

97-1090
Frame-Level Performance
Management at the
M4 Interface

Suba Varadarajan, Raj Jain
The Ohio State University

Aditya Sehgal, Southwestern Bell Communications

Raj Jain is now at Washington University in Saint Louis,
jain@cse.wustl.edu <http://www.cse.wustl.edu/~jain/>

Minutes: Sept Meeting

ATM-Forum 97-0610R1 Performance Management Requirements of ATM networks (Jain, NASA)

This contribution applies to AAL5 only, when frame-level services are offered, and when frame boundary is visible in the ATM layer. The frame considered here is the AAL5 PDU.

The modularity of congestion was a key discussion item. It was proposed that it be moved from the VC-level to the equipment-level.

Aggregation over several switches to address results on an end-to-end connection basis was also a key issue raised.

The goal is to count Early Packet Discard on a per-VC basis, on a selectable number of VCs. This goal was agreed to.

Contributions are called for at the next meeting. The requirements need to be more specific.

Note that ATM-F 97-0816 from the same source was withdrawn.



- ❑ Two counters for Selectable number of VCs
- ❑ Four counters at ATM interface level

Cell Level Monitoring Reqs

- The following counts are on a per-VC basis for a **selectable number** of VC's. They apply only when frame-level services are offered and when the frame boundary is visible in the ATM layer as in AAL5.
 - Retrieve current (15 minute) count of Cells Dropped due to Early Packet Discard (EPD)
 - Retrieve current (15 minute) count of Frames Dropped due to EPD

VP/VC Performance Requirements

- ❑ (R) PM-49 The ATM NE shall count and store in a current PM bin the layer performance parameters identified. These counters should be 15 minute intervals for a total of a 24 hour period.
- ❑ (R) PM-50 The M4 interface shall provide the OS in the NE with the ability to reset to zero each current count for the layer performance parameters identified.
- ❑ (R) PM-51 Failures, testing routines, non-boundary resets and reconfigurations may affect the collection of performance monitoring information. When such events occur, the ATM NE is expected to flag the collected information as `suspect.` The operations interface shall provide to the OS the ability to retrieve an indication as to whether the counts are reliable or suspect.
- ❑ (R) PM-52 The ATM NE shall support the suppression of all zero performance monitoring counts.
- ❑ (R) PM-52 The M4 operations interface shall support requests by the NE's OS to retrieve and change the threshold of each register.
- ❑ (R) PM-53 As soon as a threshold is reached or crossed for a given performance event, a threshold crossing notification is generated.
- ❑ (R) PM-54 Performance information shall be reportable when a request is made accross the M4 interface.
- ❑ (O) PM-55 Performance information collection may be performed periodically to support trend analysis to predict future failure or degraded conditions. On request by the M4 interface, the PM information of specific ports should be reportable periodically.

Motion 1

Add the two counters as follows:

2.3.6 VP and VC Layer Performance Monitoring

Performance information is useful for both the Virtual Path (VP) and Virtual Circuit (VC) levels of information passing through a Network Element (NE). The M4 interface shall provide the ability to initiate VP/VC performance monitoring on a limited number of VP/VC termination points. This data is then used by the NE's OS to compute the lost cell ratio and the misinserted cell ratio. Specific counters should exist for:

User Cells

Lost Cells

Misinserted Cells

Cells dropped due to EPD*

Frames dropped due to EPD*

*The EPD counts apply only when frame-level services are offered and when the frame boundary is visible in the ATM layer as in AAL5. The frame considered here is the AAL5 PDU.

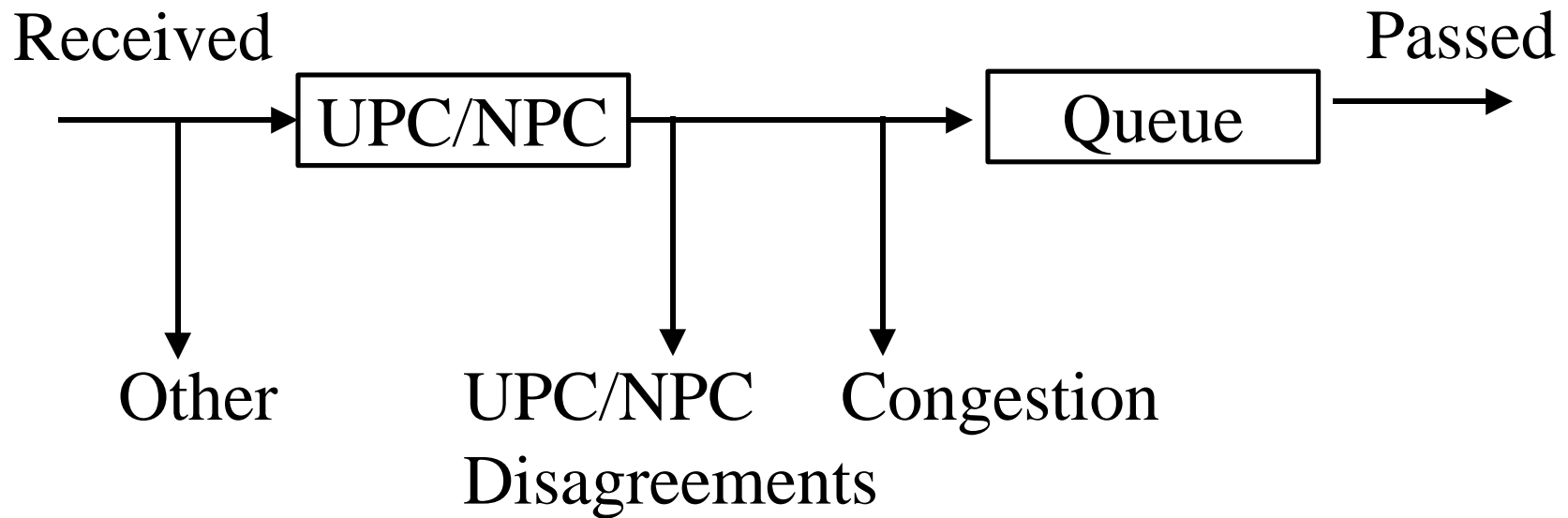
Frame Level Monitoring Reqs

The following counts are to be retrievable from each **ATM interface** terminating on the ATM NE. These counts are optional and can only be implemented where frame-level service is implemented.

- a) Frames Received
- b) Frames Successfully Passed
- c) Frames Dropped due to Congestion
- d) Discarded frames due to UPC/NPC disagreements

Other discarded frames can be calculated

Frame Counts



Frame-Level Reqs

[Modeled after Section 2.3.2]

- ❑ Set threshold values for
 - a) Frames Dropped due to UPC/NPC disagreements
 - b) Frames Dropped due to congestion
- ❑ Modify threshold values for a) and b) above
- ❑ Provide autonomous notifications of threshold crossing by ATM Network Element
- ❑ Reset all six counts to zero
- ❑ Retrieve history counts (32 fifteen minute counts)
- ❑ Mark defective data as 'suspect' and permit retrieval

Proposed Text

2.3.8 Frame-Level Performance Monitoring Requirements

Frame-Level performance monitoring is a measure of the ability of an ATM NE to provide frame-level handling of user data. The frame considered here is the AAL5 PDU. It must be noted that frame-Level performance monitoring can only be implemented where frame-level service is implemented.

(O) PM-58 The M4 interface should support the ability to retrieve current (15 minute) counts of the following data from each ATM interface (UNI, InterNNI, IntraNNI) terminating on the ATM NE:

1) Frames Received

This parameter keeps a separate count of the total number of incoming ATM frames received.

2) Frames Successfully Passed

This parameter keeps a count of the number of ATM frames that have been passed (i.e. not dropped).

3) Frames Dropped due to Congestion

This parameter keeps a count of the number of ATM frames dropped due to congestion. Discard counts are incremented only if the switch implements frame level discard.

4) Frames Dropped due to UPC/NPC disagreement

This parameter keeps a count of the number of ATM frames dropped due to traffic descriptor violations detected by the combined CLP=0 and CLP=1 UPC/NPC policing function.

Proposed Text (Cont)

- (O) PM-59 The M4 interface should support the ability to set threshold values for parameters 3 and 4 listed in PM-58 to one or more interfaces terminating on the ATM NE.
- (O) PM-60 The M4 interface should allow modification of the threshold value for parameters 3 and 4 listed in PM-58.
- (O) PM-61 The M4 interface should support autonomous notifications by the ATM NE indicating threshold crossings for parameters 3 and 4 in requirement PM-58.
- (O) PM-62 The M4 interface should provide the ability to reset to zero each count of the performance parameters identified in requirement PM-58.
- (O) PM-63 The M4 interface should allow retrieval of history counts (thirty-two 15 minute counts) of the performance parameters listed in requirement PM-58.
- (O) PM-64 If the collection of data identified in requirement PM-58 becomes suspect due to failures, testing routines, and reconfigurations of UNIs, BISSIs, and BICIs, the ATM NE should mark such data as "suspect". It should also be possible to retrieve information regarding whether the counts of parameters in PM-58 are suspect.

Motion 2

- Add the four frame-level counts and requirements indicated in 97-1090 to the M4 NE View Interface requirements as Section 2.3.8