COMPUTER NETWORK

ASSIGNMENT

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Real Time Stock market network

scenario: A stock exchange needs ultra-low latency network

A) compare copper and Fiber in terms of latency

Feature	copper cable	Fiber optic cable
speed	UP to 10 Gbps (Shoter range)	10 Gbps to 100+ Gbps (long range)
Lantency	Higher (electrical signals)	lower (light signals travel Faster)
Interference	Susceptible to EMI	Immune to EMI
Distance limit	< 100 meters (CAT6)	UP to 40 km or more

6) Explain jitter and its effect on Financial data

- jitter: Variation in packet arrival time.
  - Inconsistent delays cause some packets to arrive Faster or slower than expected

Effect on Financial Data:

- Delayed or out-of-order data can:
  - Disrupt real-time price Feeds
- cause execution errors or order mismatches
- Lead to Financial loss or compliance issues.

minimizing jitter is crucial For trading system where microseconds matter

c) Suggest a layer 1 Optimization for speed

- use Direct Fiber Optic connections (Dark Fiber)
- Dedicated Fiber links between stock exchange systems
- Avoids shared infrastructure, reducing congestion

Other optimizations:

- Shorter cable paths - minimize Physical distance
- Low - latency transceivers - Fast signal conversion at endpoints
- High - quality connectors - Reduce signal degradation

d) Recommend high - speed media with redundancy

Recommendation:

- use a dual homed Fiber ~~star~~ setup (two paths, separate routes).
- Or hybrid: Fiber (Primary) + microwave or 5G (Secondary backup).

Reason: Redundancy ensures Failover protection and continous UP time, essential for 24/7 trading environments.