IEC/IEEE 60802 Traffic Class mapping and Stream Admission

Stephan Kehrer Hirschmann Automation and Control GmbH

September 2024

Overview

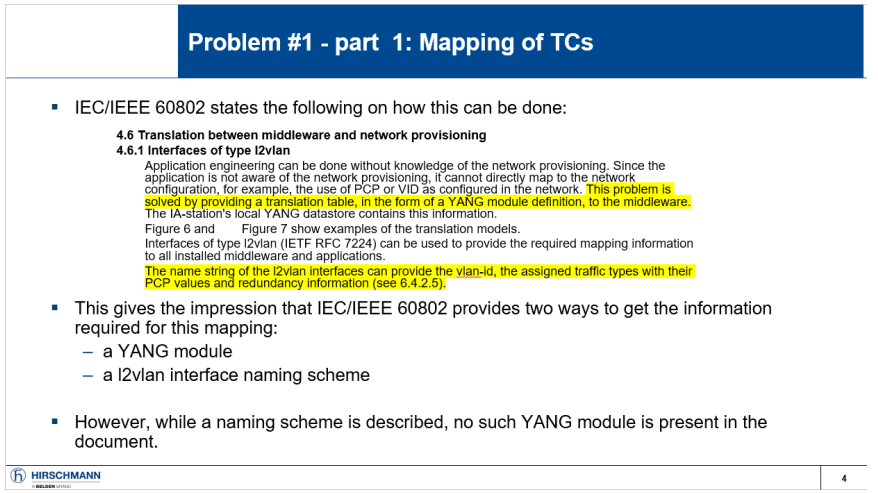
- This presentation is a follow up to the presentation “IEC/IEEE 60802 Traffic Class mapping and Stream Admission” given during the IEEE 802.1 May 2024 Interim Session
- It provides comments the presenter plans to submit for initial IEC/IEEE 60802 SA ballot to address some of the issues highlighted in May 2024, as well as a suggested way to address these issues

Planned SA Ballot Comment #1 – Comment

- Clause 4.6.1 states, regarding the provision of a mapping table between application engineering and network provisioning "This problem is solved by providing a translation table, in the form of a YANG module definition, to the middleware." and "The name string of the l2vlan interfaces can provide the vlan-id, the assigned traffic types with their PCP values and redundancy information (see 6.4.2.5).". This gives the impression that IEC/IEEE 60802 provides two ways to get the information required for this mapping, in a YANG module as well as in the form of a l2vlan naming scheme. However, there are two issues with this. First, no YANG module to express the mapping is provided. Second, the l2vlan naming scheme uses traffic type code abbreviations in the form of letters. However, these letters are only provided as informative text and therefore there is currently no normative way to express the mapping in a standardized and interoperable way. The issue is described as problem #1 in https://www.ieee802.org/1/files/public/docs2024/60802-kehrer-traffic-class-mapping-0524-v01.pdf, slides 3-5.

Problem #1: Mapping of TTs – YANG module

- Problem #1 in the presentation from May 2024 highlights that a YANG module is referenced in IEC/IEEE 60802 but no YANG module is provided
- Based on the discussion in May this presentation suggests the introduction of a YANG module to provide information, relevant for the mapping of traffic types that are configured in a network, to the application



Problem #1 - part 1: Mapping of TCs

- IEC/IEEE 60802 states the following on how this can be done:

4.6 Translation between middleware and network provisioning

4.6.1 Interfaces of type l2vlan

Application engineering can be done without knowledge of the network provisioning. Since the application is not aware of the network provisioning, it cannot directly map to the network configuration, for example, the use of PCP or VID as configured in the network. This problem is solved by providing a translation table, in the form of a YANG module definition, to the middleware. The IA-station's local YANG datastore contains this information.

Figure 6 and Figure 7 show examples of the translation models.

Interfaces of type l2vlan (IETF RFC 7224) can be used to provide the required mapping information to all installed middleware and applications.

The name string of the l2vlan interfaces can provide the vlan-id, the assigned traffic types with their PCP values and redundancy information (see 6.4.2.5).

- This gives the impression that IEC/IEEE 60802 provides two ways to get the information required for this mapping:
  - a YANG module
  - a l2vlan interface naming scheme
- However, while a naming scheme is described, no such YANG module is present in the document.

HIRSCHMANN

4

Planned SA Ballot Comment #1 – Proposed Change

- Add a YANG module, providing the relevant information for the mapping between application engineering to network provisioning, in IEC/IEEE 60802. The commenter plans to provide an initial YANG module as input to the group as a contribution.

- **A first version of the proposed YANG module addressing the issue is included as attachment to this contribution**
- **The YANG tree for the proposed YANG model looks as follows**

```
module: iecieee60802-kehrer-tt-mapping
  +--rw tt-mapping
     +--rw network* [network-name]
        +--rw network-name    string
        +--rw traffic-type* [traffic-type-name]
           +--rw traffic-type-name    string
           +--rw traffic-type-code?   tt-code
           +--rw cyclic?              boolean
           +--rw data-delivery-req?   enumeration
           +--rw time-triggered?      boolean
           +--rw stream-admission?    boolean
           +--rw vlan-id?             dot1q-types:vlanid
           +--rw priority-value?      dot1q-types:priority-type
```

Planned SA Ballot Comment #2 – Comment

- The l2vlan naming scheme currently described in IEC/IEEE 60802/D3.0 encodes VLAN ID and Priority in the l2vlan interface name. This has two issues described in problem #2 (slides 6-7) in https://www.ieee802.org/1/files/public/docs2024/60802-kehrer-traffic-class-mapping-0524-v01.pdf. One problem is the mixing of information relevant for forwarding traffic (VID) and information relevant for prioritization and application information. The second issue is that on (some) existing Unix like systems only one l2vlan interface with a unique VID is allowed per physical interface. This can lead to issues in the practical application of the naming scheme on IA-stations based on such systems.

Planned SA Ballot Comment #2 – Proposed Change

- If a YANG module is provided to allow for the mapping, as requested in another comment, the naming scheme ´will not be needed any more. In that case removing the l2vlan naming scheme seems to be the best approach to the commenter. If the YANG module is not provided, the issue can be solved by decoupling the naming scheme in such a way that l2vlan interfaces are used without encoding the priorities (i.e., one l2vlan interface per VID and physical interface) and then attaching generic interfaces to the l2vlan interfaces encoding required additional information, e.g., traffic type encoding and priority. The commenter is willing to provide a contribution for this if the YANG module is not an option. In the opinion of the commenter the YANG module would be the preferable solution.

➢ **The highlighted portion is the approach preferred by this contribution**

Planned SA Ballot Comment #3 – Comment

- Some of the traffic types that are described by IEC/IEEE 60802 are not stream based (e.g., the traffic type Best Effort High is categorized as IA non-stream). It should be possible for such non-stream based traffic to be used by an application without waiting for a stream admission for the traffic. Currently this is not possible as no information is provided to the application if a traffic type in the network is stream-based or not. This is described in more detail in problem #3 on slide 8 of https://www.ieee802.org/1/files/public/docs2024/60802-kehrer-traffic-class-mapping-0524-v01.pdf.

Planned SA Ballot Comment #3 – Proposed Change

- Add a way to provide information to the application whether a given traffic type in the network is stream based or not and therefore can be used without waiting for stream admission by the central entity, e.g., the CNC. This can either be done in the YANG module for traffic type mapping, if that is provided, or as an additional information bit in the l2vlan interface encoding. The commenter is willing to provide a contribution providing information on the stream admission information for integration in the draft.

➢ **The suggested YANG module includes this information; if the group agrees on adding this, additional information to describe the functionality will be required in IEC/IEEE 60802 The presenter is willing to assist with and/or provide such content.**

Thank you!

Any questions?