Another Approach to P802.1Qca and P802.1Qcc

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Version 2

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This presentation

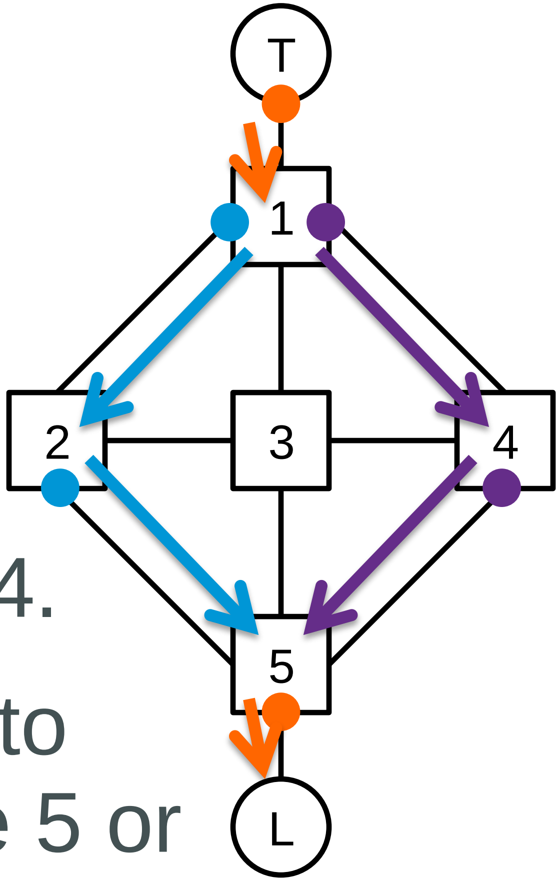
- This is ca-nfinn-another-approach-0314-v02.
- It presents a way to accomplish the goals of P802.1Qca in a manner very different from the excellent work done to date on this document, by János Farkas, Nigel Bragg, and others.
- This version, v02, is the author's interpretation of the comments made during its presentation to TSN, March 19, 2014. **No claim is made as to the opinions of other participants at that meeting.**

Setup to problem statement

- I (a network administrator) want multiple paths from Talker to Listener(s), and to send duplicate data on all of them at the same time.
  - That way, I greatly reduce the chances of losing a packet, even if a network node or link fails in a bizarre manner.
  - Who discards the extra packets is a separate question, not dealt with, here, at all.
- When a failure occurs, or a failed device is restored, I sometimes (not always) want to alter my multiple paths to get back to the "safe" situation.
- This is complicated by the fact that I have bandwidth reservations along these paths.

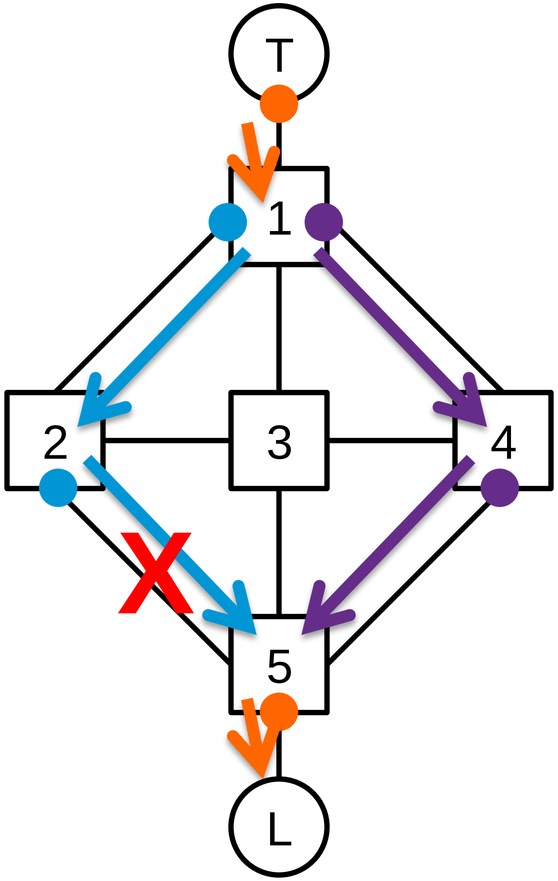
Before the failure

- Talker sends a **stream**
- Bridge 1 duplicates the frames and sends **one copy** to Bridge 2 and **one** to Bridge 4.
- Bridge 5 sends these streams to the **Listener**. (Whether Bridge 5 or the Listener discards the extra frames is for another discussion.)
- Ports are configured for stream reservations.



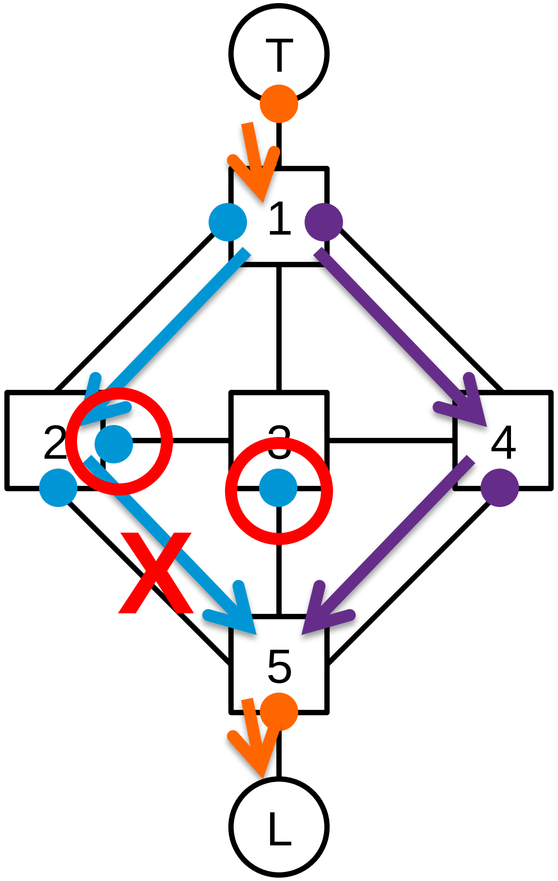
There is a **failure**

- The **2-5** link fails.
- Only the T-1-4-5-L path remains.



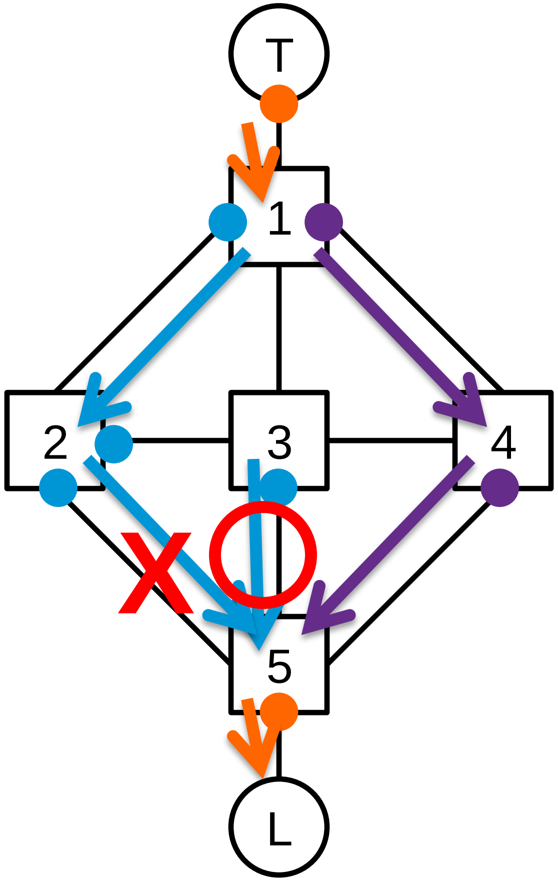
Restoring the “safe” state

- Step 1 is to **allocate the bandwidth** required for the reservation in Bridge 2 and Bridge 3.



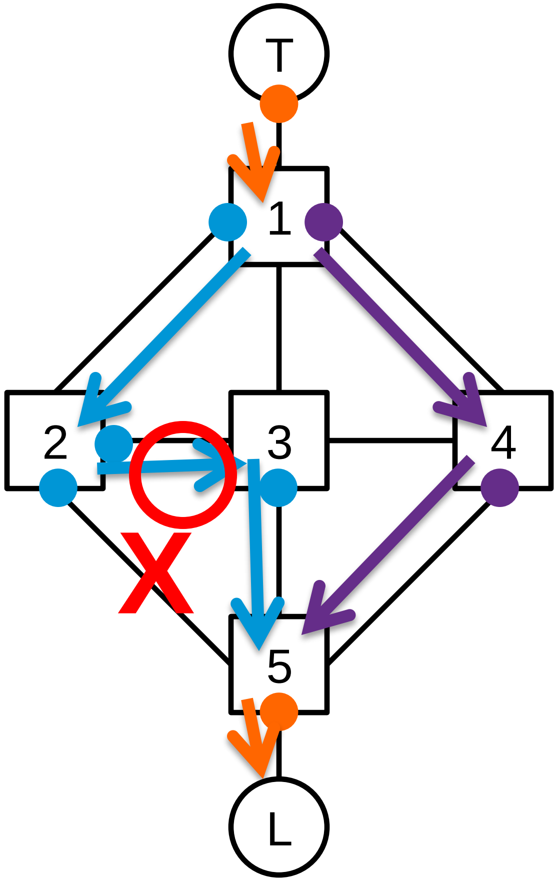
Restoring the “safe” state

- Step 2 is to **install path 3-5**.
- This can be done in parallel with Step 1, reserving the bandwidth.



Restoring the “safe” state

- Only after we have completed Step 1 and Step 2 can we proceed with Step 3.
- Step 3 is to **switch the path** from 2-5 to 2-3.



Control plane

Doing this sequencing with ISIS

- This sequencing of reservations and path alteration is not terribly complex, but it is not trivial, either.
- This author does not see a reasonable means to accomplish this sequencing with ISIS; distributing the necessary ACKs via ISIS is extraordinarily wasteful.

An alternative mechanism

- If a “master controller” has an individual point-to-point transport layer connection to each Bridge, over which it can transmit information about paths and reservations, then the controller can orchestrate any transition with a minimum of control traffic and an assurance that the TSN guarantees will be maintained to the maximum degree possible.
- IEEE 802.1 does not have to specify the details or the decision making process; it only need describe the information elements used between the master controller and the Bridge, and pick a transport protocol to carry them.

An alternative mechanism

- In this author's opinion, this is a simpler way to progress IEEE P802.1Qca and P802.1Qcc than the current course, and will result in faster acceptance of the IEEE 802.1 TSN suite of protocols.

Thank you.