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Scope For ATM Forum's Performance Benchmarking Work Item

Raj Jain, Bhavana Nagendra, Gojko Babic

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



- ❑ Summary of December 1995 discussion
- ❑ Scope
- ❑ Nongoals
- ❑ Updated Performance Metrics

Why?

- ❑ For ATM to succeed, it is important that performance of user application on ATM be better than that on competing technologies.
- ❑ Confusion caused by differing terminology and differing benchmarks will eventually lead to customer dis-satisfaction
- ❑ Imagine the confusion if the definitions of cell loss rate (CLR), Cell transfer delay (CTD), etc. were not standardized. Performance benchmarking work is required to do the same at the frame level. CLR of 1% \neq Frame loss rate of 1%
- ❑ Better customer information will contribute to more customer satisfaction and more sales and hence success of ATM.

SCOPE: Goals

- ❑ Define metrics that help the customer compare various ATM (and possibly non-ATM) equipment.
- ❑ The metrics should independent of switch architectures
They should apply to all architectures
- ❑ Develop precise methodologies for measuring these metrics.
Methodology = Procedure + Configuration + Traffic Pattern
⇒ Anyone (user or vendor) can conduct it and come up with the same result.
- ❑ Any extensions of the above that enhance the marketability of ATM can be added to the scope

Goals (Cont)

- ❑ Metrics and methodologies for CBR, VBR, ABR, UBR can be different
- ❑ Cover as many protocol stacks as possible.
Begin with most common stacks.
- ❑ Should include performance of traffic management, network management, connection setup, along with data transfer.

Non-Goals

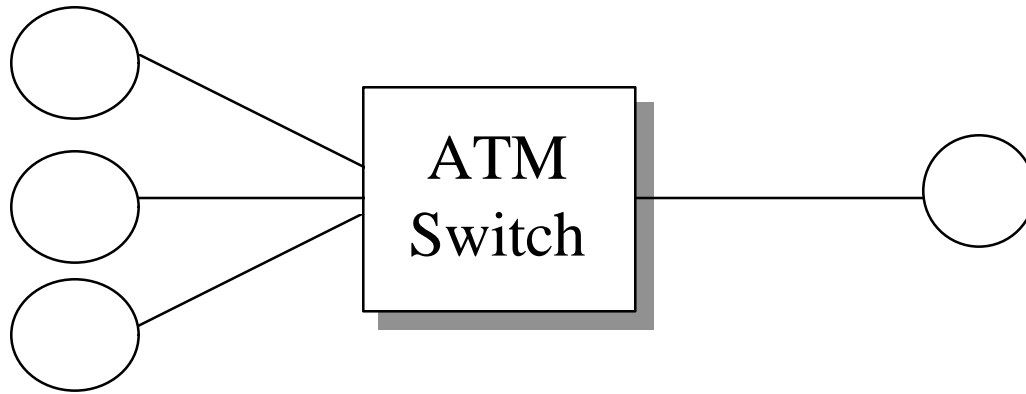
- ❑ ATM Forum will not do any measurements.
- ❑ Forum will not certify any measurements.
- ❑ Will not set any performance thresholds
 - ❑ Setting thresholds can kill the performance-cost tradeoffs
 - ❑ Example 1: Frame loss rate should be no more than 1%
 - ❑ Example 2: Switch delay should be less than 1 ms.

Sample Proposal

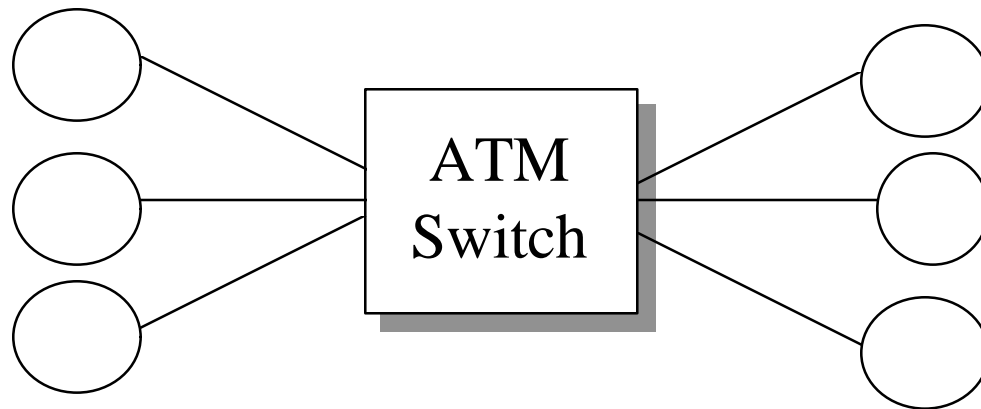
- ❑ Configurations
- ❑ Protocol Stacks
- ❑ Traffic Pattern
 - ❑ Open-loop or closed-loop (UDP vs TCP)
 - ❑ 1 to 1, n to 1, or n to n

Configurations

- N-to-1:

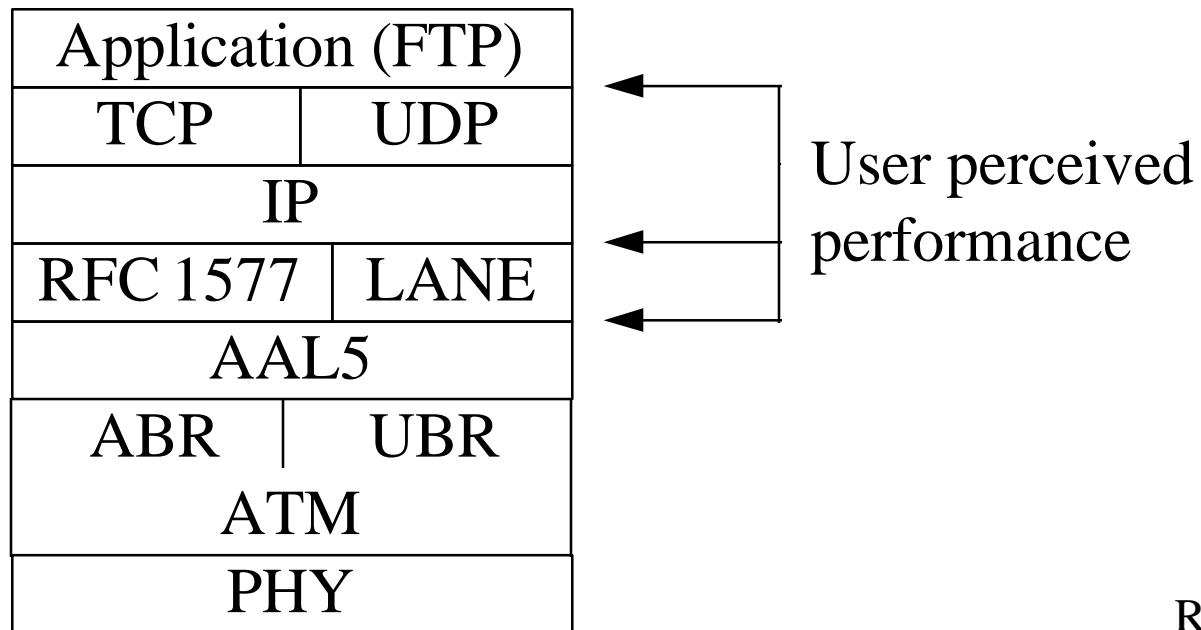


- N-by-N: N-to-1, N-to-N; Unidirectional or bi-directional



Protocol Layer

- ❑ AAL5 Layer: Can't compare with non-ATM technologies
- ❑ IP over LANE vs IP over Ethernet vs IP over RFC1577
- ❑ Data application over TCP or UDP



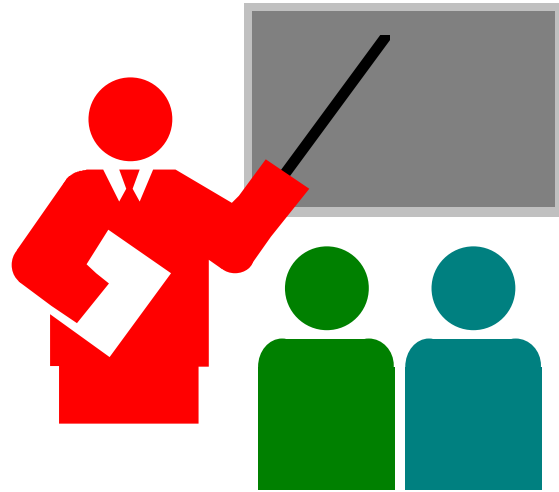
Throughput

- ❑ Closed-Loop Traffic (TCP):
 - ❑ Maximum TCP throughput delivered to application
 - ❑ Cells or frames may be lost and retransmitted. But only consecutive frames (no gaps) are delivered to application.
 - ❑ Excessive loss or bad resource management results in low throughput
- ❑ Open-Loop Traffic (UDP):
 - ❑ Maximum throughput without any loss
- ❑ Unit = Bits/sec
Frames/sec requires specification of frame size
Cells/sec does not reflect higher layer overheads

Frame Latency

- ❑ Four possibilities:
 - ❑ First-bit in to first-bit out
 - ❑ Last-bit in to last-bit out
 - ❑ First-bit in to last-bit out (varies with the frame size)
 - ❑ Last-bit in to first-bit out (varies with the frame size)
- ❑ Prefer last-bit in to last-bit out.
 - ❑ Ensures that complete frames are delivered
 - ❑ Applies to cut-through architectures
 - ❑ Independent of frame size

Summary



- ❑ ATM forum should define higher level performance metrics and methodologies
- ❑ Consistent definitions will enhance the marketability of ATM
- ❑ ATM Forum should not be involved in certification, measurement, or setting minimum performance requirements