P802.1CM TIME-SENSITIVE NETWORKING FOR FRONTHAUL

GOALS, PAR, CSD

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BACKGROUND – TSN TOOLS

- The 802.1 Time-Sensitive Networking (TSN) Task Group (TG) is developing a number of “tools” that are promising for transporting fronthaul streams in a bridged network
- TSN tools under development and referred by 802.1CM draft PAR
  - P802.3br – Interspersing Express Traffic and
    P802.1Qbu – Frame Preemption
    Time-critical frames can suspend the transmission of non-time-critical frames while one or more time-critical frames are transmitted.
  - P802.1Qbv – Enhancements for Scheduled Traffic
    Time-aware queue-draining to schedule the transmission of frames relative to a known timescale. Virtual Local Area Network (VLAN) tag encoded priority values allow simultaneous support of scheduled traffic and other bridged traffic over Local Area Networks.

GOALS

- Develop standard TSN profiles for Fronthaul in order to enable the transport of fronthaul streams in a bridged network
- The 802.1CM specification
  - will collect requirements for Fronthaul networks
  - will provide guidance for meeting Fronthaul requirements, which includes
    - selecting 802.1 TSN features in order to build networks capable of transmitting Fronthaul streams like CPRI
    - describing how the selected TSN features and components can be combined, configured and used in order to meet Fronthaul requirements
- The P802.1CM project may identify additional TSN functions that would be useful

PROJECT AUTHORIZATION REQUEST (PAR) – DRAFT

- http://www.ieee802.org/1/files/public/docs2015/new-P802-1CM-draft-PAR-0515-v02.pdf
- **2.1 Title**: Time-Sensitive Networking for Fronthaul
- **4.3 Projected Completion Date for Submittal to RevCom**: 05/2019
- **5.2 Scope**: This standard defines profiles that select features, options, configurations, defaults, protocols and procedures of bridges, stations and LANs that are necessary to build networks that are capable of transporting fronthaul streams, which are time sensitive.
- **5.4 Purpose**: The purpose of this standard is to enable the transport of time sensitive fronthaul streams in Ethernet bridged networks.

DRAFT PAR – CONT'D

- **5.5 Need for the Project**: A mobile operator's radio equipment and radio equipment controller are often separated and the connection between them has very stringent requirements. This fronthaul connection is not provided by a bridged network today. In an IEEE 802.1 bridged network potentially carrying other categories of traffic, specific configurations of various IEEE 802 standards (e.g. P802.1Qbu, P802.1Qbv, P802.3br) are needed to meet the requirements of the fronthaul streams. Therefore, the use and the configurations of functions defined in the IEEE 802 standards have to be specified by standard profiles for bridged fronthaul networks.
- **8.1 Additional Explanatory Notes**: This work will be done in close collaboration with CPRI Cooperation.

CRITERIA FOR STANDARDS DEVELOPMENT (CSD) – DRAFT

- http://www.ieee802.org/1/files/public/docs2015/new-P802-1CM-draft-CSD-0515-v02.pdf
- ***1.2.1 Broad market potential:*** Mobile operators are looking at new solutions that can help to simplify networks and reduce cost, e.g., by sharing resources. This led, e.g., to the separation of radio equipment and the radio equipment controller, where the transport link between them is referred to as fronthaul. For implementing fronthaul over packet networks such as IEEE 802.1 bridged networks, it is essential to meet the stringent service requirements of protocols running over the fronthaul. The specification of the use of Time-Sensitive Networking (TSN) features in fronthaul scenarios is beneficial for vendors offering and/or developing TSN products as well as for mobile operators.

DRAFT CSD – CONT'D

- ***1.2.4 Technical Feasibility***
  - The proposed standard will specify profiles for the use of other IEEE 802 standards for which system feasibility has been demonstrated.
  - The proposed standard will use other IEEE 802 standards for which the technology has been proven.
- ***1.2.5 Economic Feasibility***
  - The well-established balance between infrastructure and attached stations will not be changed by the proposed standard.
  - The cost factors are known for the IEEE 802 standards that this specification builds upon.
  - There are no incremental installation costs relative to the IEEE 802 standards that this specification builds upon.
  - There are no incremental operational costs relative to the existing costs associated with the IEEE 802 standards that this specification builds upon. Furthermore, operational costs can be decreased by automatic procedures based on this specification versus manual configuration.
  - No other areas have been identified.

ROUGH PLAN

- PAR approval by IEEE 802 (July 17, 2015)
- PAR approval by IEEE SA NesCom (New Standards Committee) approval (September 3, 2015)
- Official start of P802.1CM project (September 8, 2015)
  - Starts with gathering requirements, use cases
- Task Group Ballots
- Initial Working Group Ballot
- Working Group Recirculation Ballot(s)
- Initial Sponsor Ballot (July 2018)
- Sponsor Recirculation Ballot(s)
- Submission for IEEE SA RevCom (Review Committee) approval (May 2019)

EXPECTATIONS TO CPRI

- Collaboration on P802.1CM
- Provide CPRI requirements
- Evaluate the solution being developed in P802.1CM
- If a new version of CPRI is defined by CPRI Cooperation
  - Provide the requirements of the new version (if any)
  - Discuss the capabilities of a 802.1 TSN bridged network

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