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Department : B.Tech - AIML

Semester : Ist semester

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Assignment

Unit - II

Scenario:-

An online gaming server must handle thousands of concurrent player actions with minimal lag and error

1. How does ARQ (Automatic Repeat Request) impact delay in such a system?

→ a) ARQ increases reliability by retransmi-tting lost or corrupted packets.

→ b) However, in real-time systems like gaming, ARQ can introduce significant delay due to waiting for acknowledgment and retransmissions.

→ a) FEC reduces the need for ret.

→ c) This delay can cuse lag and negatively affect the real-time responsiveness of the game.

→ d) Especially under high traffic, ARQ may lead to buffering and packet queuing further increasing latency.

→ e) Hence, while ARQ ensures data accuracy, it can degrade user experience in latency-sensitive applications like online gaming.

2. Propose a suitable data link control protocol for this setup.

- a) Selective Repeat ARQ is more suitable than Stop-and wait or Go-Back-N for reducing delay.

- b) However, due to gaming's real-time nature, Forward error correction (FEC) is often preferred over ARQ.

- c) FEC reduces the need for retransmissions by sending redundant bits, allowing the receiver to correct some errors without delay.

- d) combining FEC with UDP at the transport layer and a lightweight data link protocal like HDLC (High-Level Data Link control) or a custom one optimized for low latency is ideal.

- e) This ensures low latency, minimal retransmissions, and high data integrity - all crucial for gaming performance