

Fast Networking Technologies

Asynchronous Transfer Mode or cell relay

similar to frame relay in many
respects except:

- data transmitted in *fixed size cells*
 - small cells reduce delay for priority cells
 - fixed length allows efficient hardware switching
- even more streamlined
- faster - data rates include 155.52Mbit/s and 622.08Mbit/s

ATM (cont)

Two layers:

- ATM layer
- ATM Adaptation Layer (AAL)

Several adaptation layer protocols defined:

- 1 constant bit rate services
- 2 variable bit rate services - strict timing constraints
- 3/4 variable bit rate service
- 5 variable bit rate - the Simple and Efficient Adaptation Layer (SEAL). Used for LANs where higher level protocol manages connection.

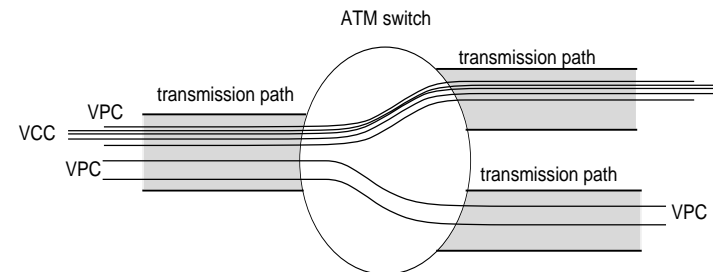
**See “Internetworking with ATM WANs”
By J. Cavanaugh & T.Salo. for tech details.
with these notes on the web**

Traffic negotiation parameters and QoS parameters

- Peak, Min, Sustainable cell rates
 - average rates of traffic submission
- Burst Tolerance
 - max variability in cell arrivals with ref. to peak cell rate
- Cell delay variation tolerance
 - max variability in cell arrivals with ref. to sustainable cell rate
- Cell transfer delay
 - average and maximum cell latency
- Cell delay variation
 - jitter
- Cell error ratio
- Cell loss ratio
- Cell misinsertion rate
 - if a virtual channel identifier or virtual channel identifier is corrupted and not detected.

ATM Logical Connections

- Logical connections known as Virtual Channel Connections (VCC's)
 - variable rate
 - full duplex
 - fixed size cells
- Virtual Path Connections (VPC)
 - a group of VCCs



VCC/VPC characteristics

- Quality of Service
 - Switched and semi permanent connections
 - Cell sequence integrity
 - Traffic negotiation and monitoring
 - Virtual Channel Identifier restriction
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- A call control signalling channel is required so as to be able to set up a VCC (or VPC)
 - A permanent channel is thus required to do this, the *meta-signalling* channel.

ATM cells

- header 5 octet
- payload 48 octet

| | |
|----------------------------|-------------------------|
| Virtual Path Identifier | 12 bits (8 bits at UNI) |
| Virtual Channel Identifier | 12 bits |
| Payload type | 3 bits |
| Cell Loss Priority | 1 bit |
| Header Error Control | 1 octet |
| Information | 48 octets |

Transmission

- No framing (ie. flags)
 - synchronisation by bit by bit checking of for correct Header Error Control (HUNT)
 - a number of additional consecutive cells are checked before synchronisation achieved (PRESYNC)
 - once SYNC is achieved error detection and correction can be performed. Several failures indicate synchronisation is lost.

ATM Congestion

More problematic than for packet switching or frame relay

- traffic not amenable to flow control
- wide range of applications few kbit/s to 100's Mbit/s
- Many different traffic patterns (constant <--> bursty variable)
- different service requirements eg. delay sensitive & loss sensitive
- very high speeds make situations volatile - reaction causes waste and possibly oscillation

research currently being carried out in this area