Computer Networks

ATM is a telecommunications standard defined by ANSI and ITU for digital transmission of multiple types of traffic, including telephony (voice), data, and video signals in one network without the use of separate overlay networks.

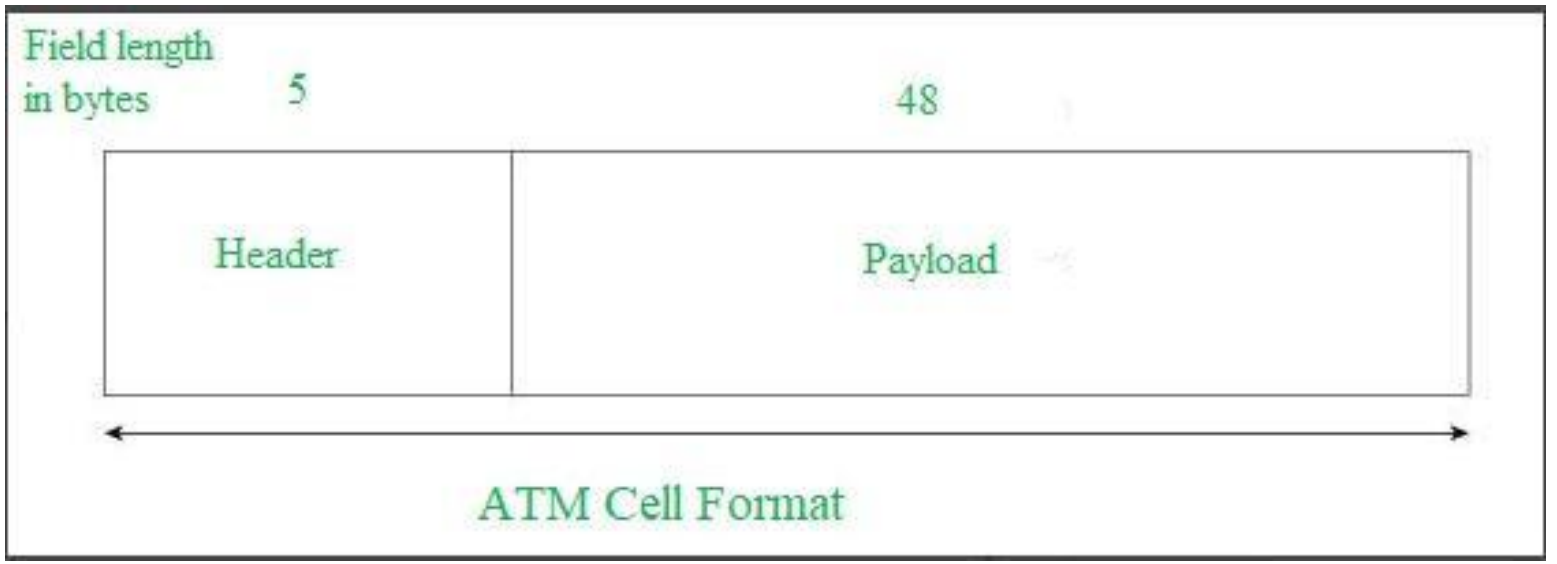
ATM was developed to meet the needs of the Broadband Integrated Services Digital Network, as defined in the late 1980s, and designed to integrate telecommunication networks.

It can handle both traditional high-throughput data traffic and real-time, low-latency content such as voice and video. ATM provides functionality that uses features of **circuit switching** and **packet switching** networks.

Asynchronous Transfer Mode (ATM)

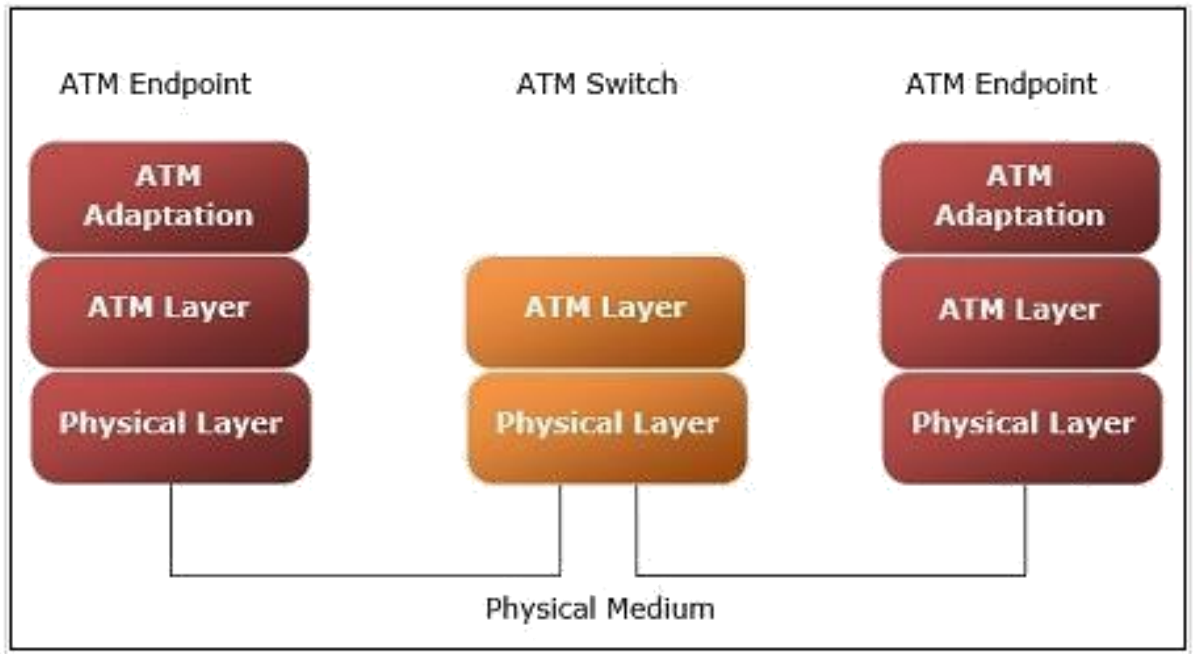
- ATM stands for **Asynchronous Transfer Mode**. It is a switching technique that uses **time division multiplexing** (TDM) for data communications.
- ATM networks are **connection oriented networks** for cell relay that supports voice, video and data communications. It encodes data into small fixed - size cells so that they are suitable for TDM and transmits them over a physical medium.
- There are two different cell formats - user-network interface (**UNI**) and network-network interface (**NNI**).

The size of an ATM cell is 53 bytes: 5 byte header and 48 byte payload.



Advantages

- It provides the dynamic bandwidth that is particularly suited for bursty traffic.
- Since all data are encoded into identical cells, data transmission is simple, uniform and predictable.
- Uniform packet size ensures that mixed traffic is handled efficiently.
- Small sized header reduces packet overload, thus ensuring effective bandwidth usage.
- ATM networks are scalable both in size and speed.


ATM Endpoint
ATM Switch
ATM Endpoint
ATM Adaptation
ATM Layer
Physical Layer
ATM Layer
Physical Layer
ATM Adaptation
ATM Layer
Physical Layer
Physical Medium

ATM reference model comprises of three layers

- **Physical Layer –** This layer corresponds to physical layer of OSI model. At this layer, the cells are converted into bit streams and transmitted over the physical medium. This layer has two sub layers: PMD sub layer (Physical Medium Dependent) and TC (Transmission Convergence) sub layer.
- **ATM Layer –**This layer is comparable to data link layer of OSI model. It accepts the 48 byte segments from the upper layer, adds a 5 byte header to each segment and converts into 53 byte cells. This layer is responsible for routing of each cell, traffic management, multiplexing and switching.

- **ATM Adaptation Layer (AAL) –**This layer corresponds to network layer of OSI model.
- It provides facilities to the existing packet switched networks to connect to ATM network and use its services.
- It accepts the data and converts them into **fixed sized segments**. The transmissions can be of fixed or variable data rate.
- This layer has two sub layers − Convergence sub layer and Segmentation and Reassembly sub layer.

- **ATM endpoints –** It contains ATM network interface adaptor. Examples of endpoints are workstations, routers, CODECs, LAN switches, etc.
- **ATM switch –**It transmits cells through the ATM networks. It accepts the incoming cells from ATM endpoints (UNI) or another switch (NNI), updates cell header and retransmits cell towards destination.

https://www.tutorialspoint.com/ATM-Networks