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Frame-Level Performance Management Requirements for ATM Networks

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Overview

❑ Why do we need frame-level metrics?

❑ Performance Requirements for:

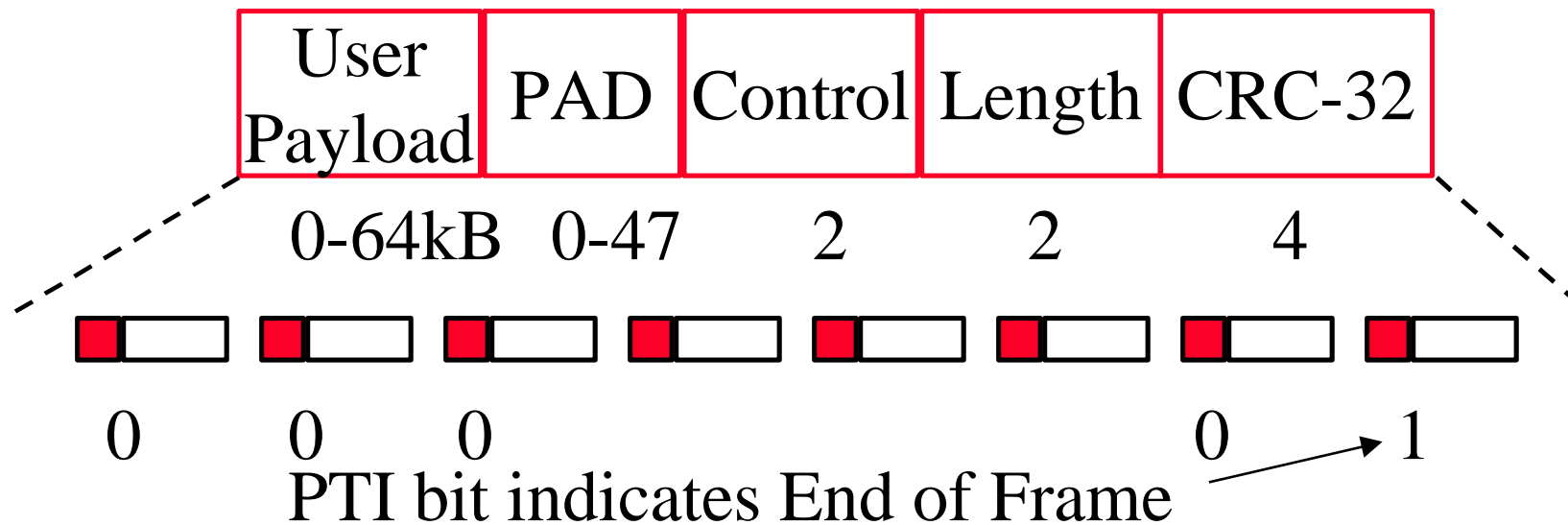   ❑ M4 Network Element View

    ❑ M4 Network View

Why Frame-Level?

❑ ATM Forum TM and signaling allow ABR/UBR users to request frame-level discard also known as early packet discard (EPD)

❑ Depending upon the frame size, a congested switch may drop many cells due to frame discard

❑ Current network management specs do not allow monitoring any frame-level performance information

Why Frame Level (Cont)?

❑ Many users care for frame level performance. However, cell level performance does not give any indication of frame level performance.

1% Cell loss ratio $\neq$ 1% Frame loss ratio

❑ Frame-level monitoring becomes more important with the introduction of GFR where frames may be dropped due to UPC/NPC

What is a Frame?

❑ Frame = AAL5 Protocol Data Unit

❑ Frame boundary is visible even in ATM layer

❑ Switches are designed to forward/drop complete frames.

User Payload	PAD	Control	Length	CRC-32
0-64kB	0-47	2	2	4

0   0   0   0   1

PTI bit indicates End of Frame

Performance Requirements

- ❏ M4 Network Element View
    - ❏ Cell Level Monitoring
    - ❏ Frame Level Monitoring
- ❏ M4 Network View
- ❏ Note:
    - ❏ All counters presented here apply only for AAL5 and only if any frame-level services offered.
    - ❏ All counters are optional.
    - ❏ Defining them allows a standard method for requesting and communicating/rejecting info

Cell Level Monitoring Requirements

❑ Retrieve current (15 minute) count of cells discarded due to frame discard

  ❑ Set threshold value

  ❑ Modify threshold value

  ❑ Support autonomous notifications of threshold crossing by ATM Network Element

  ❑ Reset cell count to zero

  ❑ Retrieve history counts (32 fifteen minute counts)

 ❑ Mark defective data as 'suspect' and permit retrieval

Frame Level Monitoring Requirements

❑ Retrieve current (15 minute) counts of:

   a) Frames received on each connection

   b) Frames successfully passed on each connection

   c) Frames discarded due to UPC/NPC disagreements

   d) Frames discarded due to congestion

   e) Frames passed successfully after UPC/NPC

   Other discarded frames can be calculated

Frame Counts
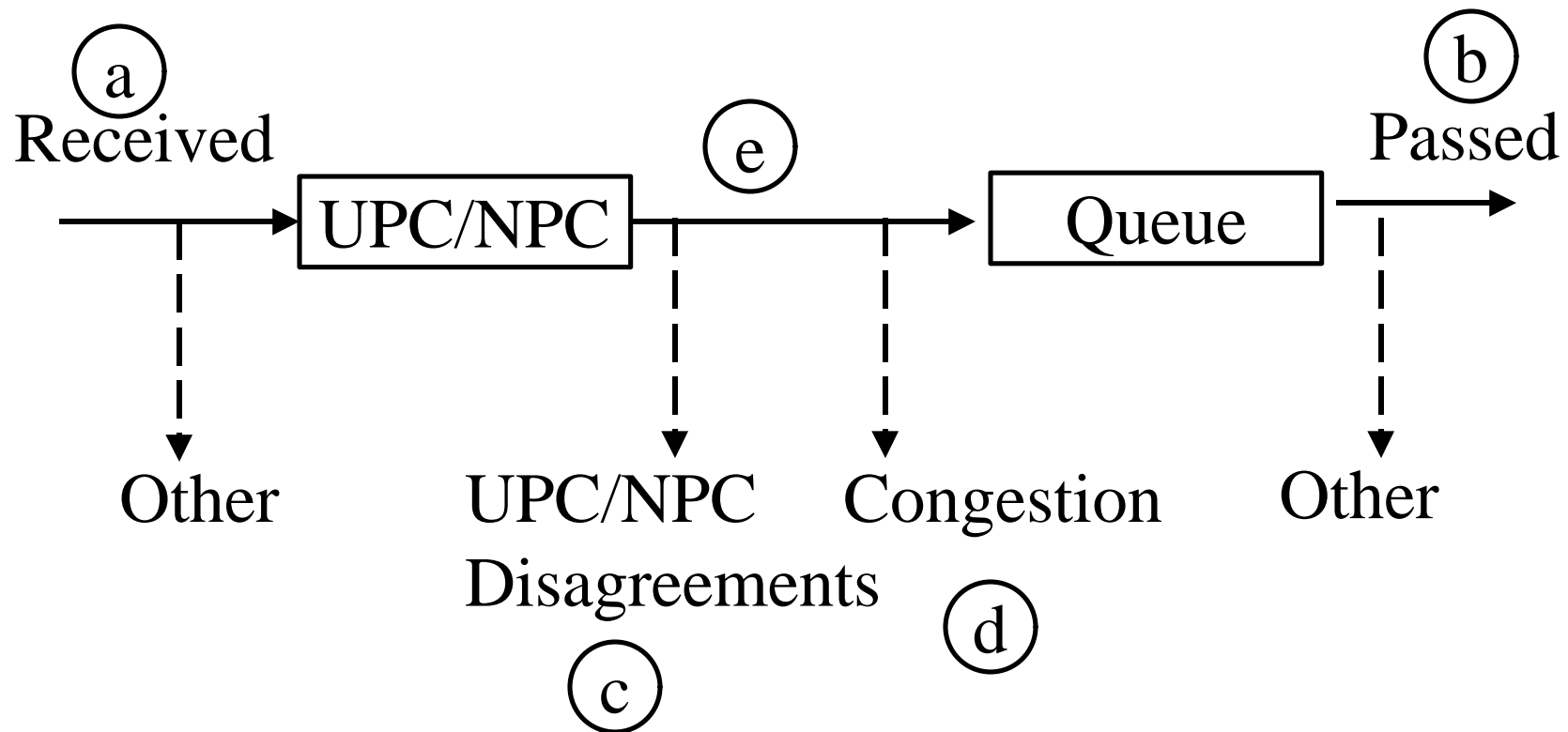
Frame Level (Cont)

❑ Set threshold values for

      a) Discarded frames due to UPC/NPC disagreements

      b) Discarded frames due to congestion

❑ Modify threshold values for a) and b) above

❑ Provide autonomous notifications of threshold crossing by ATM Network Element

❑ Reset all counts to zero

❑ Retrieve history counts (32 fifteen minute counts)

❑ Mark defective data as 'suspect' and permit retrieval

M4 Network View

❑ Support management requests for:

Performance information about entire network

Performance information about specific part of the sub-network

Summary
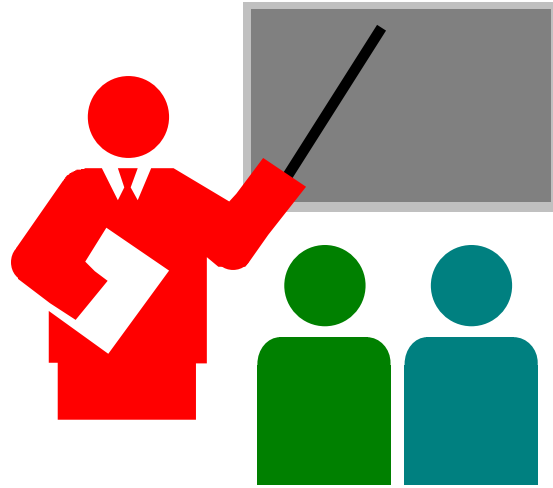
❑ It is important that performance management include frame level metrics

❑ Addition of cell count and frame counts for M4 Network Element View

❑ M4 Network View requirements