***Examples of Stream and Flow Characterization* Date:** 2020-04-23

**Source:**

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**Venue: *Nendica SFI***

**Abstract:**

This document proposes examples of Stream and Flow Characterization as anticipated for the SFI Work Item.

**Summary:**

* The SFI charter document (“IEEE 802 Nendica Work Item Proposal: Network Stream and Flow Interworking”) proposes to include (among other things) “a catalog of the various streams and flows specified in IEEE 802 networks and other relevant networks” along with characterization of those streams and flows. This contribution proposes, considering the lists in the SFI charter document, an initial list of networks to be considered and an initial characterization of flow types in several of those.

**Background Documents:**

* IEEE 802 Nendica Work Item Proposal: Network Stream and Flow Interworking
  + IEEE 802.1-20-0004-04-ICne

***Stream and Flow Characterization***

**[Proposed] Stream and Flow Types to be considered:**

•IEEE 802.11 Trafﬁc Streams

•IEEE 802.1 TSN Streams

•IEEE Std 1722 AVB?

•IEEE 802.16 Service Flows

•Carrier Ethernet Virtual Connection

•IETF DetNet & RAW

•DOCSIS Service Flows

•3GPP Bearers

•IP flows (DSCP; IPv6 flow identifier)

•others

**IEEE 802.11 Trafﬁc Streams**

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **IEEE 802.11 Trafﬁc Streams** | **notes** |
| **Specification document** | IEEE Std 802.11 |  |
| **Sub-specification** | HCCA |  |
| **Network architecture** | Shared medium  Point-to-Multipoint | HCCA is centralized |
| **Conditions** | Operates under CSMA/CA | Scheduling is by an AP within its BSS; not guaranteed in the presence of non-HCCA devices, or another HCCA BSS |
| **Addressing** | 802 unicast |  |
| **End station** | Non-AP STA |  |
| **Control** | Access point (AP) scheduler |  |
| **Flow-sensitive elements** | AP |  |
| **Flow name** | parameterized traffic stream (TS) |  |
| **Flow identification** | traffic stream identifier (TSID) |  |
| **Flow quantity** | 8 (3 bits) | per connection (AP+STA), per direction |
| **Flow descriptor** | traffic specification (TSPEC) |  |
| **Flow addition process** | add traffic stream (ADDTS) |  |
| **Flow deletion process** | delete traffic stream (DELTS) |  |
| **Flow change process** | [none] |  |
| **Flow QoS properties** | Nominal MSDU Size, Maximum MSDU Size, Minimum Service Interval, Maximum Service Interval, Inactivity Interval, Suspension Interval, Service Start Time, Minimum Data Rate, Mean Data Rate, Peak Data Rate, Burst Size, Delay Bound, Minimum PHY Rate, Surplus Bandwidth Allowance, Medium Time | 9.4.2.29 |
| **Frame classification** | stream classification service (SCS)? | 11.26 |
| **Request/grant system and polling services** | Polled TXOP  Buffer status report (BSR) [P802.11ax] | 10.23.3.3 |
| **Admission control** | yes |  |
| **Interworking** | R.3 QoS mapping guidelines for interworking with external networks |  |

**MEF Carrier Ethernet – Ethernet Virtual Connections**

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **MEF Carrier Ethernet** | **notes** |
| **Specification document** | MEF 6.3 | and other MEF specs |
| **Sub-specification** | EVC:  Ethernet Virtual Private Line (EVPL)  Ethernet Virtual Private LAN (EVP-LAN)  Ethernet Virtual Private Tree (EVP-Tree) | port-based services are not included here |
| **Network architecture** | Shared medium  EVC Type: Point-to-Point, Multipoint-to-Multipoint, or Rooted-Multipoint |  |
| **Conditions** |  |  |
| **Addressing** | IEEE 802 48-bit address |  |
| **End station** | Ethernet connected at port (UNI) |  |
| **Control** |  |  |
| **Flow-sensitive elements** | bridges or other operator elements |  |
| **Flow name** | service |  |
| **Flow identification** | Customer-Edge VLAN ID |  |
| **Flow quantity** | 4094 (12 bits) |  |
| **Flow descriptor** | Service attributes |  |
| **Flow addition process** | manual (historically) | may be automated per MEF Lifecycle Service Orchestration (LSO) |
| **Flow deletion process** | manual (historically) | may be automated per MEF Lifecycle Service Orchestration (LSO) |
| **Flow change process** | manual (historically) | may be automated per MEF Lifecycle Service Orchestration (LSO) |
| **Flow QoS properties** | many |  |
| **Frame classification** | unspecified |  |
| **Request/grant system and polling services** | None; full-duplex system, reservation-based |  |
| **Admission control** | Yes |  |
| **Interworking** | unspecified |  |

**DOCSIS Service Flows**

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **DOCSIS** | **notes** |
| **Specification document** | DOCSIS 4.0 MAC and Upper Layer Protocols Interface Specification | key features date to DOCSIS 1.1 |
| **Sub-specification** |  |  |
| **Network architecture** | point-to-multipoint |  |
| **Conditions** |  |  |
| **Addressing** | IEEE 802 48-bit address |  |
| **End station** | cable modem (CM) |  |
| **Control** | cable modem termination system  (CMTS) |  |
| **Flow-sensitive elements** | CMTS and CM |  |
| **Flow name** | service flow | unidirectional |
| **Flow identification** | service identifier (SID) | Service flows are identified by SFID and described by QoS parameters. Active service flows are assigned an SID. |
| **Flow quantity** | SID 14 bits | SFID is 32 bits |
| **Flow descriptor** | QoS Parameter Set |  |
| **Flow addition process** | Dynamic Service Addition |  |
| **Flow deletion process** | Dynamic Service Deletion |  |
| **Flow change process** | Dynamic Service Change |  |
| **Flow QoS properties** | Traffic Priority, Maximum Sustained Traffic Rate, Maximum Traffic Burst, Minimum Reserved Traffic Rate, etc. |  |
| **Frame classification** | Upstream and Downstream Classifiers; Payload Header Suppression Rules; |  |
| **Request/grant system and polling services** | Upstream Service Flow Scheduling Services, including Unsolicited Grant Service (UGS), Real-Time Polling Service (rtPS), Unsolicited Grant Service with Activity Detection (UGS-AD), Non-Real-Time Polling Service (nrtPS) and Best Effort (BE) service |  |
| **Admission control** | yes |  |
| **Interworking** |  |  |