Continuity Check Message format

	Octet
Common CFM Header	1 – 4
Sequence Number	5 – 8
Maintenance association End Point Identifier	9 – 10
Maintenance Association Identifier (MAID)	11 – 58
Defined by ITU-T Y.1731	59 – 74
Reserved for definition in future versions of the protocol ^a	
Optional CCM TLVs	First TLV Offset + 5 ^b
End TLV (0)	First TLV Offset + 5, if no Optional CCM TLVs are present

Notice MEPID and MA are in the PDU

^a This field has 0 length in this version 0 of CFM. It is shown in order to stress that additional information can be present in future versions of CFM, and that a version 0 receiver ignores its contents, if present.

^b Octet 75 for transmitted CCMs.

Table 21-21—Loopback Message and Loopback Reply formats

	Octet
Common CFM Header	1 – 4
Loopback Transaction Identifier	5 – 8
Reserved for definition in future versions of the protocol ^a	
Additional LBM/LBR TLVs	First TLV Offset + 5 ^b
End TLV (0)	First TLV Offset + 5, if no Additional LBM/LBR TLVs are present

Notice NO MEPID and MA are in the PDU

^a This field has 0 length in this version 0 of CFM. It is shown in order to stress that additional information can be present in future versions of CFM, and that a version 0 receiver ignores its contents, if present.

^b Octet 9 for transmitted LBMs.

What does this mean ?

- Define separate MA per flow for end-end CCM (connectivity and continuity monitoring)
 - 802.1ag utilize MAID miss match to detect cross connect errors.
- Use a default MA for testing reachability and paths between Rbridges
 - Why ? LBM, Path Trace PDU does not contain MA-ID and hence no cross connect error checking
 - LBM, PT, MIB Objects allow flexibility to define a flow to be include in the specific instance of the message.

MD Level - X

Default MA at MD-Level=x

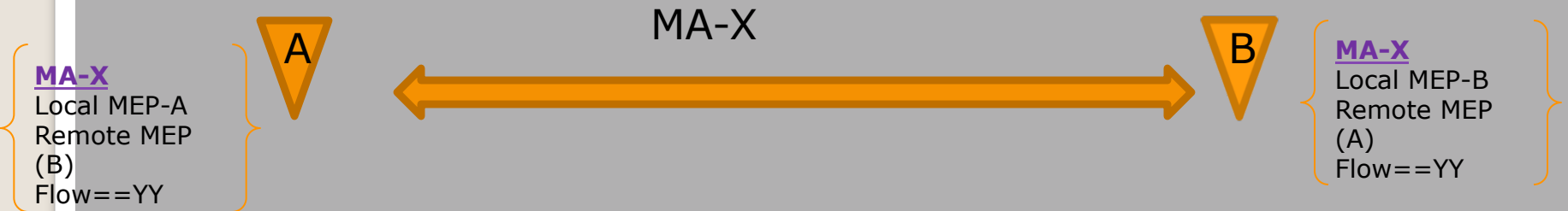
1. Include all Rbridges as MEP.
2. Allow to initiate PT or LBM or MT between RB.
3. LBM, PT, MT does not have MEPID or MA in the PDU
4. LBM, PT, MT MIB objects under default MA have flow-entropy allowing to specify any other flow

MA-AA for Flow=F and MEP {A,B..}

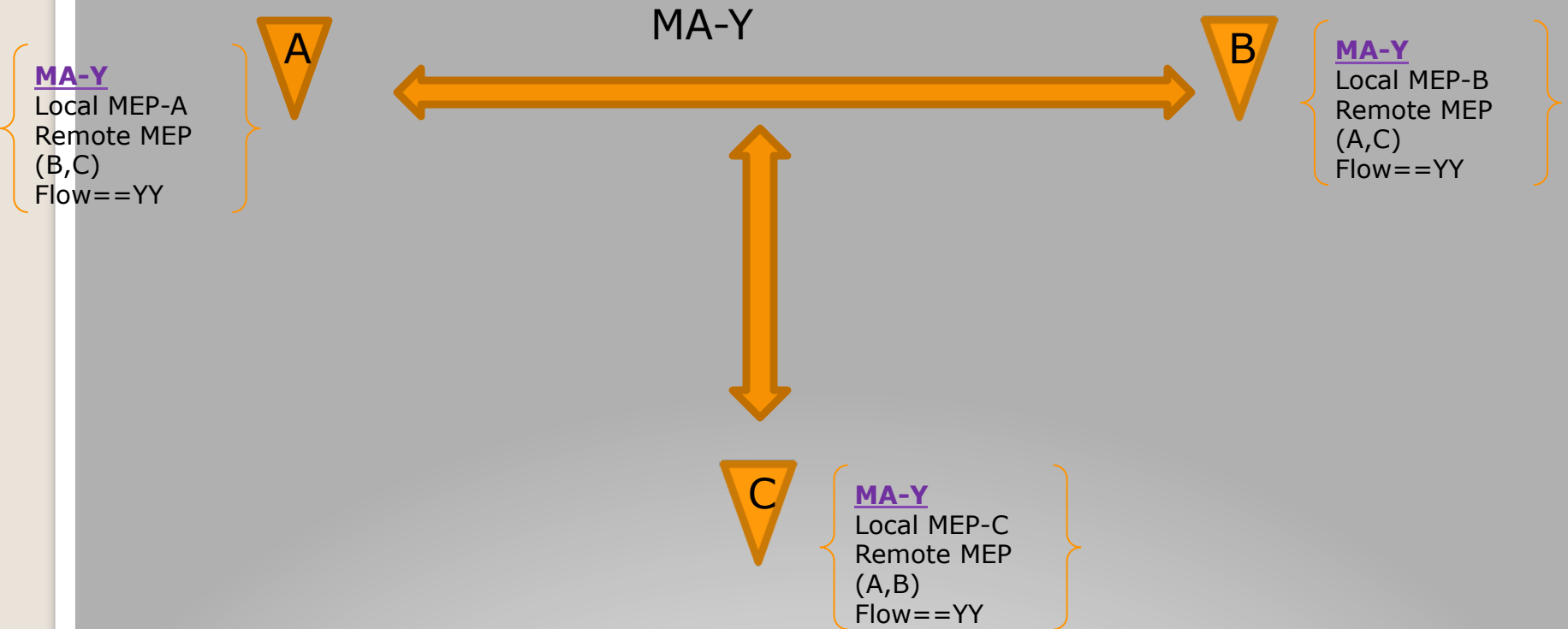
1. Define per flow basis.
2. Include only the Rbridges of the end points.
3. Utilized for CCM

MA

Maintenance Association (MA)

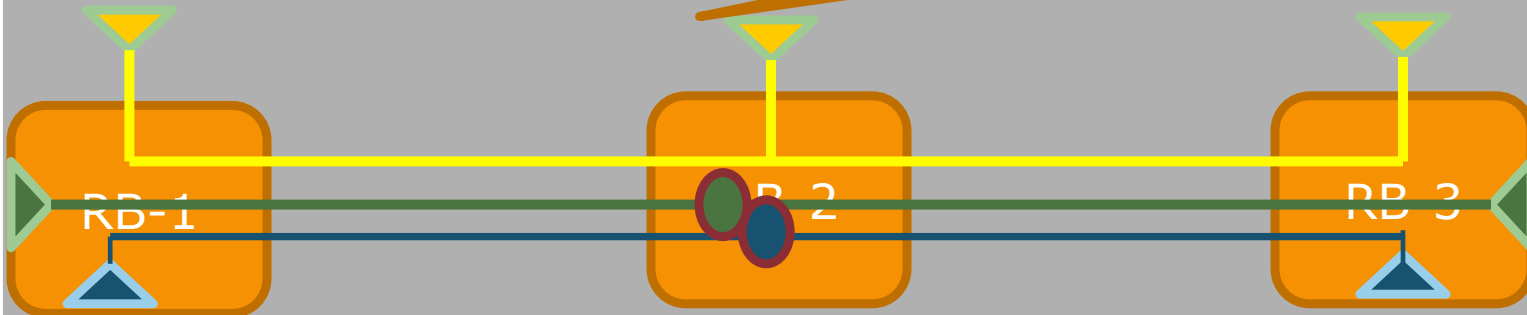


Maintenance Association (MA)



Maintenance Association (MA)

1. MIP allow to respond to PT
2. MEP allow to initiate LBM, PT etc
3. PT messages arrives with TTL=0



- **Yellow** is Default MA for general reachability
- **Green** and **Blue** are flow specific MA

Next Steps

- Move Requirement document to IESG
- Move Framework document to WG status.
- Socialize the proposal to reuse the 802.1ag with IEEE 802.1 volunteers and others and request feedback.
- Publish updated version of TRILL fault management draft based on the comments and feedback.

Reference

- Requirement document
 - <https://datatracker.ietf.org/doc/draft-ietf-trill-oam-req/>
- Framework document
 - <https://datatracker.ietf.org/doc/draft-salam-trill-oam-framework/>
- Fault Management
 - <https://datatracker.ietf.org/doc/draft-tissa-trill-oam-fm/>