



Aerospace Stream Isolation options | Nov 2022

Aerospace Stream Isolation Proposal

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Objective



- **Review aerospace stream isolation options**
- **Propose a potential solution**

References:

- P802.1DP Stream Isolation, May 2022
<https://www.ieee802.org/1/files/public/docs2022/dp-jabbar-stream-isolation-0522-v01.pdf>
- P802.1DP Stream Isolation Continued
<https://www.ieee802.org/1/files/public/docs2022/dp-jabbar-stream-isolation-continued-0622-v00.pdf>
- Summary of Aerospace Use Cases
<https://www.ieee802.org/1/files/public/docs2021/dp-Jabbar-Aerospace-UseCase-Summary-0521-v01.pdf>
- Introduction to Aerospace Network Certification
<https://www.ieee802.org/1/files/public/docs2021/dp-zaehring-Introduction-to-Aerospace-Network-Certification-JAR25-1309-CS25-0321-v01.pdf>

Stream Isolation



What is meant by stream isolation?

When multiple streams traverse a bridge, one stream's behavior should have no impact on other streams. This includes both normal operation and faulty/failure modes.

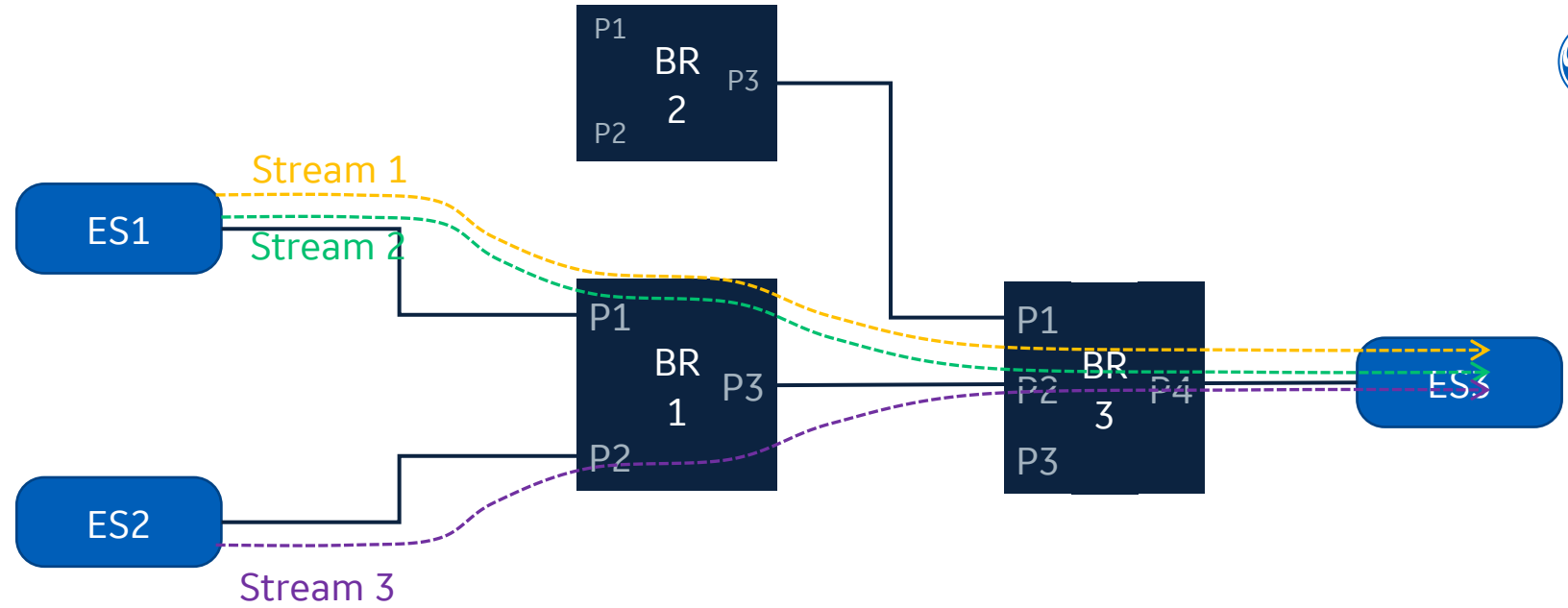
From TSN Toolset perspective, this implies that bridges primarily support **per-stream** :

1. Identification
2. Filtering and Policing
3. Queueing and Forwarding (this is supported in Pre-TSN Ethernet)

Does not include stream performance requirements, which might also impose certain stream isolation requirement

Stream Isolation

Trivial Example



Option 1: Isolate every stream level at every hop

- Num of bridge entries = num streams in the network (up to 4K for aerospace scenarios)

Option 2: Isolate at the device level by aggregating streams ... failure in one stream is failure of all streams

- Num of bridge entries = num of nodes (100 to 500)
- Difficult for qbv streams, does not work for partitioned systems

Option 3: Per stream isolation at the edge bridges and per-port isolation (of aggregate flows) on the core network

- Difficult for Qbv streams, certification issues
- Edge bridges still need to support on average 64 streams per port for large aerospace scenarios

Proposal



Number of streams supported (for identification and policing)

Low Stream Count Use Cases (Table 1)		High Stream Count Use Cases (Table 2)	
Num ports	Num Entries	Num ports	Num Entries
<=4	128	<=4	256
5-8	256	5-8	512
9-12	256	9-12	1024
13-18	256	13-18	2048
>18	256	>18	4096

- Low stream count use cases match automotive requirements
- High stream count use cases support both legacy Ethernet based avionics networks as well as future converged Ethernet networks
- Discussion: what to mandate for DP compliant bridges?
 - a. Shall support minimum requirement as per Table 1 and should support Table 2
 - b. Compliance class-1 shall support Table 1 and Compliance class-2 shall support table 2