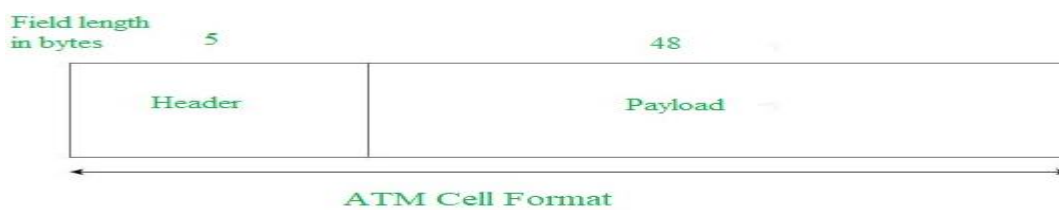ATM stands for Asynchronous transfer mode. It is a switching technique used by telecommunication networks that uses asynchronous time-division multiplexing to encode data into small, fixed-sized cells. ATMs can be used for efficient data transfer over highspeed data networks. ATM provides real-time and non-real-time services.

The services provided by ATM are as follows−

- **Available Bit Rate:** It provides a guaranteed **minimum capacity**, but data can be burst to higher capacities when network traffic is lower.
- **Constant Bit Rate:** It is used to specify a **fixed bit rate** so that data is sent in a steady stream. This is analogous to a leased line.
- **Unspecified Bit Rate:** This **doesn't assure any throughput level** and is used for applications, including **file share that can tolerate delays**.
- **Variable Bit Rate (VBR):** It can provide a determining throughput, but **data is not transmitted evenly**. This makes it a famous choice for **voice and video conferencing.**

ATM Cell Format –
As information is transmitted in ATM in the form of **fixed-size units called cells**. As known already each cell is 53 bytes long which consists of a 5 bytes header and 48 bytes payload.

ATM Cell Format

Asynchronous Transfer Mode can be of two format types which are as follows:

UNI Cell Format   NNI Cell Format
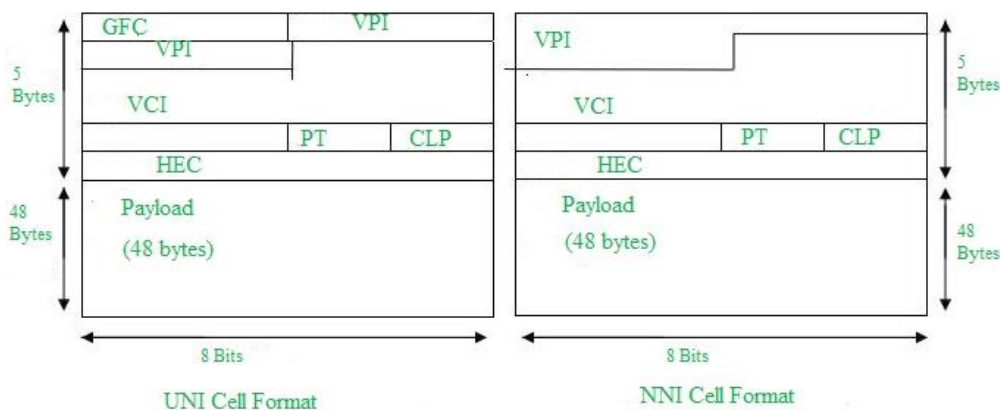
1. **UNI Header:** This is used within **private networks of ATMs** for communication between **ATM endpoints and ATM switches**. It includes the Generic Flow Control (GFC) field.

2. **NNI Header:** is used for **communication between ATM switches**, and it does not include the Generic Flow Control(GFC) instead it **includes a Virtual Path Identifie**r (VPI) which occupies the first 12 bits.
3. ATM Applications

1. ATM WANs

To send the data over a long distance, we use WAN and a router to connect ATMs and other networks.

2. Multimedia virtual private networks and managed services It helps manage ATM, LAN, voice, and video services and is capable of full-service virtual private networking, including integrated multimedia access.

3. Frame relay backbone Frame relay services are a networking infrastructure for a range of data services and enable frame-relay ATM service to Internetworking services.

4. Residential broadband networks ATM by choice provides the networking infrastructure for establishing residential broadband services in search of highly scalable solutions.

5. Carrier infrastructure for telephone and private line networks

To make more effective use of SONET/SDH fiber infrastructures we build the ATM infrastructure to carry out the telephonic and private-line traffic.

ATM Architecture

ATM is a connection-oriented network at a point where the sender or user which access devices are known as end-point, these end-points connected through a user to network interface (UNI) to the switches on the network, these switches provide a network to network interface (NNI).

The architecture of the ATM is shown in the figure below.

ATM Architecture
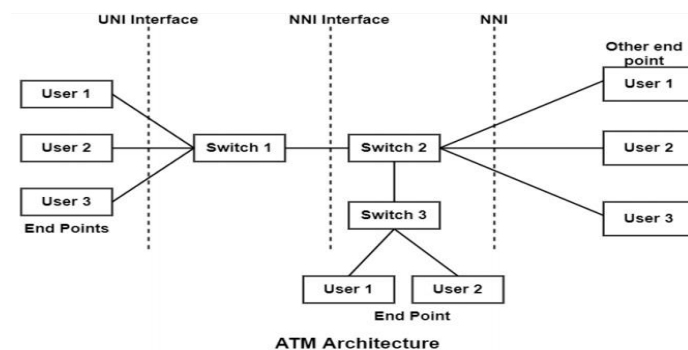
ATM transfers the information through a transmission path which is made up of a logical virtual path and virtual channel. The transmission path consists of the physical cable, which is connected to an ATM switch. The cables have a transfer speed of up to 155 megabits per second on an optical fiber link.

Virtual Path
The transmission path is logically divided into separate virtual paths identified using the virtual path identifier (VPI) in the ATM header.

Virtual Channel
The bandwidth of a logical virtual path is further divided into a separate channel. Each channel is given a virtual channel identifier in the ATM header.

Traffic flow through the Network
A two-tiered addressing design is used with the following elements being contained in the addressing assignments.

- **Virtual Channel:** A virtual channel represents the structure of a single network connection data flow between two ATM end-users. The ATM standards represent this as a unidirectional connection between two end-points on the network.
- **Virtual Path:** A virtual path can carry one or more virtual channels by the network. It is represented as a group of channels between the two end-points.