

Lecture 25

ATM

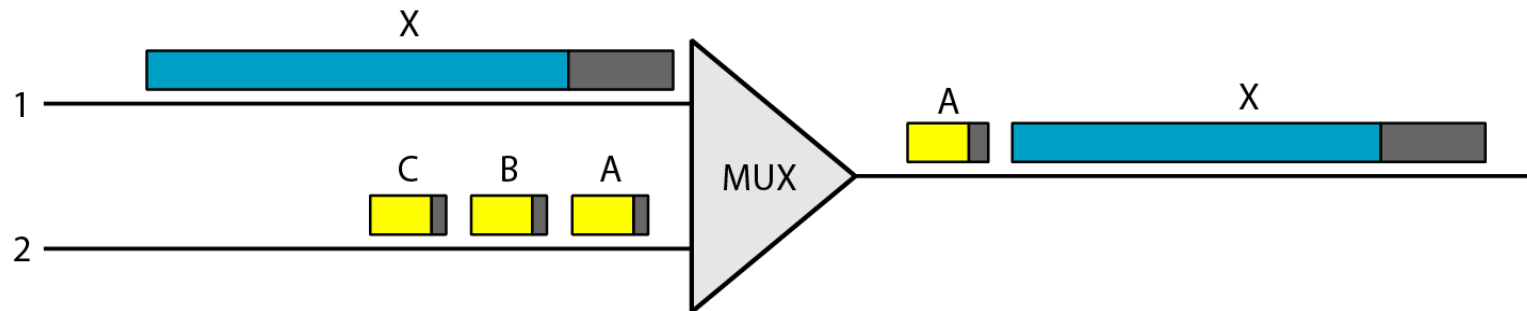
Topics Covered

- ATM
- Multiplexing using different frame sizes
- Multiplexing using cells
- ATM multiplexing
- Architecture of an ATM network
- An ATM cell
- ATM layers
- APPLICATIONS

ATM

*Asynchronous Transfer Mode (ATM) is the **cell relay** protocol designed by the ATM Forum and adopted by the ITU-T.*

Multiplexing using different frame sizes



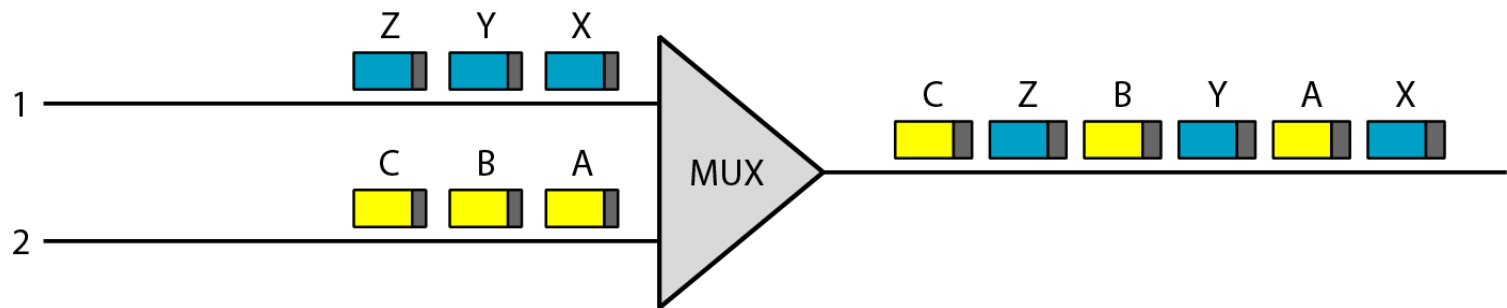


Note

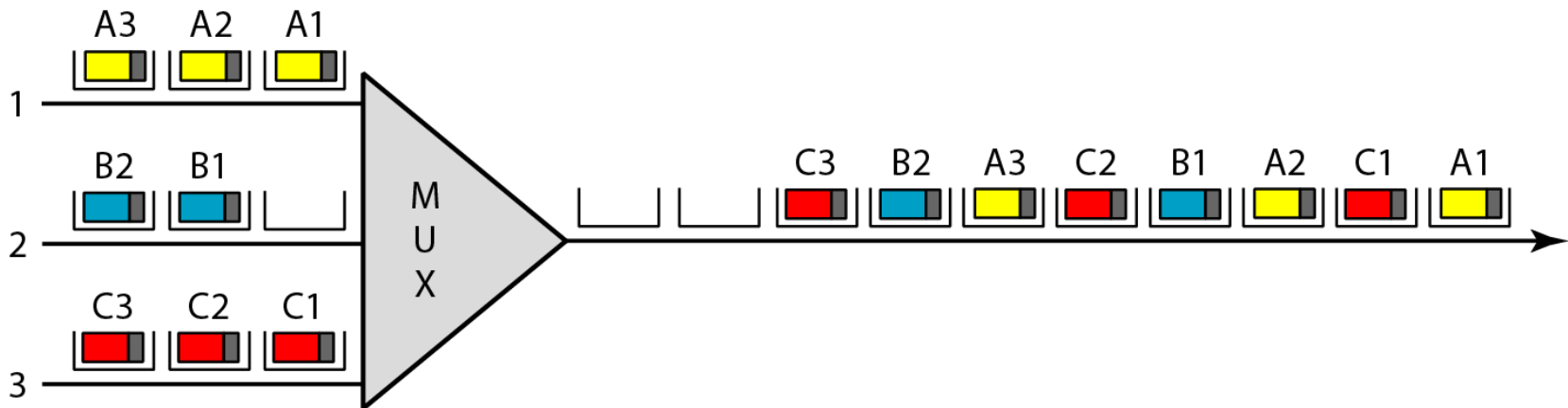
A cell network uses the cell as the basic unit of data exchange.

A cell is defined as a small, fixed-size block of information.

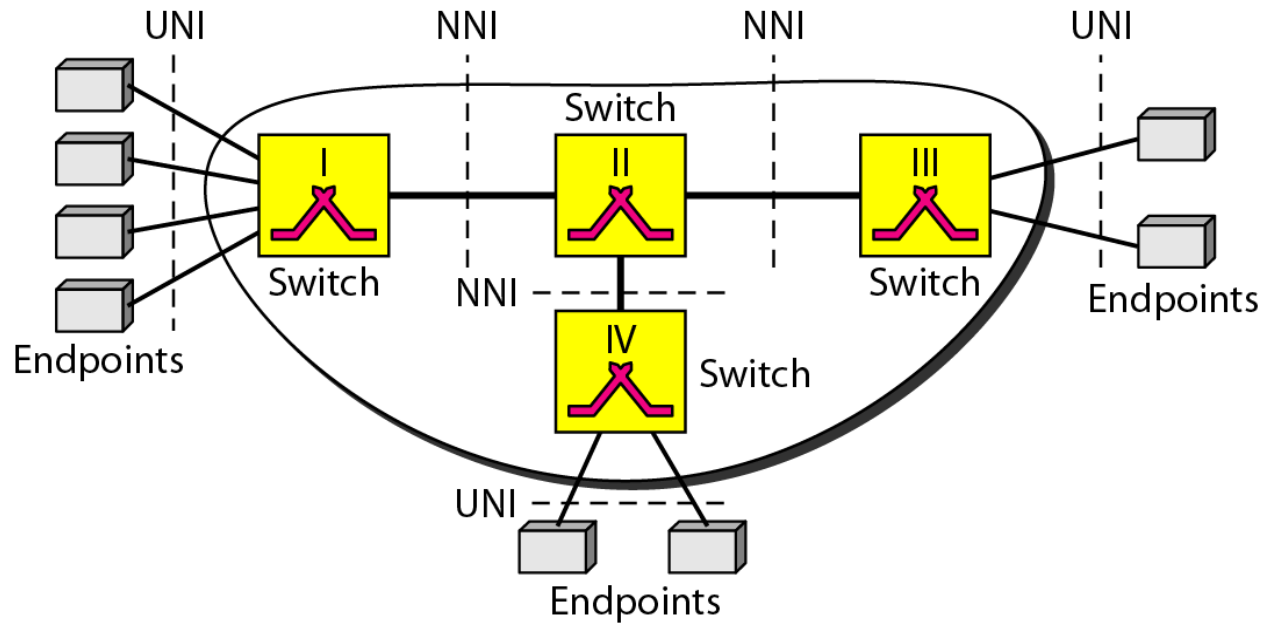
Multiplexing using cells



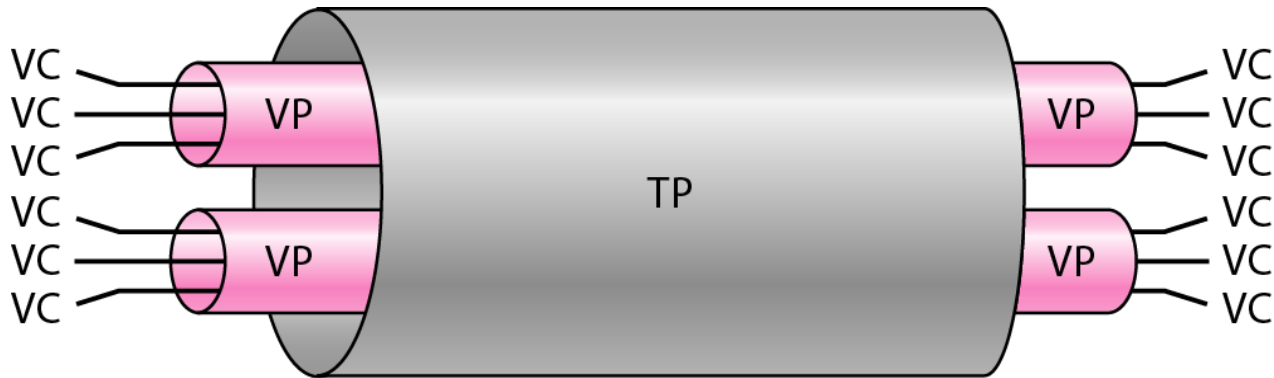
ATM multiplexing



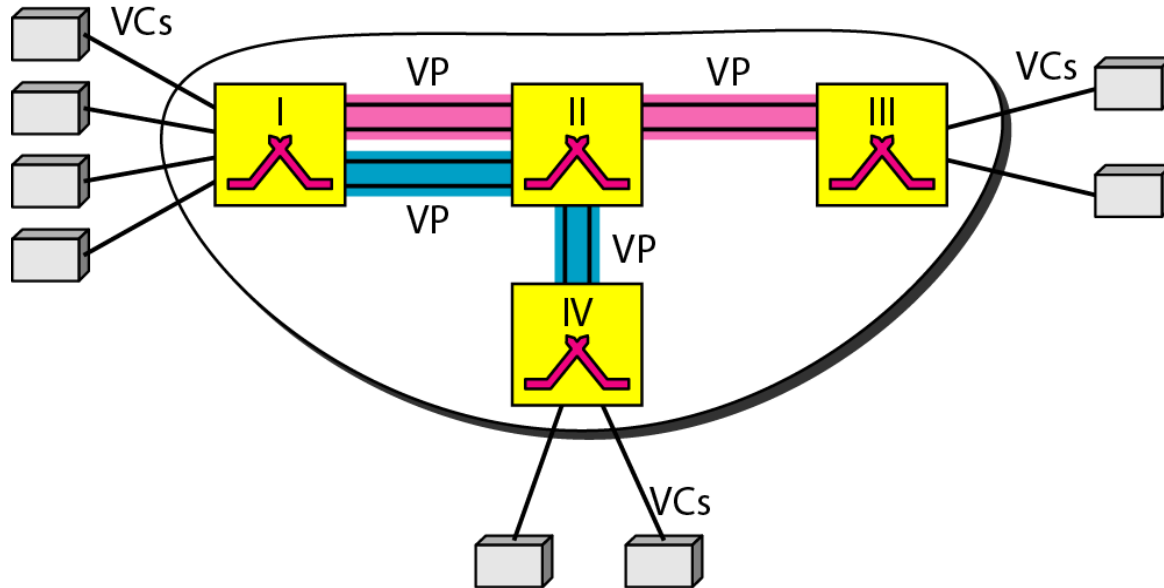
Architecture of an ATM network



TP, VPs, and VCs



Example of VPs and VCs

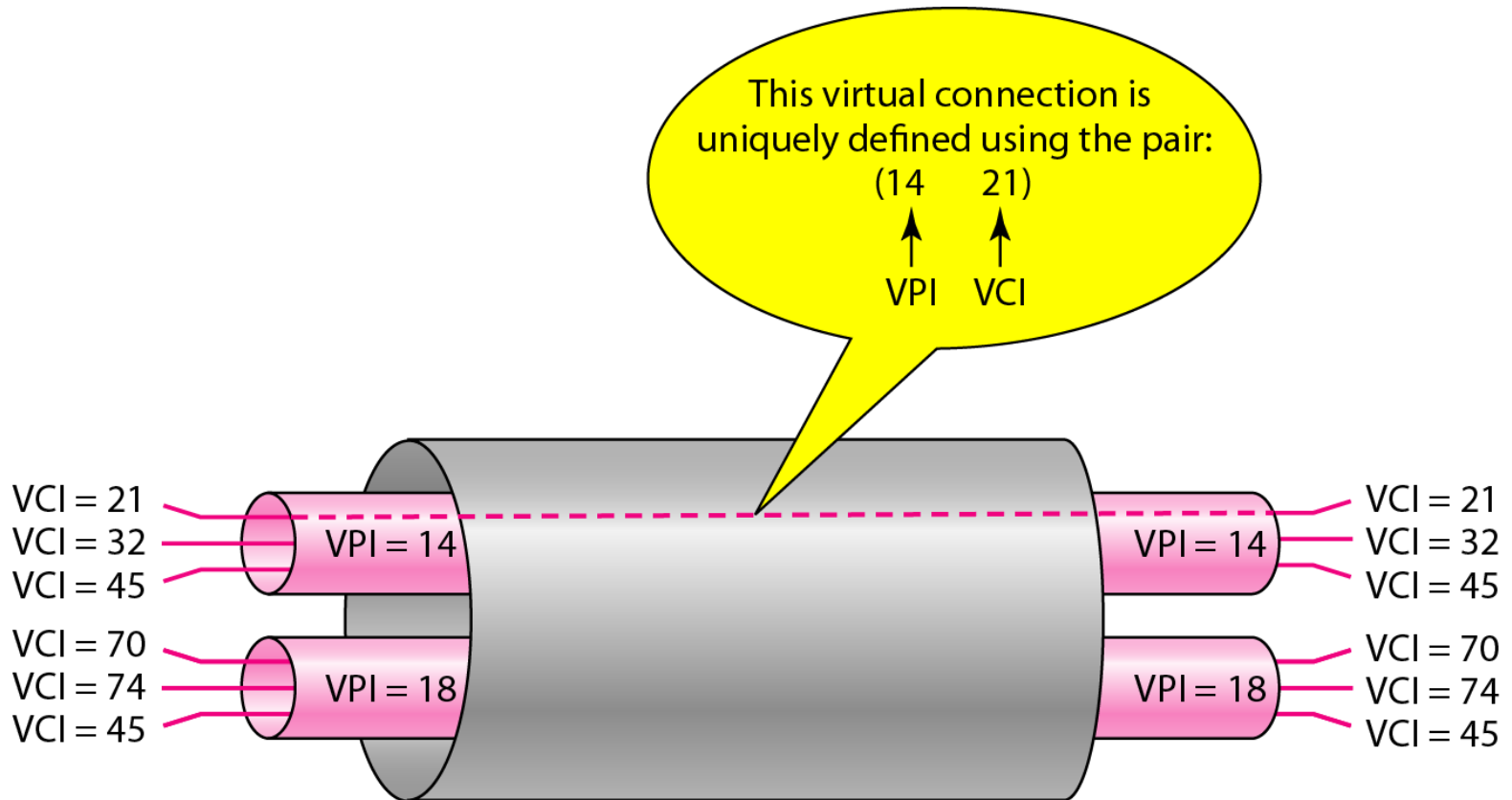




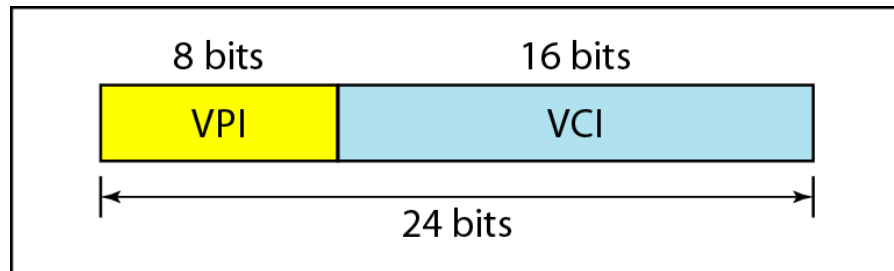
Note

**Note that a virtual connection is defined by a pair of numbers:
the VPI and the VCI.**

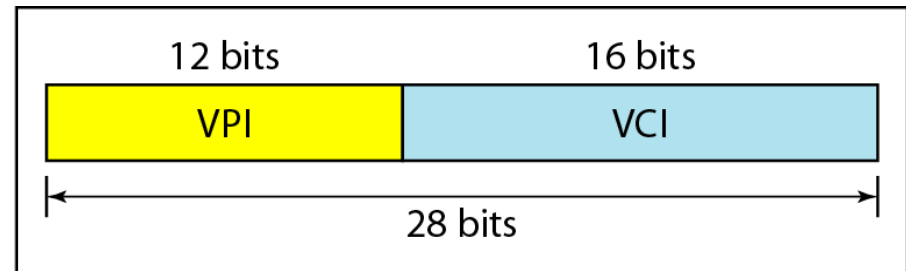
Connection identifiers



Virtual connection identifiers in UNIs and NNIs

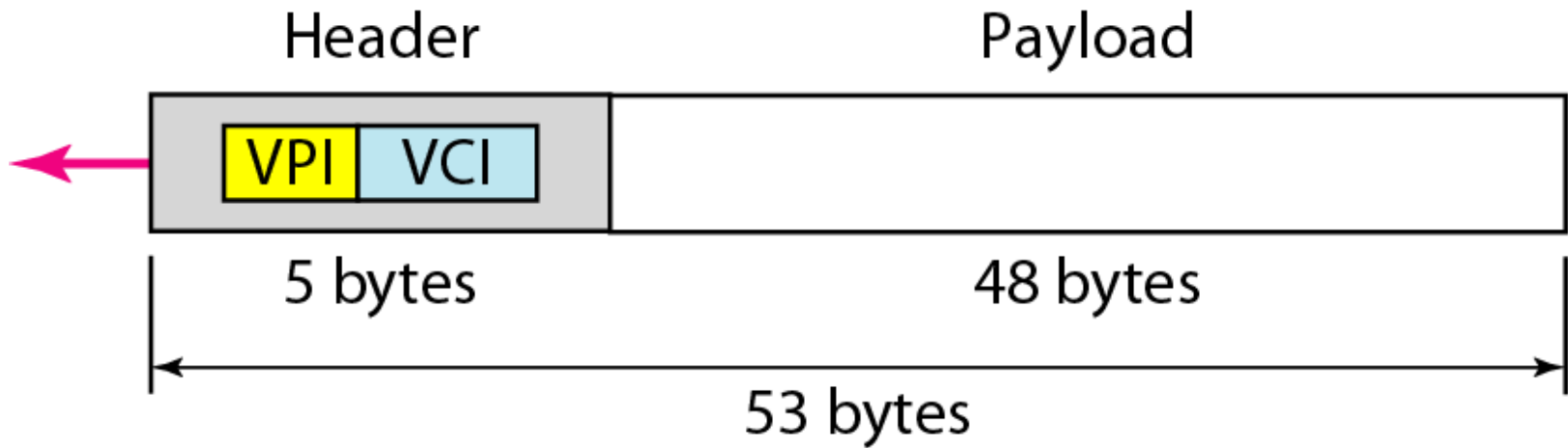


a. VPI and VCI in a UNI

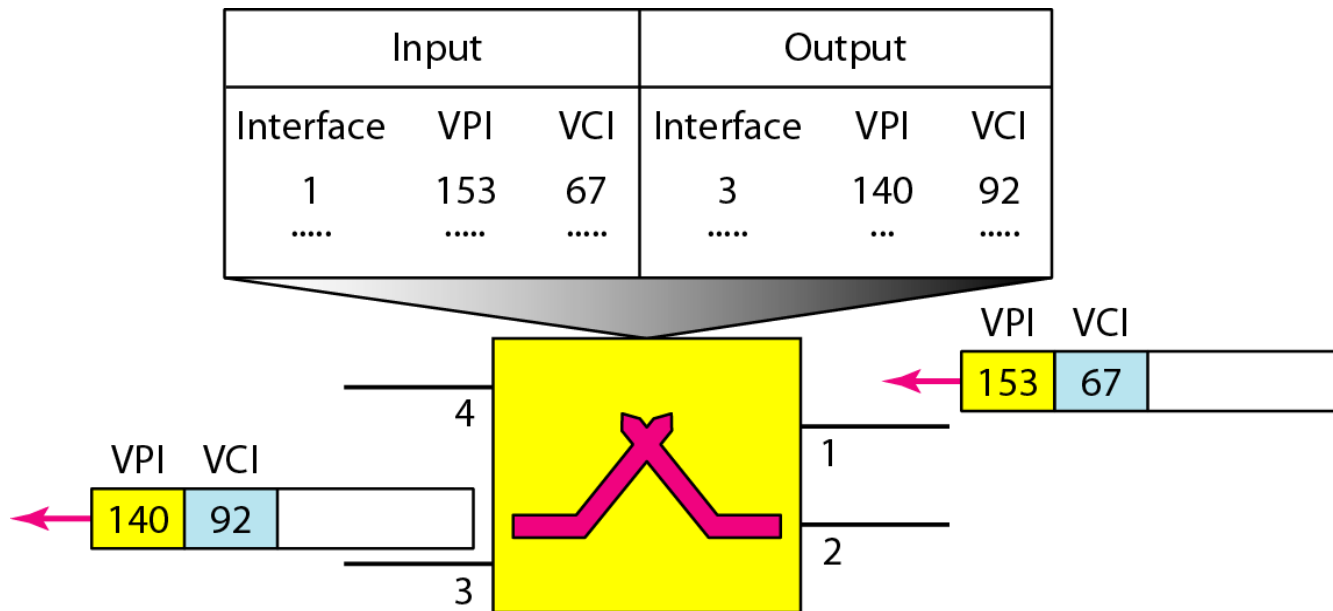


b. VPI and VCI in an NNI

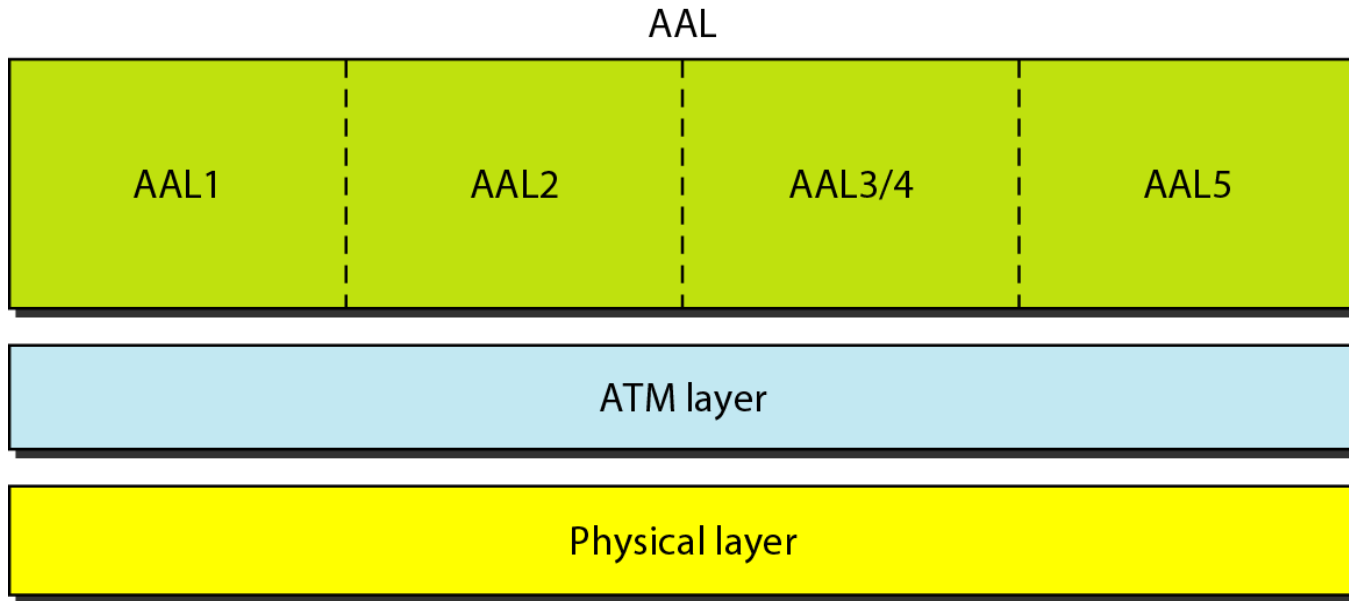
An ATM cell



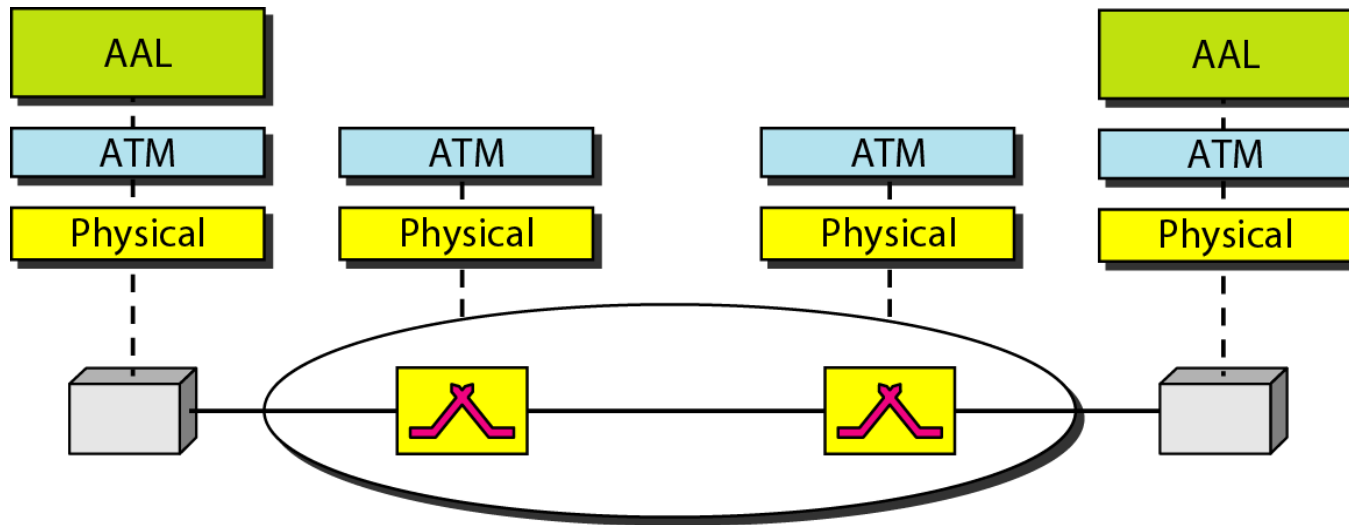
Routing with a switch



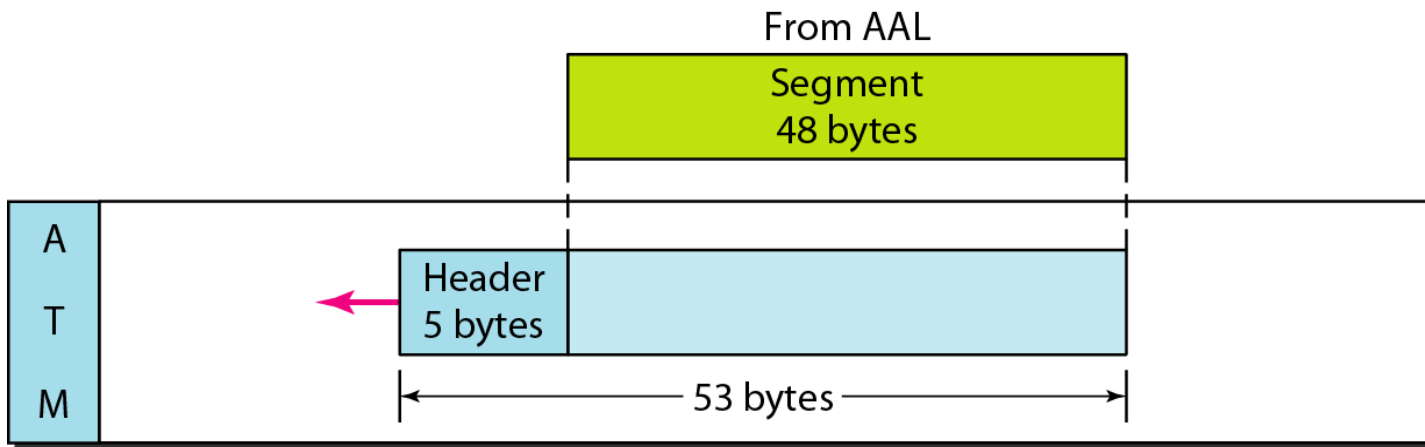
ATM layers



ATM layers in endpoint devices and switches



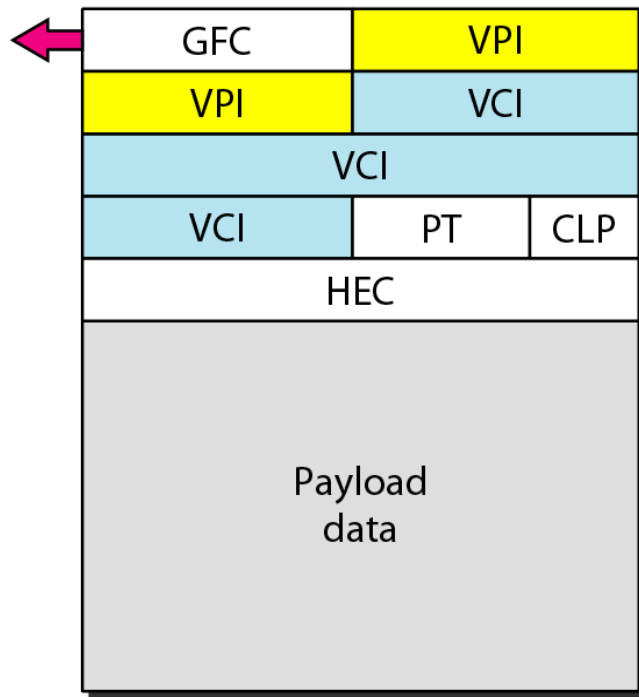
ATM layer



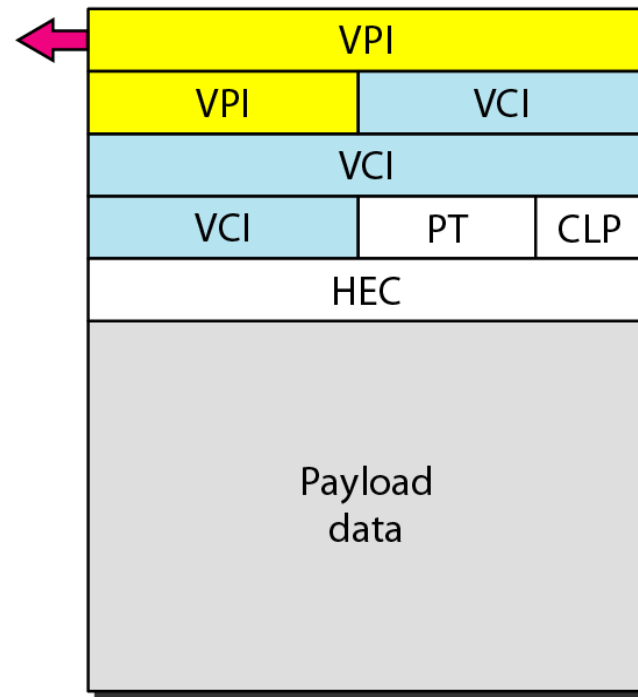
ATM headers

GFC: Generic flow control
VPI: Virtual path identifier
VCI: Virtual circuit identifier

PT: Payload type
CLP: Cell loss priority
HEC: Header error control



UNI cell

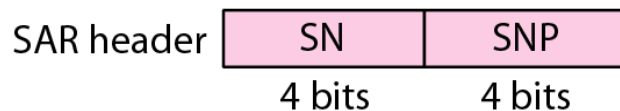
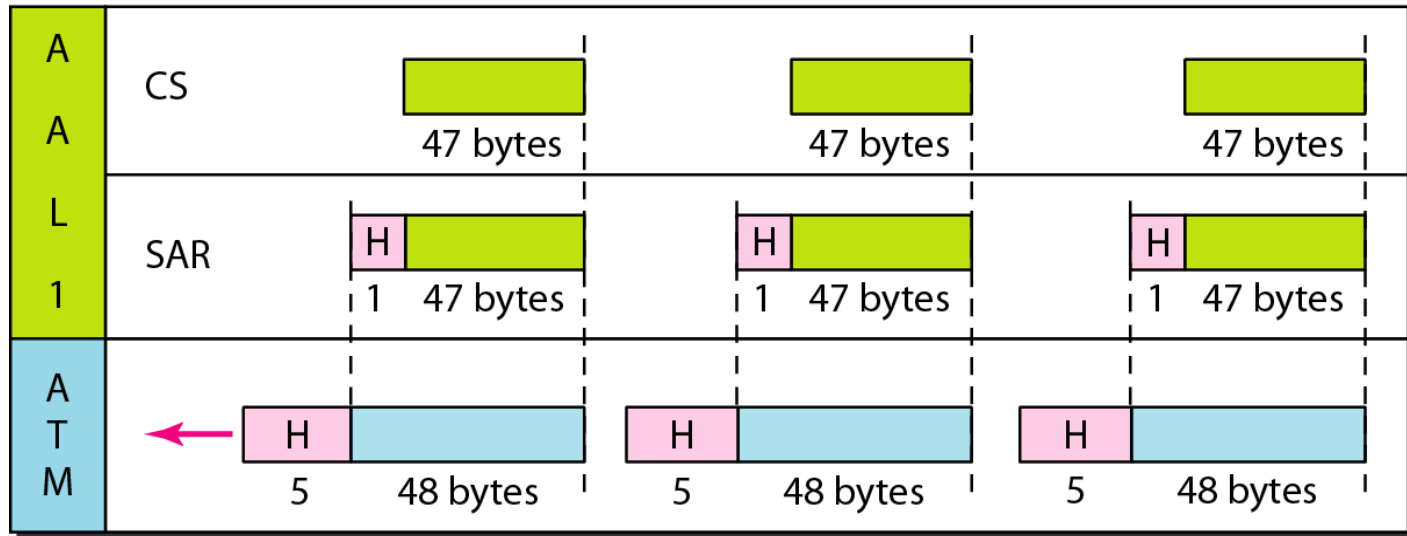


NNI cell

AAL1

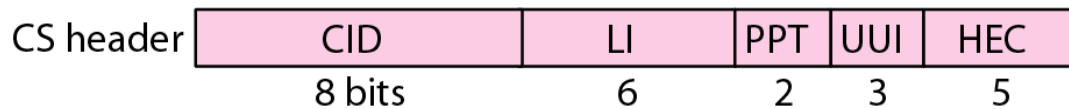
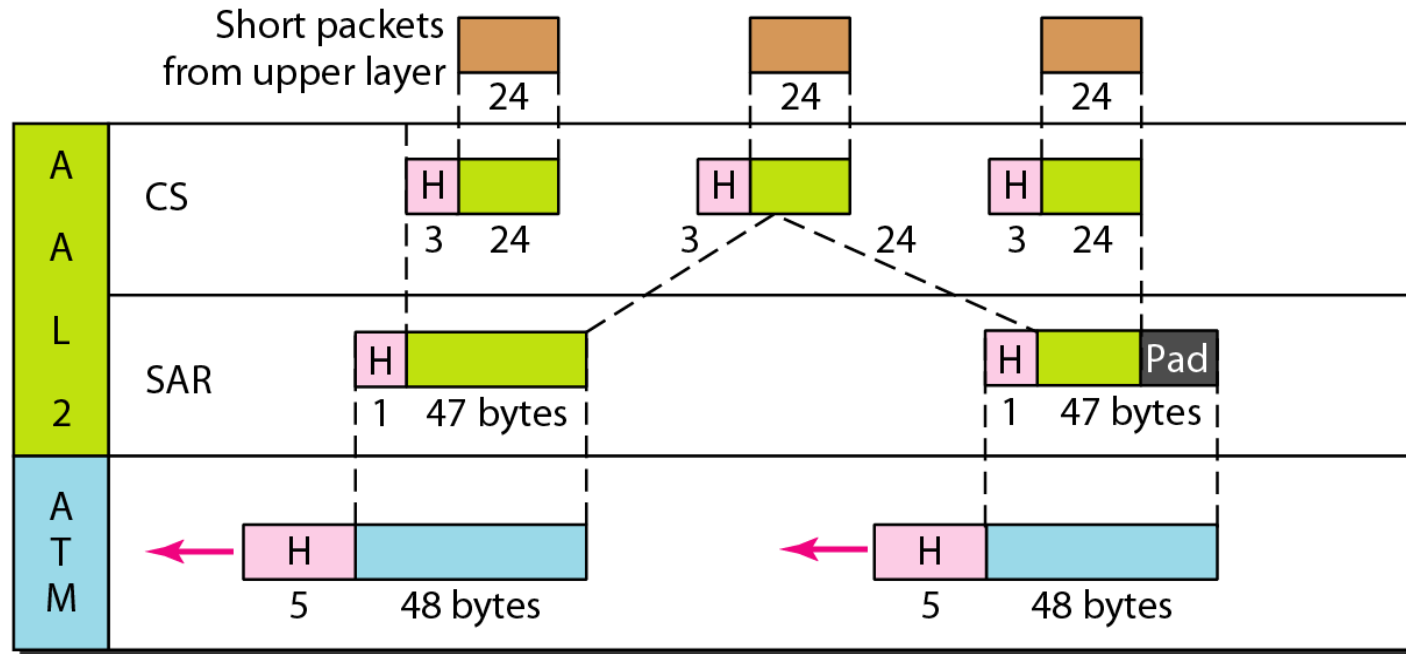
Constant-bit-rate data from upper layer

.....1110010010001111 111110101010101



SN: Sequence number
SNP: Sequence number protection

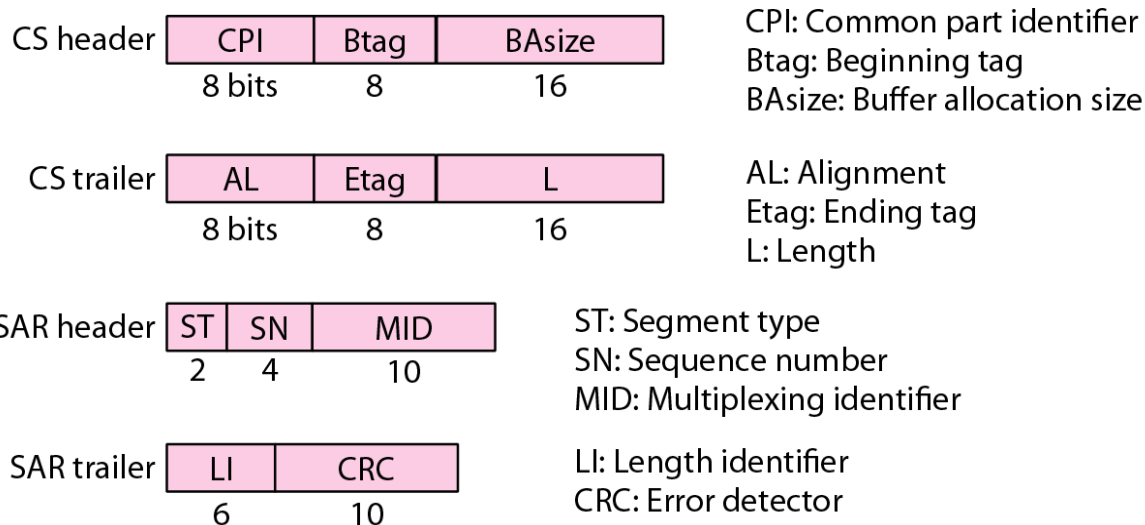
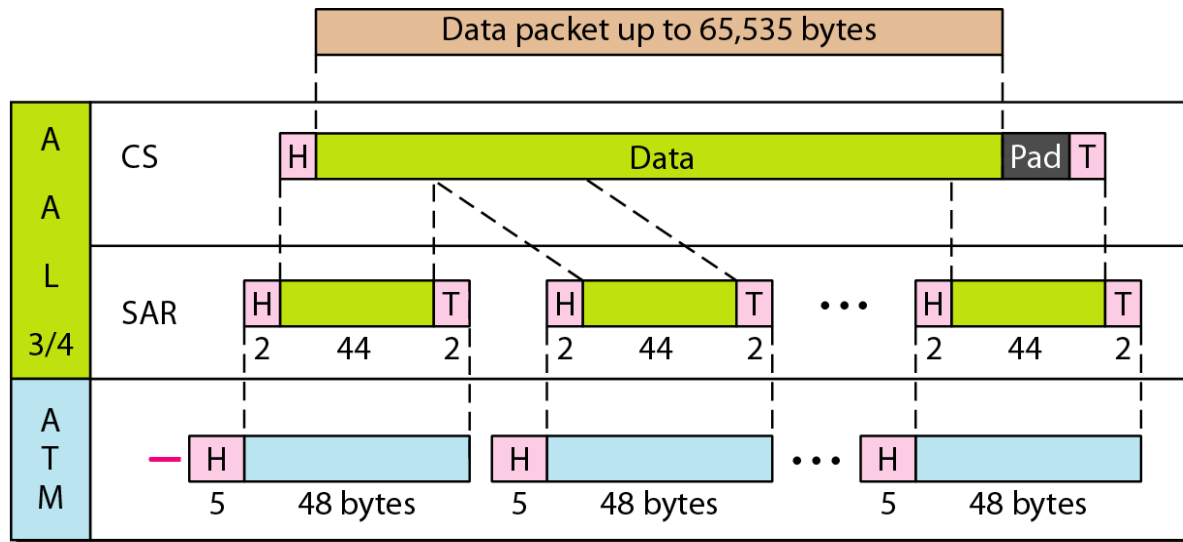
AAL2



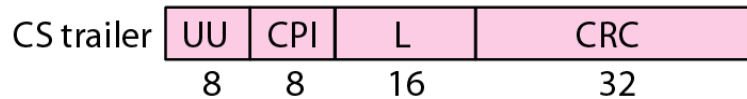
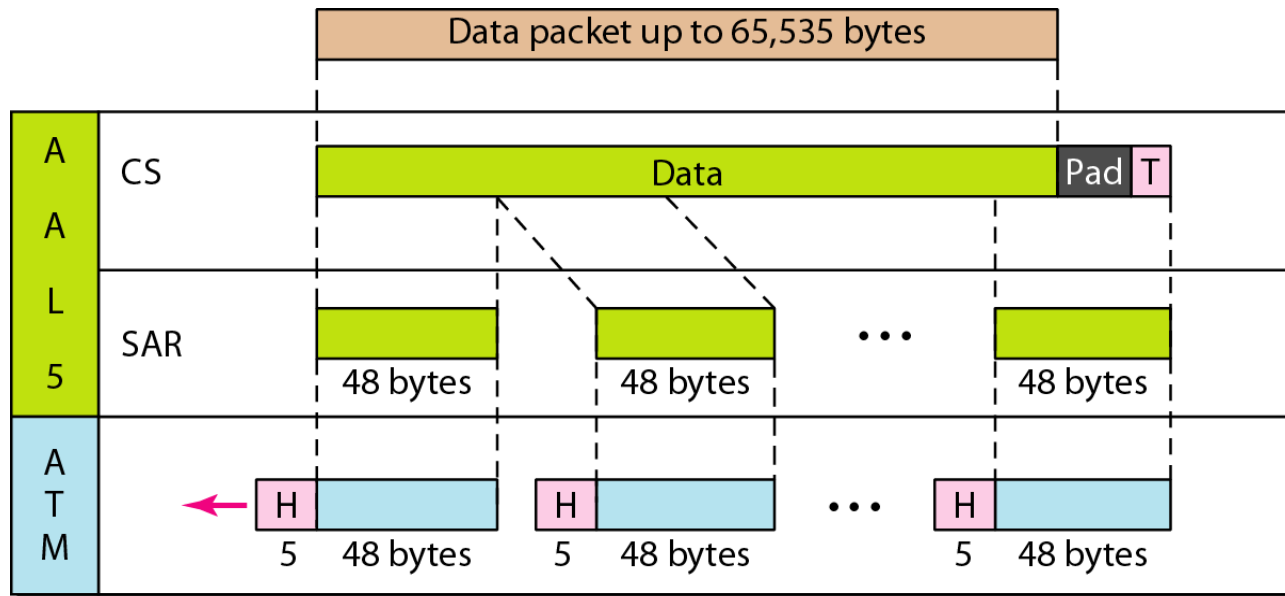
CID: Channel identifier
 LI: Length indicator
 PPT: Packet payload type

UUI: User-to-user indication
 HEC: Header error control
 SF: Start field

AAL3/4



AAL5



UU: Channel identifier
CPI: Common part identifier
L: Length
CRC: Error detector

APPLICATIONS

- ATM was developed to meet the needs of the Broadband Integrated Services Digital Network
- Asynchronous Transfer Mode (ATM) is, according to the ATM Forum, standards for carriage of a complete range of user traffic, including voice, data, and video signals
- It is designed to unify telecommunication and computer networks.
- ATM has functional similarity with both circuit switched networking and small packet switched networking. It was designed for a network that must handle both traditional high-throughput data traffic (e.g., file transfers), and real-time, low-latency content such as voice and video.
- ATM is a core protocol used over the SONET/SDH backbone of the public switched telephone network (PSTN) and Integrated Services Digital Network (ISDN), but its use is declining in favour of All IP.

SCOPE OF RESEARCH

- Mobile and wireless ATM Networks