Database for Software Developers

Overview of different types of Databases

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Types of Database

Database Genres

- Relational (*MySQL, PostgreSQL, Oracle*)
- Key-Value (*Memcached, Redis*)
- Columnar (*HBase, Cassandra*)
- Document (*MongoDB, CouchDB*)
- Search (Elasticsearch, Apache Solr, Meilisearch, Typesense)
- Geospatial (PostGIS)
- Graph (*Neo4j*)

1. Relational

- Solid Foundation ✅
- Consistent Schema ✅
- Query flexibility ✅
- Data Safety (ACID compliance) ✅
- Abundant Resources ✅
- Requires effort to scale 🚫

2. Key Value

- Simplicity of Use ✅
- Support of Various Data Structures ✅
- High-read speed ✅
- Durability is a weakness 🚫

3. Document

- Flexible Data Model ✅
- Handles Huge Datasets ✅
- Sharding and Replication ✅
- Denormalization of Data 🚫

4. Columnar

- Robust Scalability ✅
- Handles Huge Amount of Data ✅
- Analytical Data ✅
- Hard to scale down 🚫

5. Search

- Robust Filtering and Sorting ability ✅
- Handles Huge Amount of Data ✅
- Supports Synonyms and other language features ✅
- Continuous data sync with primary data 🚫

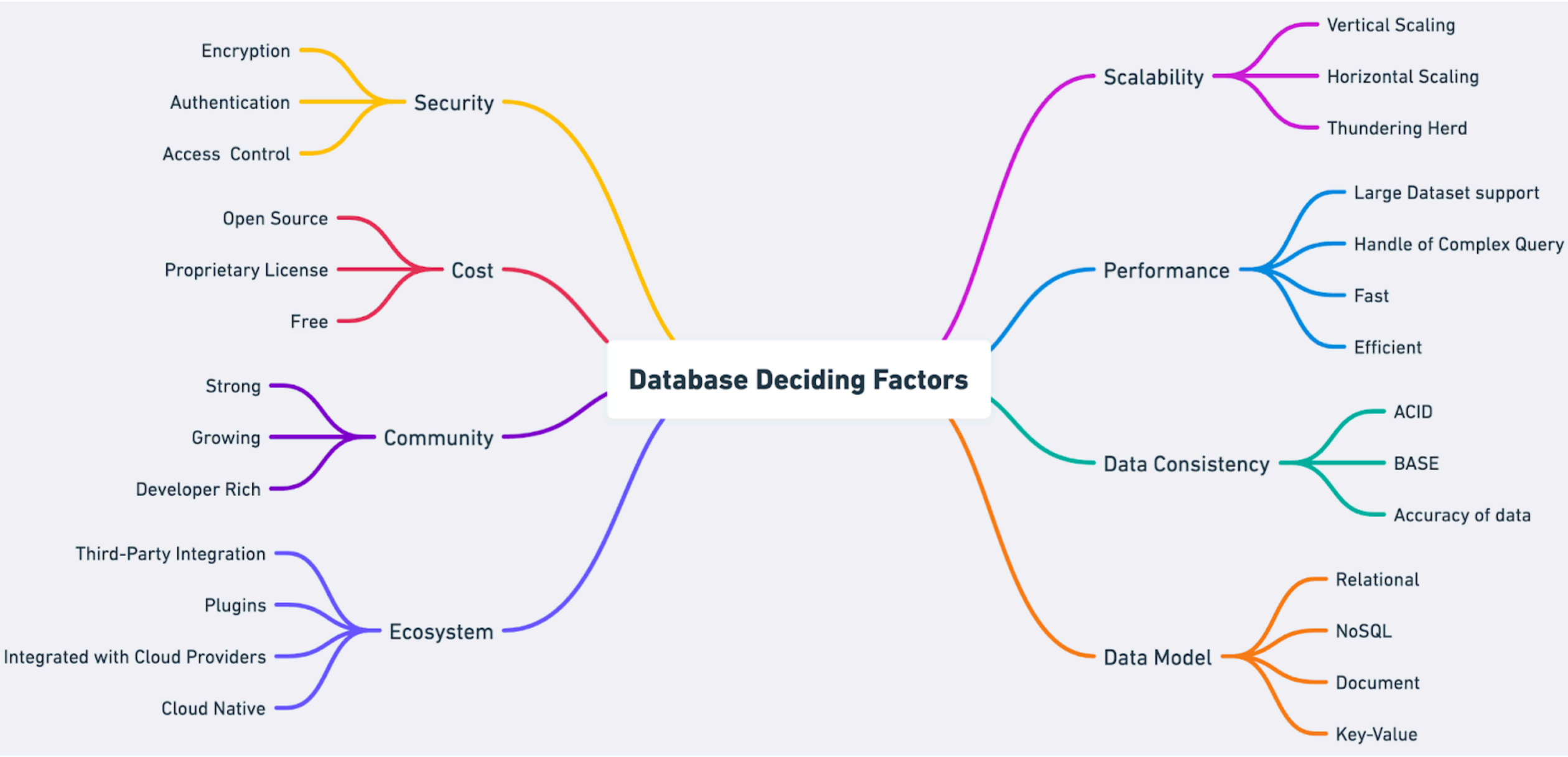
Why RDBMS is still going strong?

- 40+ years of R&D and production usage.
- Widely used, discussed, and actively developed.
- Knowledge of SQL is a highly sought-after skill.
- Helps software engineers, data analysts, and others.
- Certain usage case demands the use of RDBMS.

What database or combination of databases best resolves your problem?

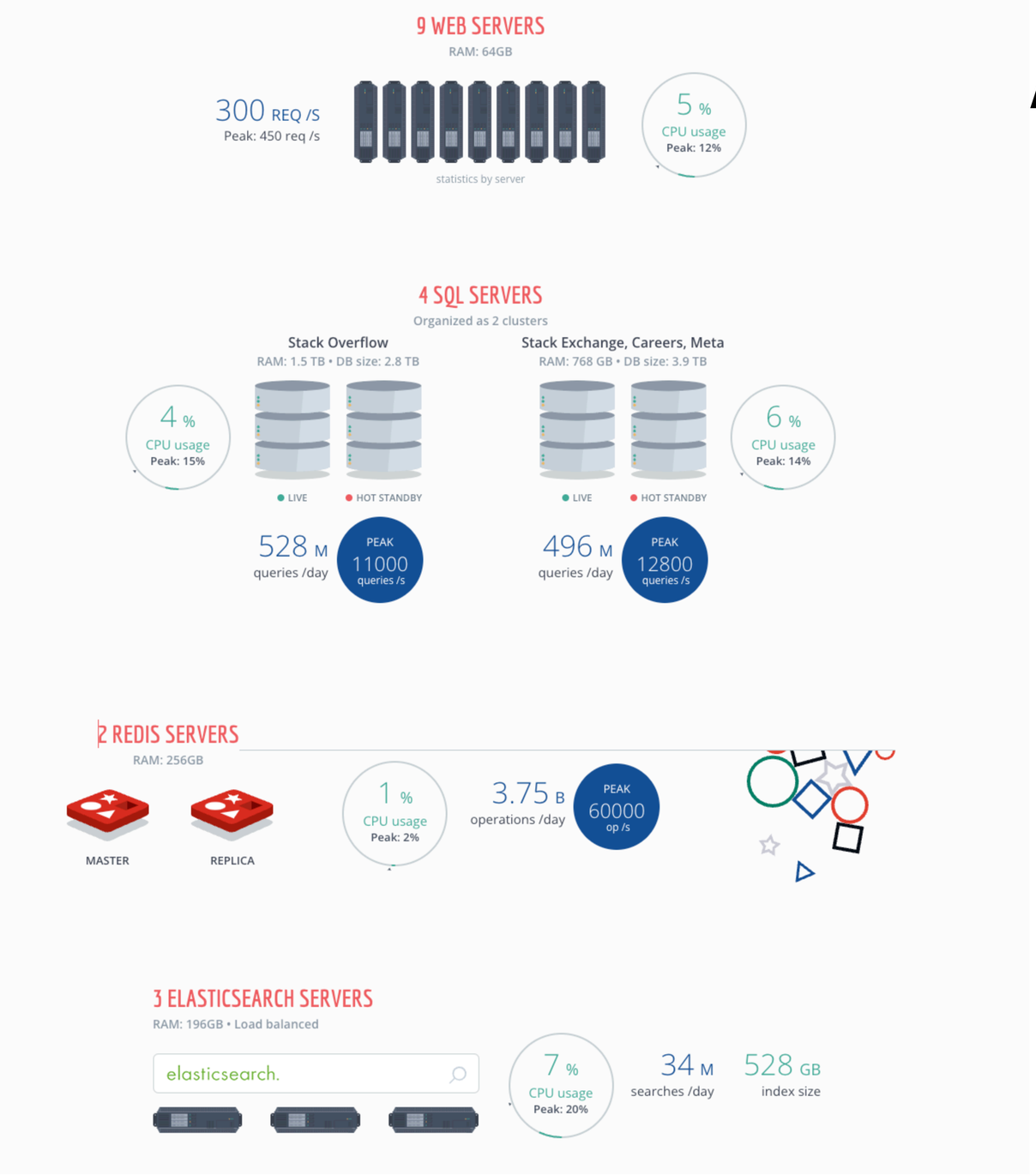
Questions to ask

- What type of database is this?
- What was the driving force?
- How do you talk to it?
- What makes it unique?
- How does it perform?
- How does it scale?

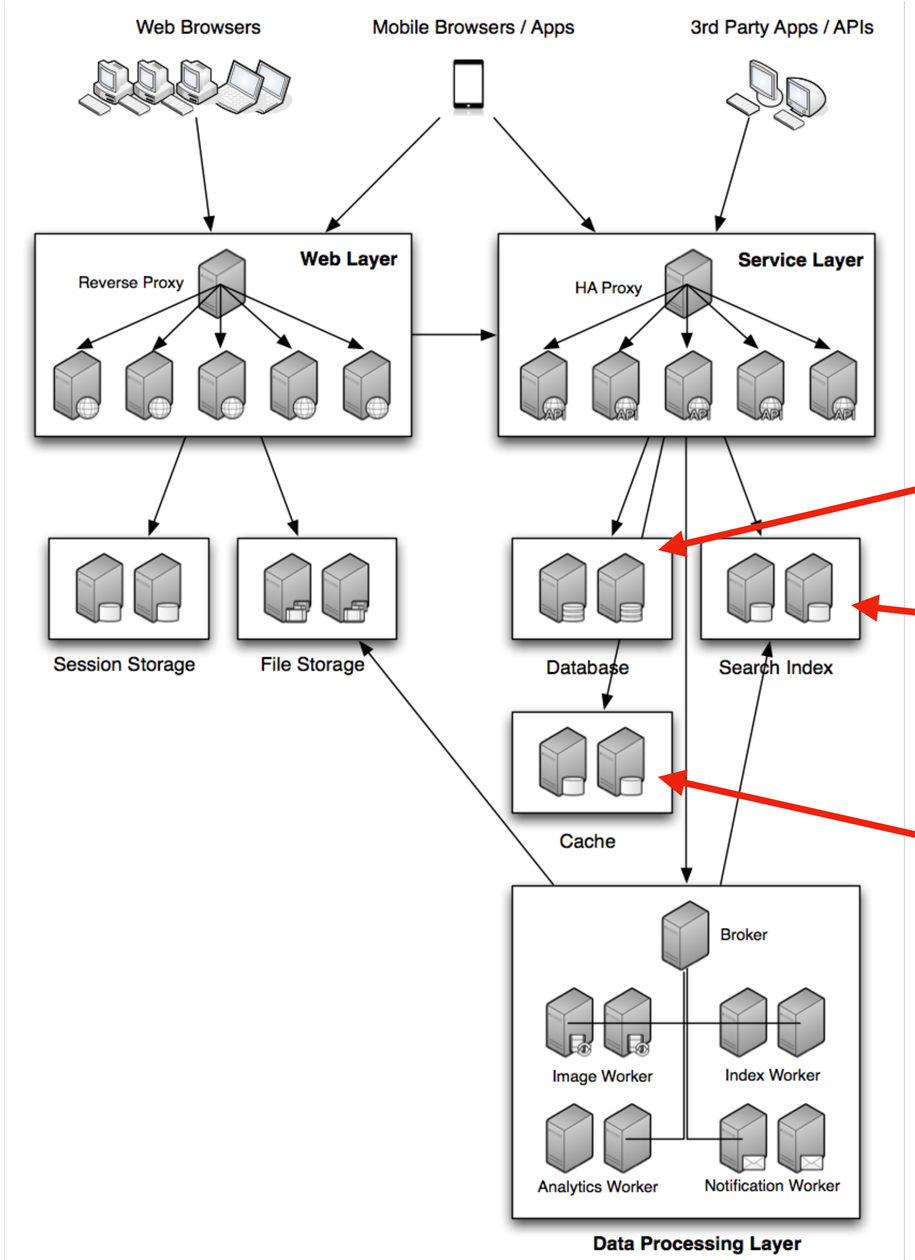

Database Deciding Factors
Security
Encryption
Authentication
Access Control
Cost
Open Source
Proprietary License
Free
Community
Strong
Growing
Developer Rich
Ecosystem
Third-Party Integration
Plugins
Integrated with Cloud Providers
Cloud Native
Scalability
Vertical Scaling
Horizontal Scaling
Thundering Herd
Performance
Large Dataset support
Handle of Complex Query
Fast
Efficient
Data Consistency
ACID
BASE
Accuracy of data
Data Model
Relational
NoSQL
Document
Key-Value

Real-Life Examples

Architecture: Stack Overflow



Architecture: Job Platform



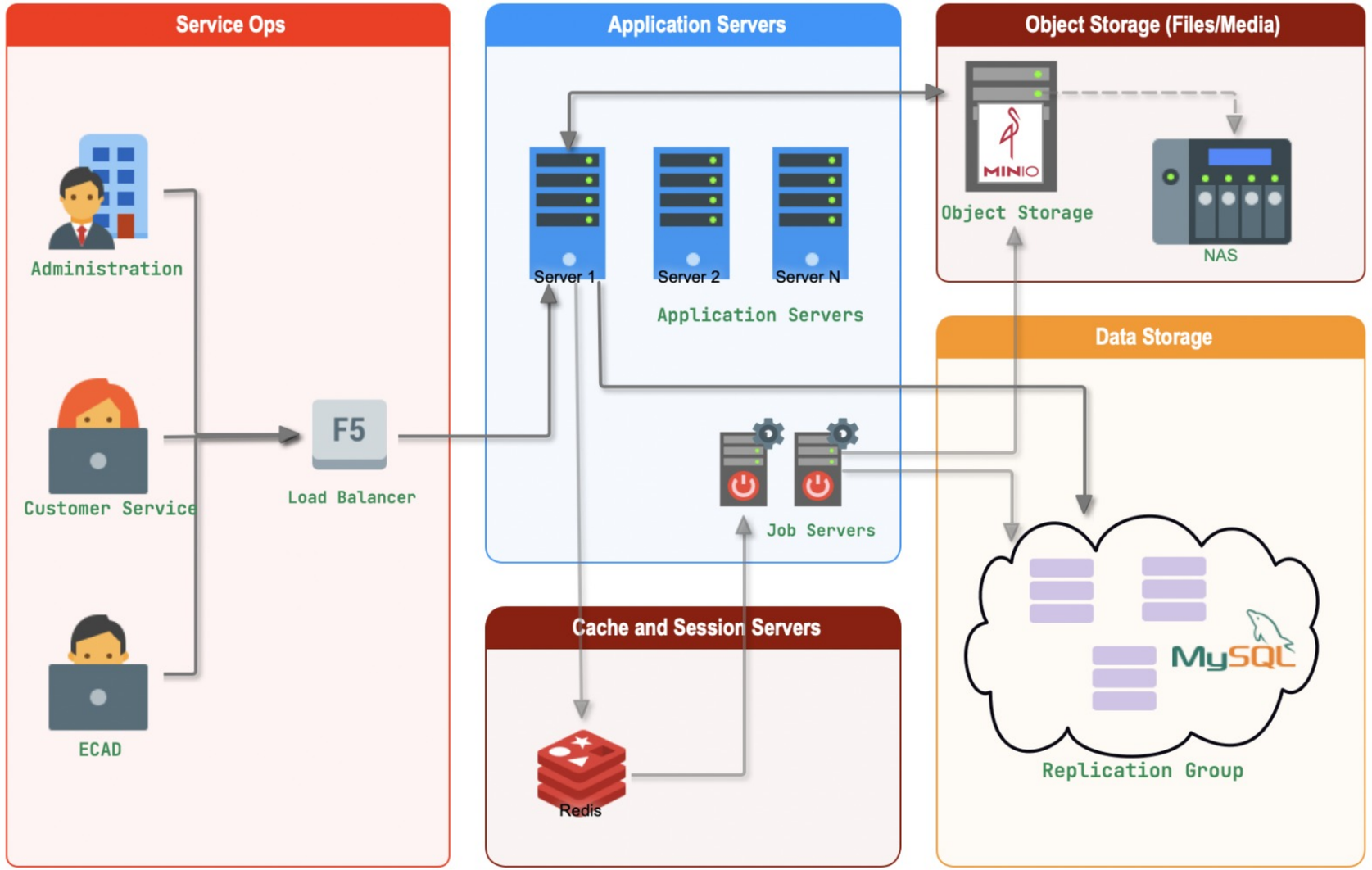
MySQL

MongoDB

ElasticSearch

Redis

Architecture: KYC Management Platform



The Pragmatic Programmers

Seven Databases in Seven Weeks

Second Edition

A Guide to Modern Databases and the NoSQL Movement

Luc Perkins
with Eric Redmond and Jim R. Wilson

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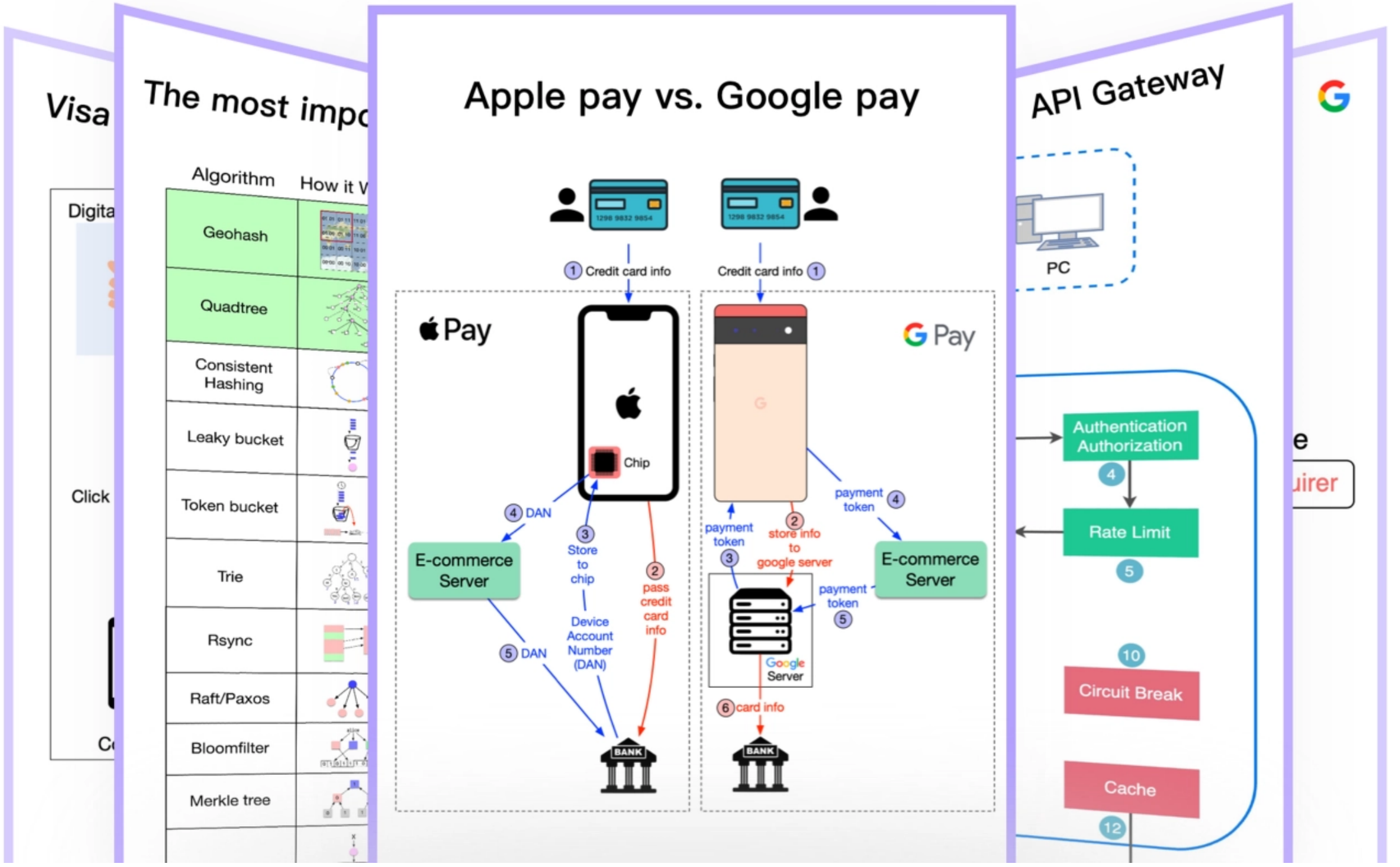

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Q&A