IEEE P802.1Qdj

Update on draft d0.0

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Agenda

- Overview over the state of draft d0.0
- Discussion on the scope of IEEE P802.1Qdj
- Definition of CUC and CNC

State of draft d0.0

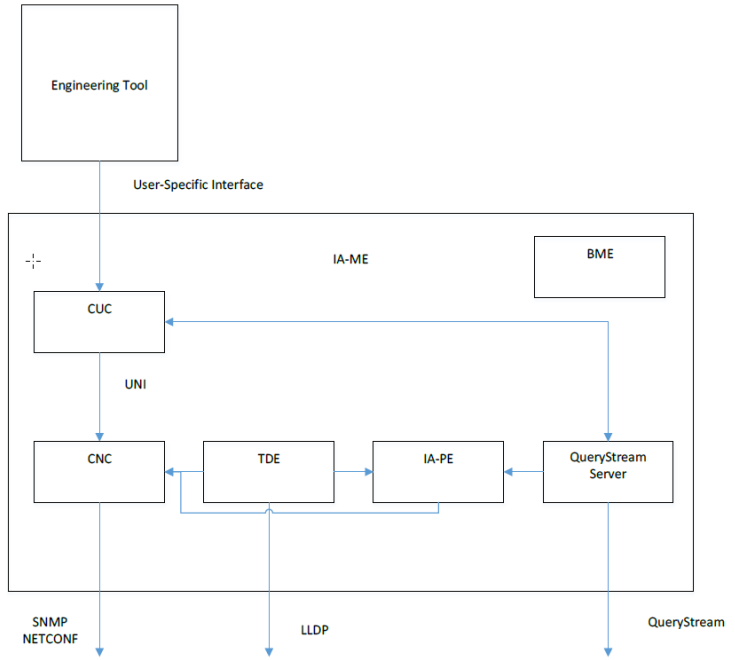
- Currently draft mainly contains boilerplate and structure
- First draft of a definition for CUC and CNC responsibilities included
- Work is currently being done to include a first version of an enhanced YANG model structure
  - This includes enhancements to the interface as described in IEEE Std 802.1Qcc-2018
  - The enhancements are aiming to close gaps that have been discovered in testbeds regarding a complete TSN stream configuration workflow
- The models for the management models introduced in IEEE Std 802.1Qcc-2018 will be enhanced to allow a better differentiation between the interfaces called UNI in that amendment.

Scope of IEEE P802.1Qdj

- One of the main drivers for the work that is to be done in IEEE P802.1Qdj currently is the IEC/IEEE 60802 profile work
- In the understanding of the editor of IEEE P802.1Qdj, however, the interface definitions defined in P802.1Qdj will need to be sufficiently generic to accommodate requirements from other markets as well
- The scope for IEEE P802.1Qdj reads as follows:
  - *This amendment **specifies procedures, interfaces, and managed objects** to enhance the three models of 'Time-Sensitive Networking (TSN) configuration'. **It specifies enhancements to the User/Network Interface (UNI) to include new capabilities** to support bridges and end stations **in order to extend the configuration capability**. This amendment preserves the existing separation between configuration models and protocol specifications. This amendment also addresses errors and omissions in the description of existing functionality.*

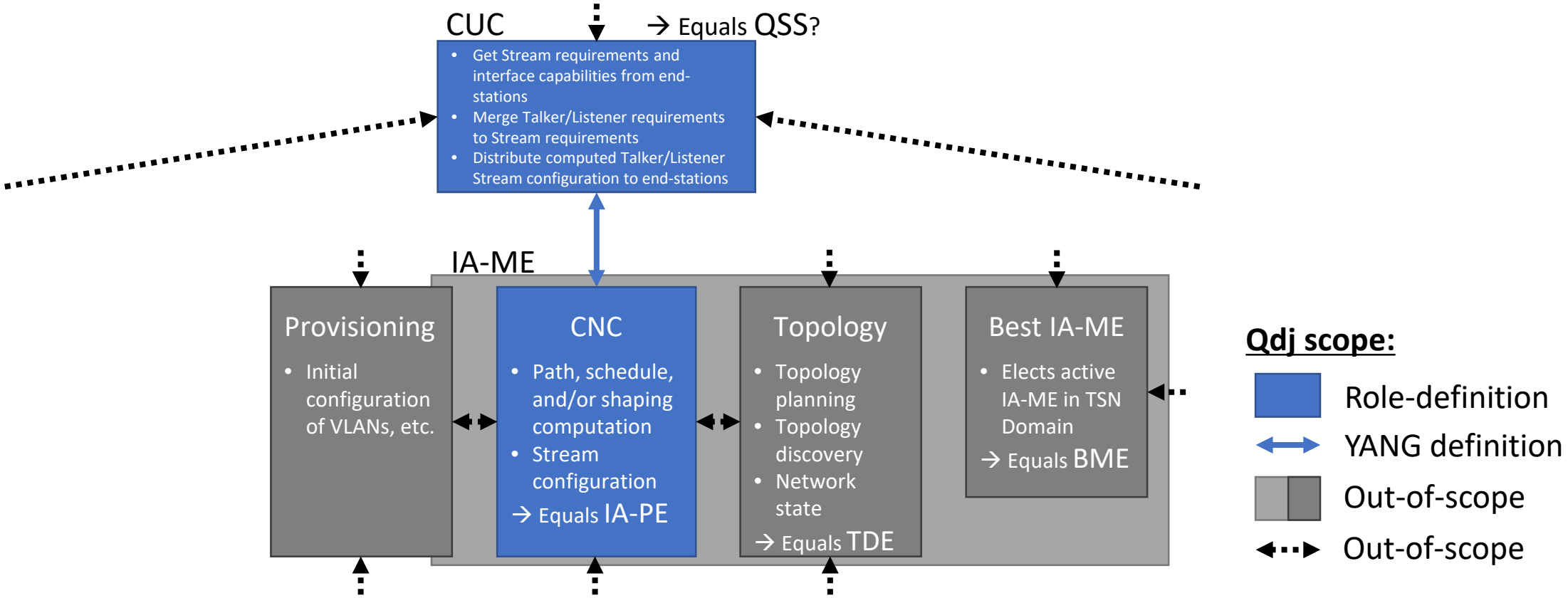
Scope of IEEE P802.1Qdj

- IEC/IEEE 60802 d1.1, clause 5.7.1, discuses an engineering management model for industrial automation
- The model includes CUC, CNC and several other entities that, together, comprise the so called IA-ME (Industrial Automation Management Entity)
- It also contains the following editor's note:
  - *Arguably, the TDE and the IA-PE could be considered part of the CNC since Qcc implies that the CNC has an understanding of paths and topology. Likewise, the QSS could be considered an extension of the CUC. For the purpose of this draft, the editor has attempted, to the extent practical, to maintain the partitioning proposed by the original contributor while expressing the model in terms familiar to reader of IEEE 802 standards.*



Scope of IEEE P802.1Qdj

- The following model shows the interpretation of the editor of P802.1Qdj regarding the entities that should be generically described in P802.1Qdj (i.e. that are in scope of P802.1Qdj), the entities specific for industrial automation and their relationship



Definition of CUC – in IEEE Std 802.1Qcc-2018

- Current definition in IEEE Std 802.1Qcc-2018:
  - **3.x Centralized User Configuration (CUC):** A centralized entity that discovers end stations, retrieves end station capabilities and user requirements, and configures TSN features in end stations. The protocols that the CUC uses for communication with end stations are specific to the user application, not specified in this standard. A CUC exchanges information with a CNC in order to configure TSN features on behalf of its end stations.

Definition of CUC – suggested enhancements

- Suggested enhanced definition:
  - **3.x Centralized User Configuration (CUC):** A centralized entity that discovers end stations, retrieves end station capabilities and user requirements, and configures TSN features in end stations. It is a logical entity that can be located in any device of a network (e.g. a bridge, end-station, engineering tool, or network management system). The CUC is responsible for the following services:
    a. Collecting application level QoS requirements (e.g. application cycle time) for TSN streams from talkers and listeners.
    b. Translating the stream requirements from talkers and listeners to merged stream requirements.
    c. Communicating the merged stream requirements to the CNC.
    d. Retrieving the merged end-station communication-configuration from the CNC.
    e. Distributing the end-station communication-configuration to talkers and listeners.

    The protocols that the CUC uses for communication with end stations can either be specific to the user application (not specified in this standard) or a protocol specified by IEEE 802.1. A CUC exchanges information with a CNC in order to configure TSN features on behalf of its end stations. It communicates with the CNC through the Configuration-UNI defined in this standard.

Definition of CNC – in IEEE Std 802.1Qcc-2018

- Current definition in IEEE Std 802.1Qcc-2018:
  - **3.x Centralized Network Configuration (CNC):** A centralized component that configures network resources on behalf of TSN applications (users).

Definition of CNC – suggested enhancements

- Suggested enhanced definition:
  - **3.x Centralized Network Configuration (CNC):** A centralized component that configures network resources on behalf of TSN applications (users). It is a logical entity that can be located in any device of a network (e.g. a bridge, end-station, engineering tool, or network management system). The CNC is responsible for the following services:
    a. Receiving the merged stream requirements for a TSN stream from the CUC.
    b. Computing paths for requested streams.
    c. Performing computation of scheduling and/or shaping configuration for the requested streams.
    d. Configuring the network devices to provide the required services and resources for the streams (e.g. FDB entries, configuration of transmission gates, …).
    e. Provide the merged end-station communication-configuration for the streams to the CUC.

    The CNC communicates with the CUC through the Configuration-UNI defined in this standard (northbound communication). It communicates with the network devices using the managed objects defined in IEEE Std 802.1Q-2018 and other IEEE 802.1 standards.

Thank you!

Any questions?