Ultra-Condensed System Design Notes (Amazon & Facebook)

Inventory Management

Key idea: Keep stock levels consistent using DB + cache + async updates.

URL Shortener

Key idea: Map short keys to long URLs, cache hot entries, DB for persistence.

Payment System

Key idea: Ensure reliability, idempotency, and integration with banks.

Order Tracking

Key idea: Event-driven updates, pub/sub for notifications.

Recommendation System

Key idea: Batch + real-time pipelines, precompute and cache results.

Real-time Analytics

Key idea: Stream ingestion (Kafka), process (Flink/Spark), store in OLAP DB.

Rate Limiter

Key idea: Token bucket / leaky bucket using Redis or distributed counters.

Logging System

Key idea: Ingest logs, durable store, query index.

News Feed

Key idea: Fan-out on write/read, ranking, caching.

Messenger

Key idea: Persistent connections, message queues, DB sharding.

Photo Sharing

Key idea: Blob storage, CDN, metadata DB.

Video Streaming

Key idea: Chunked storage, CDN, adaptive bitrate streaming.

Event System

Key idea: CRUD events, subscriptions, push notifications.

Notification Service

Key idea: Fan-out, priority queues, user device mapping.

Search Engine

Key idea: Index building, query parsing, ranking, caching.

Spam/Fake Detection

Key idea: Real-time rules + ML pipelines.