Qdj Draft 1.0 Comments Rationale & Proposed Solutions

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Feedback on non-valid StreamID

Current concept does not allow for the CNC to inform that the suggested StreamID is not valid (and to associate a newly generated StreamID with the requested stream)

According to the current draft

- If CUC requests new stream with non-unique StreamID
  - If StreamID is not unique within CUC branch
    - CUC fails to add an entry into stream list (already existing key)
      - YANG returns an error
      - CNC has no chance to propose a new StreamID and inform CUC about it

Proposed solution

Create a custom RPC to AddStreams

- Input contains suggested StreamID
- Output contains confirmed StreamIDs

Concept presented in *dj-coelho-yang-module-0122-v02.pdf*

Centralized management of requests in CNC

Feedback on non-valid StreamID

Current concept does not allow for the CNC to inform that the suggested StreamID is not valid (and to associate a newly generated StreamID with the requested stream)

According to the current draft

- If CUC requests new stream with non-unique StreamID
  - If StreamID is unique within CUC branch but not unique within CNC branch
    - CUC adds an entry into stream list
    - Candidate datastore validation can detect non-uniqueness
      - YANG returns an error
      - CNC has no chance to propose a new StreamID and inform CUC about it

Proposed solution

Create a custom RPC to AddStreams

- Input contains suggested StreamID
- Output contains confirmed StreamIDs

Concept presented in *dj-coelho-yang-module-0122-v02.pdf*

Centralized management of requests in CNC

YANG module content when StreamID is non-valid

Current concept defines a Failure code for streams with non-valid StreamID

Failure code is located under

- stream.status-info.failure-code

However, stream exists only with a (unique) valid StreamID

According to current Qdj draft

- Existing stream gets a failure-code

Proposed solution

Include informative text informing that trying to add a stream with an existing StreamID does not change the failure-code of the existing stream

Table 46-15—TSN Failure Codes

Failure Code	Description of cause
1	Insufficient bandwidth
2	Insufficient Bridge resources
3	Insufficient bandwidth for traffic class
4	StreamID in use by another Talker
5	Stream destination_address already in use
6	Stream preempted by higher rank
7	Reported latency has changed
8	Egress Port is not AVB capable [a]

Initial values for read-only leaves

CUC provides values for *rw* leaves

- Copied to the candidate datastore

After <commit>, all *ro* leaves are present in the running datastore

- Need for initial values for *ro* leaves
  - Values before CNC computes the stream

Proposed solution

- Add informative text: definition of initial values to the profiles

P25, 46.2.2, L4

“The StreamID of each group correlates each request to its corresponding response, …”

- This correlation is not achievable with StreamID alone

Example:

1. Req1: add talker to Stream_1
2. Req2: add listener_1 to Stream_1
3. Req3: add listener_2 to Stream_1

Multiple requests with same StreamID

Proposed solution

Create a custom RPC to AddStreams, ScheduleStreams, AddAndScheduleStreams

- Request ⇔ calling RPC
- Response ⇔ RPC reply

Ensures unique mapping between request and response

Concept presented in *dj-coelho-yang-module-0122-v02.pdf*

Group of Streams

Industry automation

- Applications require a minimum set of streams (group) to work.
- CNC must either establish all streams of a group or none

Proposed solution

Create a custom RPC to ComputeStreams, AddAndScheduleStreams

- All streams listed in the input of a these RPCs belong to the same group

Ensure 802.1CB is not required for CNC to provide MAC-DA of streams

Conflicting requirements

1. Stream MAC-DA must be provided by CNC
    1. Talker.InterfaceConfiguration.ieee802-mac-addresses.destination-mac-address

2. According to Qcc, Talker.InterfaceConfiguration.ieee802-mac-addresses.destination-mac-address is only provided if the station supports 802.1CB
    1. “This configuration value is not provided unless IEEE Std 802.1CB is supported and a value for Active Destination MAC and VLAN Stream identification is provided in CB-StreamIdenTypeList of InterfaceCapabilities.”

Note: IA-Stations in 60802 do not require support of 802.1CB

How/ When CUCs subscribe to ConfigureStreamsComplete notification

Currently not described in Qdj

- May lead to inconsistent behavior in a multivendor network

Proposed solution

- CUCs subscribe to changes on stream-status

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“Modified” stream status

“Modified” state does not allow for distinguishing between requested modification and actual configuration

Example assuming concurrent access of multiple CUCs

- Stream_1 is established
  - Configured in network, state “Configured”
- CUC_1 modifies Stream_1 property, e.g. FrameSize
  - State “modified”
    - Stream_1 has a set of properties configured in NW and another in CNC
- CUC_2 requests Stream_2
  - Which set of properties for Stream_1 should CNC use?
    - Keep both sets? Where? How many states should be supported?

Table 46-12—StreamStatus enumeration

Name	Value	Description
Planned	0	Stream has been requested but has not yet been configured.
Configured	1	Stream has been computed and configured.
Modified	2	Stream has been configured but Stream parameters have been modified after configuration..

Stream has been configured but Stream parameters have been modified after configuration..

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“Modified” stream status

Dealing with this scenario is

- Cumbersome
- Probably not required

Proposed solution

- Remove “modified” state
- If stream changes are needed then
  - Remove stream
  - Add new set of parameters

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stream.stream-status

Proposed states

- Planned: CNC stored stream requirements in the running datastore — existing
- Calculating: CNC is calculating resources requirements, checking resource availabilities (scheduling) — new
- Establishing: CNC is configuring streams (in the network) — new
- Configured: CNC completed stream configuration — existing
- Failure: CNC failed to configure or calculate the stream — new

State Modified should be removed — removed

How CNC handles a stream config/ computation failure

Currently not described in Qdj

- May lead to inconsistent behavior in a multivendor network

Proposed solution

- CNC notifies CUC
- CUC is responsible to react
  - (Remove, request again, etc)

Add informative text

Stream status: Somehow present in two groups

46.2.3.10 StreamStatus

StreamStatus provides the status of a Stream.

StreamStatus uses the enumeration specified in Table 46-12.

Insert Table 46-12 in subclause 46.2.3.10, renumbering subsequent tables as required.

Table 46-12—StreamStatus enumeration

Name	Value	Description
Planned	0	Stream has been requested but has not yet been configured.
Scheduled	1	Stream has been computed and configured.
Modified	2	Stream has been configured but Stream parameters have been modified since then.

46.2.5.1 StatusInfo

The StatusInfo group provides information regarding the status of a Stream's configuration in the network.

The elements of the StatusInfo group are listed in Table 46-12.

Table 46-12—StatusInfo elements

Name	Data type	Reference
TalkerStatus	enumeration	46.2.5.1.1
ListenerStatus	enumeration	46.2.5.1.2
FailureCode	uint8	46.2.5.1.3

Table 46-13—TalkerStatus enumeration

Name	Value	Description
None	0	No Talker detected.
Ready	1	Talker ready (configured).
Failed	2	Talker failed.

Table 46-14—ListenerStatus enumeration

Value	Description
0	No Listener detected.
1	All Listeners ready (configured).
2	One or more Listeners ready, and one or more Listeners failed. If Talker is ready, Stream can be used.
3	All Listeners failed.

(at least some) values of StreamStatus seem to have a unique correlation to the values present in StatusInfo elements.
If that is the case, please provide that correlation
This will help the reader understanding the difference between these two "StreamStatus"

StatusInfo 46.2.3.10 seems to have been defined for SRP. The information there does not fit the overall TSN purposes. I propose to make the StatusInfo optional

Handling of StreamIDs

Scenarios

1. What happens if some StreamIDs are created/ reserved and the session brakes before CUC gets them?
2. How to avoid a (malicious) CUC to request all available StreamIDs?

Currently not described in Qdj

- May lead to inconsistent behavior in a multivendor network

Proposed solution

- Add informative text
- Contribution required

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Adding listeners (join listener) to streams not in “planned” state

If CUC changes status to “planned”

- CNC sees this stream as not established
  - Although stream might be configured and using NW resources

If status is kept as “established”, “calculating”

- CNC does not account for this stream upon “ComputePlannedAndModifiedStreams”

If CUCs and CNC write stream.stream-status
- Race condition

For multiple CUCs
- Increased risk of race condition

Proposed solution

- Add listeners using a custom RPC
  - stream.stream-status managed by CNC only

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