P802.1DP Monitoring for Egress Shaping and Policing

Abdul Jabbar
GE Research

Objective

- ***Review approach to monitoring and management for DP***
- ***Discuss required monitoring objects for TAS, PSFP***

Reference:

- ***P802.1DP Monitoring and Management, Jan 2023 Interim Session https://www.ieee802.org/1/files/public/docs2023/dp-jabbar-monitoring-0123-v01.pdf***
- ***IEEE Std 802.1Q 2022***

IEEE/IETF Managed Objects

- IEEE/IETF defines managed objects for end stations and bridges, which can be categorized in to following categories (IMHO):
  1. Identity and capability: information on the device attributes
     e.g. bridgeName, bridgeType, supportedListMax, supportedCycleMax
  2. Configuration: configure and/or query current configuration
     e.g. gateEnabled, adminControlList, operControlList
  3. Operational: status/statistics derived from operating conditions
     a. Status/health (capturing both normal and erroneous conditions)
        e.g. isSynched, GateClosedDueToOctetsExceeded,
     b. Statistics (capturing both normal and erroneous behavior)
        e.g. passingFrameCount, notPassingSDUCount, redFramesCount

IEEE/IETF Managed Objects – Aerospace Use

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Defined offline via device datasheet

Abstracted via configuration models;
Config query useful in design phase

Applicable during operation (flight)
Required to meet DAL certification
DP should mandate specific ones

Proposed Approach: Identify the operational objects necessary for aerospace use and make them mandatory in P802.1DP

P802.1DP Specified Functions

Functions	Profile Specification
Time Synchronization	802.1AS-2020*
Egress Traffic Shaping	Credit Based Shaper Time Aware Shaper*
Redundancy	Frame Replication and Elimination
Ingress Policing	Per-Stream Filtering and Policing
Stream Separation	Stream identification, transformation, and separation
Configuration	Fully centralized, Yang models
Forwarding	Per-stream forwarding
Management and Monitoring	Required error, fault, and performance metrics

** Only applicable to Synchronous profile*

Time Aware Shaper - Operational Objects

12.29.1.1.2 TransmissionOverrun

A counter that is incremented when the implementation detects that the transmission gate associated with a queue has closed and a frame that originated from the queue is still being transmitted by the MAC.

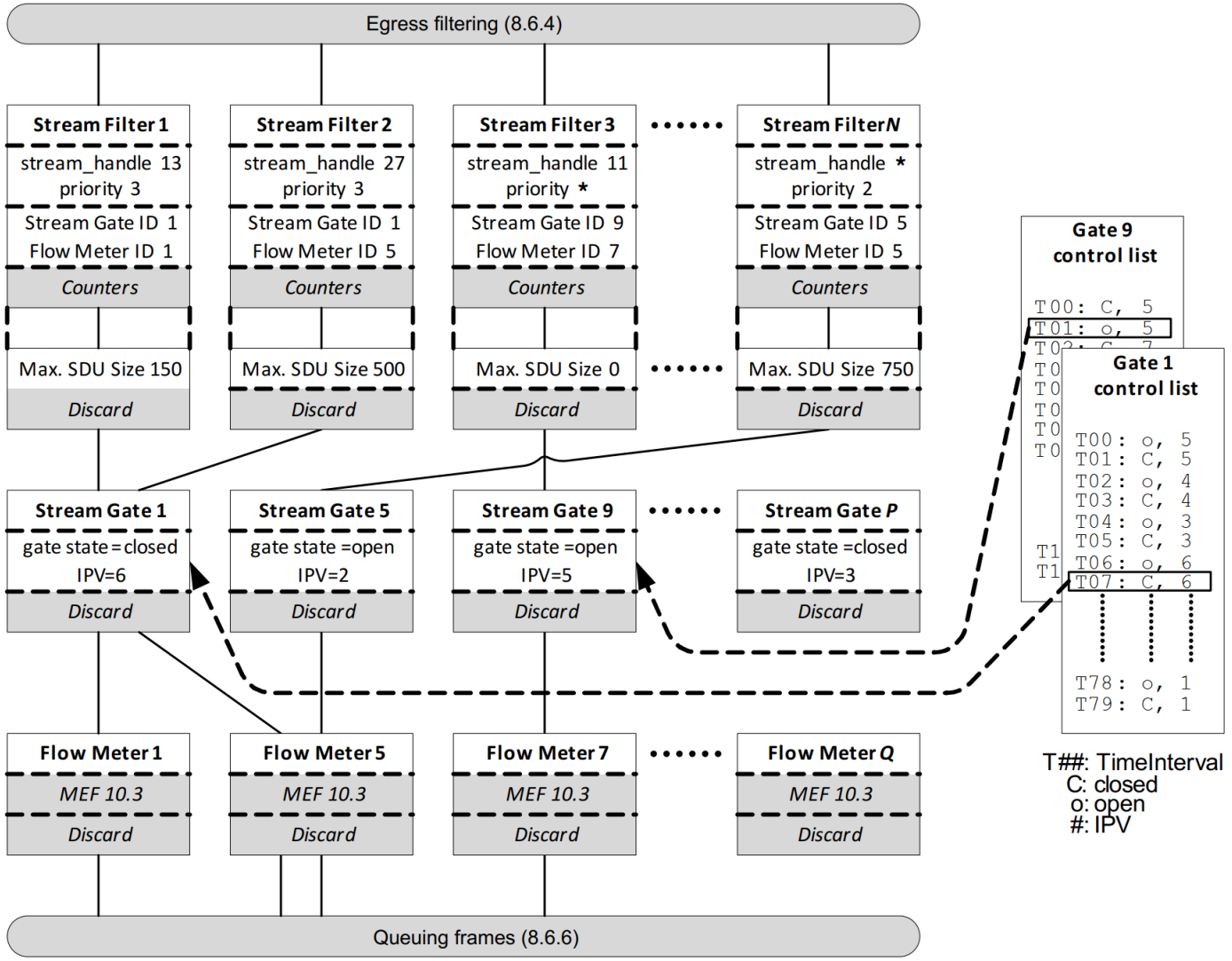
Data Type: Counter64 (uint64)

Granularity: Per port, per queue

Credit Based Shaper - Operational Objects

None

Per Stream Filtering and Policing



KEY
Counters: Matching, passing, and discarded frame counters (8.6.5.3).
Discard: Frame discarding abilities and parameters (8.6.5.3.1, 8.6.5.4, 8.6.5.5).
MEF 10.3: Flow metering based on MEF 10.3 Bandwidth Profile parameters and algorithm as specified in 8.6.5.5.

Figure 8-14—Per-stream classification for PSFP

Per Stream Filtering and Policing

Operational Objects

Each stream filter comprises the following counters for frames associated with the stream filter:

h) *MatchingFramesCount*: all frames associated with that stream filter.
i) *PassingSDUCount*: frames passing the maximum SDU size filter (8.6.5.3.1).
j) *NotPassingSDUCount*: frames not passing the maximum SDU size filter (8.6.5.3.1).
k) *PassingFrameCount*: frames passing the associated stream gate (8.6.5.4).
l) *NotPassingFrameCount*: frames not passing the stream gate (8.6.5.4).
m) *RedFramesCount*: frames discarded by the flow meter (8.6.5.5)
Data Type: Counter64 (uint64)

A Boolean *StreamBlockedDueToOversizeFrame* parameter*:* discarding all frames from a stream when a frame exceeds the max SDU size.

Granularity: Per stream filter

Per Stream Filtering and Policing

Operational Objects

If PSFP are supported, each stream gate also includes the following:
f) A boolean *GateClosedDueToInvalidRx* parameter: Permanent frame discarding due to a frame being received during a closed gate state
h) A boolean *GateClosedDueToOctetsExceeded* parameter: Permanent frame discarding due to a frame experiencing insufficient left octets condition (meaning not enough time left to transmit the full frame – due to exceeding the intervalOctetMax)
Granularity: Per stream gate

Each flow meter includes:
A boolean *MarkAllFramesRed* parameter : permanently discard all frames after an initial frame has been discarded

Granularity: Per flow meter