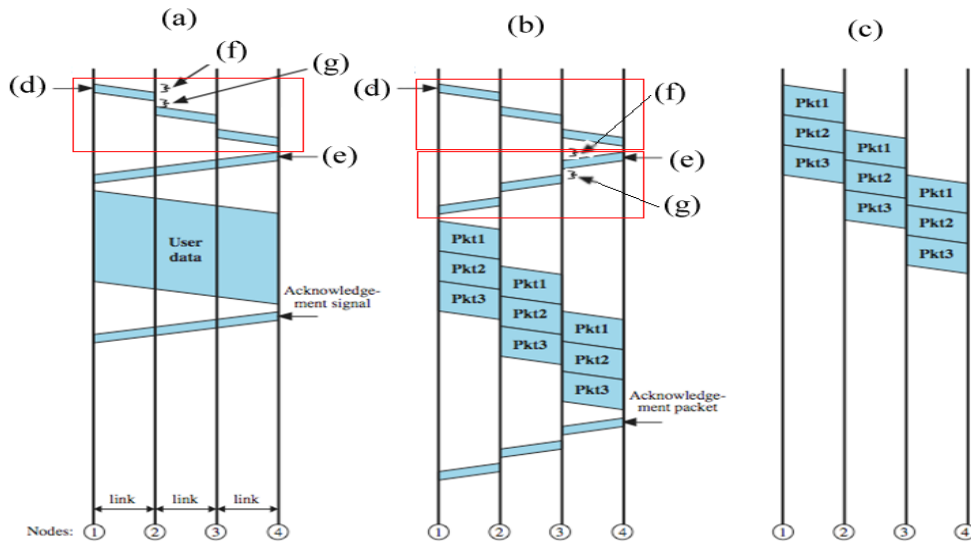


Network I Tutorial (model answer) Packet switching, Frame relay, and ATM

1. The following figure shows three different approaches of switching, Write down the name of each symbol.

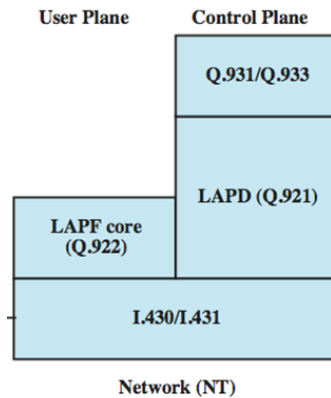


- a. circuit switching approach
- b. virtual circuit packet switching approach
- c. Datagram packet switching approach
- d. call request (setup) signal
- e. acknowledgment signal for call request
- f. propagation delay
- g. processing delay

2. X.25 is a reliable protocol unlike frame relay. Discuss

- X.25 protocol use acknowledgment for each packet (data or control) in each switching node. Acknowledgment is achieved by using sequence number for each ingoing and outgoing packet
- While frame relay ignores acknowledgment between nodes (data packets), acknowledgment becomes the responsibility of end points not switching nodes.

3. The following figure shows frame relay protocol architecture for network terminals. User plane contains only two layers while control plane contains 3 layers. discuss



Network plane is implemented only in switching nodes, as discussed before nodes are only responsible of switching and identifying virtual circuits, while acknowledgement is the responsibility of end point (terminal plane). That's why the 3rd layer is disappeared (which is responsible of acknowledgement) as it's not implemented in switching nodes (network plane)

The previous discussion is only applied on data packets (user plane) while any control packet still uses sequencing so the 3rd layer still presented in control plane.

4. What are the main differences between X.25 and frame relay .

X.25 is reliable, used for low data rate, uses huge overhead for error flow and error control
Frame relay is not reliable, used for high data rate, uses small overhead

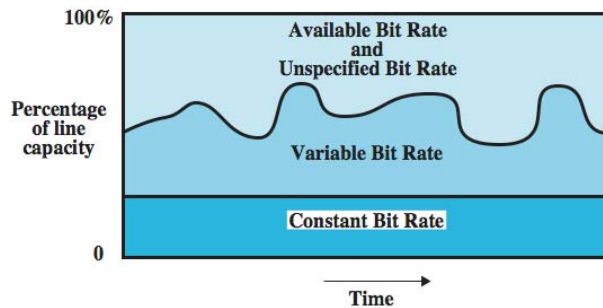
5. What are the main differences between ATM and frame relay .

ATM uses fixed cell size, header contains error control, provides fixed data rate.
Frame relay uses variable packet size, tail contains error control, provides variable data rate.

6. What are the main differences between ATM and X.25.

X.25 is reliable, used for low data rate, uses huge overhead for error flow and error control, uses variable packet size, provides variable data rate.
ATM is not reliable, used for high data rate, uses small overhead, uses fixed cell size, provides fixed data rate.

7. ATM supports many type of traffics, state with examples.

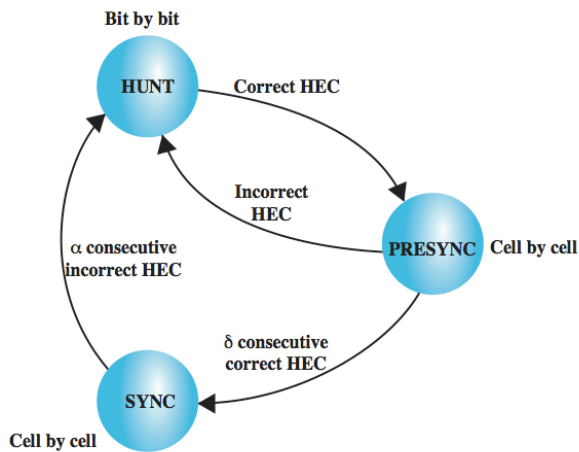


- Constant bit rate (CBR)
 - fixed data rate during the connection lifetime
 - relatively tight upper bound on transfer delay.
- Real-time variable bit rate (rt-VBR)
 - variable data rate during the connection lifetime (due to modern compression approaches)
 - relatively tight upper bound on transfer delay.
- Non-real-time variable bit rate (nrt-VBR),
 - used for data transfers that have critical response-time requirements.
 - Examples airline reservations, banking transactions, and process monitoring.
- Available bit rate (ABR),
 - application specifies peak cell rate (PCR) & minimum cell rate (MCR)
 - resources allocated to give at least MCR
 - spare capacity fairly shared among all ARB sources
 - to ensure fairly sharing of channel band width
- Unspecified bit rate (UBR),
 - suitable for applications that can tolerate variable delays and some cell losses, which is typically true of TCP-based traffic

9. State the main functions of Header error control in ATM header structure.

1. used for transmitter and receiver synchronization in the beginning of communication
2. used for single bit error correction
3. Used for mutable error detection
4. Detection mess synchronization, the resynchronization process.

10. The following figure shows the three different states of ATM switching node. Discuss the function if each state.



HUNT state,

- a cell delineation algorithm is performed bit by bit to determine if the HEC coding law is observed (i.e., match between received HEC and calculated HEC).
- Once a match is achieved, it is assumed that one header has been found, and the method enters the PRESYNC state.

PRESYNC state,

- a cell structure is now assumed.
- The cell delineation algorithm is performed cell by cell until the encoding law has been confirmed consecutively δ (delta) times.

SYNC state,

- The HEC is used for error detection and correction .
- Cell delineation is assumed to be lost if the HEC coding law is recognized consecutively as incorrect α (Alpha) times.