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Trusted by 500+ professionals worldwide | Coaching across SDE, DE, TPM, EM, SRE & SA roles since 2015

Reference: ■filecite■turn1file0■

IFRAILT (+Security) — System Design Cheat Sheet

I — Intent & Users
Clarify intent, users, success criteria. Ask: who, must-have vs nice-to-have, SLA/SLO targets.

F — Functional & Non-Functional Requirements
List core flows and NFRs: latency (p95/p99), availability, durability, RPO/RTO, compliance (PCI/PII).

R — Rates, Scale & Growth
Napkin math: peak QPS/TPS, read/write ratios, data growth, partitioning cardinality.

A — Architecture (Core Components & Data)
Draw boxes: Client → API Gateway → Auth → Domain Services → Queue/Stream → Workers → OLTP/Cache → CDC
Async boundaries are key.

I — Interfaces & Data Model
Public APIs, idempotency keys, versioning, entity keys/indices, tenancy model, lifecycle (TTL/archival).

L — Latency, Reliability & Resilience
Latency budgets, retries+backoff+jitter, DLQ, circuit breakers, idempotency, canary deploys, backpressure.

T — Threats, Security, Tradeoffs, Testing & Telemetry
Embed security (OAuth2, mTLS, KMS, tokenization) early. Threat model (STRIDE), SLOs, chaos tests, tracing & metrics.

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Fintech Example, Interview Script & Reading Roadmap

Fintech Example

Real-time Payment API (p99 ≤ 2s, 99.95% avail):

- Flow: Client -> API GW/WAF -> Payments API -> Orchestrator -> Vendor Adapters -> Ledger (ACID) -> CDC -> DWH

- Important: Idempotency keys, outbox/retry stream (DLQ), fraud scoring within latency budget, tokenization for PAN, audit logs.

- Tradeoffs: Relational ledger (ACID) vs event-sourced (audit-first); Kafka (ordering/throughput) vs SQS (simplicity).

1-hour Session Script

1-hour coaching script (high level):

- 0–5m: Warm-up & set goals

- 5–10m: Teach IFRAILT quickly

- 10–20m: Clarify case & assumptions (quantify)

- 20–35m: Draw architecture + data flow (deep dive one component)

- 35–45m: Deep-dive resilience & failure modes

- 45–55m: SDM voice, tradeoffs, leadership framing

- 55–60m: Wrap-up, homework (apply IFRAILT to analytics pipeline)

Reading Roadmap

Key books & focus chapters:

1) Designing Data-Intensive Applications — Kleppmann: Ch 1,2,5-8,11 (replication, partitioning, transactions, stream processing).

2) Systems Design Interview — Alex Xu: Payment system, feed, rate limiter (practical interview patterns).

3) Site Reliability Engineering (Google SRE): SLOs, monitoring, load balancing, data integrity.

4) The Art of Scalability: Scale Cube, team/process design, operability.