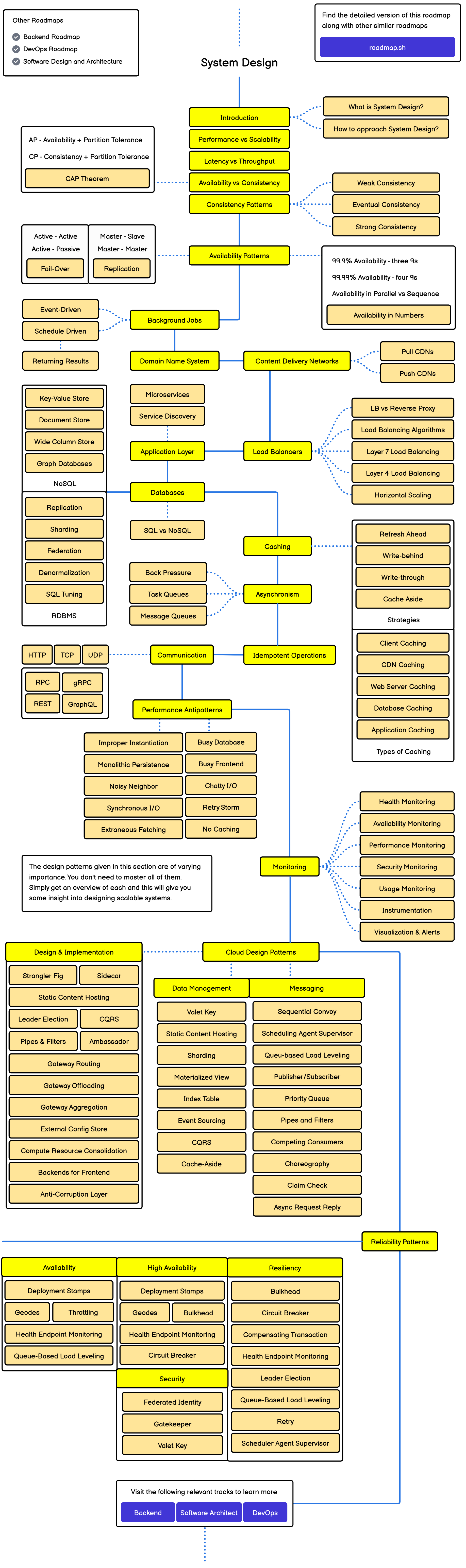
Other Roadmaps
Backend Roadmap
DevOps Roadmap
Software Design and Architecture
System Design
Find the detailed version of this roadmap along with other similar roadmaps
roadmap.sh
Introduction
What is System Design?
How to approach System Design?
Performance vs Scalability
Latency vs Throughput
AP - Availability + Partition Tolerance
CP - Consistency + Partition Tolerance
CAP Theorem
Availability vs Consistency
Consistency Patterns
Weak Consistency
Eventual Consistency
Strong Consistency
Active - Active
Active - Passive
Fail-Over
Master - Slave
Master - Master
Replication
Availability Patterns
99.9% Availability - three 9s
99.99% Availability - four 9s
Availability in Parallel vs Sequence
Availability in Numbers
Event-Driven
Schedule Driven
Background Jobs
Returning Results
Domain Name System
Content Delivery Networks
Pull CDNs
Push CDNs
Key-Value Store
Document Store
Wide Column Store
Graph Databases
NoSQL
Microservices
Service Discovery
Application Layer
Load Balancers
LB vs Reverse Proxy
Load Balancing Algorithms
Layer 7 Load Balancing
Layer 4 Load Balancing
Horizontal Scaling
Replication
Sharding
Federation
Denormalization
SQL Tuning
RDBMS
Databases
SQL vs NoSQL
Caching
Refresh Ahead
Write-behind
Write-through
Cache Aside
Strategies
Back Pressure
Task Queues
Message Queues
Asynchronism
Client Caching
CDN Caching
Web Server Caching
Database Caching
Application Caching
Types of Caching
HTTP
TCP
UDP
RPC
gRPC
REST
GraphQL
Communication
Idempotent Operations
Performance Antipatterns
Improper Instantiation
Busy Database
Monolithic Persistence
Busy Frontend
Noisy Neighbor
Chatty I/O
Synchronous I/O
Retry Storm
Extraneous Fetching
No Caching
The design patterns given in this section are of varying importance. You don't need to master all of them. Simply get an overview of each and this will give you some insight into designing scalable systems.
Monitoring
Health Monitoring
Availability Monitoring
Performance Monitoring
Security Monitoring
Usage Monitoring
Instrumentation
Visualization & Alerts
Design & Implementation
Strangler Fig
Sidecar
Static Content Hosting
Leader Election
CQRS
Pipes & Filters
Ambassador
Gateway Routing
Gateway Offloading
Gateway Aggregation
External Config Store
Compute Resource Consolidation
Backends for Frontend
Anti-Corruption Layer
Cloud Design Patterns
Data Management
Messaging
Valet Key
Static Content Hosting
Sharding
Materialized View
Index Table
Event Sourcing
CQRS
Cache-Aside
Sequential Convoy
Scheduling Agent Supervisor
Queu-based Load Leveling
Publisher/Subscriber
Priority Queue
Pipes and Filters
Competing Consumers
Choreography
Claim Check
Async Request Reply
Reliability Patterns
Availability
Deployment Stamps
Geodes
Throttling
Health Endpoint Monitoring
Queue-Based Load Leveling
High Availability
Deployment Stamps
Geodes
Bulkhead
Health Endpoint Monitoring
Circuit Breaker
Security
Federated Identity
Gatekeeper
Valet Key
Resiliency
Bulkhead
Circuit Breaker
Compensating Transaction
Health Endpoint Monitoring
Leader Election
Queue-Based Load Leveling
Retry
Scheduler Agent Supervisor
Visit the following relevant tracks to learn more
Backend
Software Architect
DevOps