Technical Design Document

[Project Title]

[Team Name]
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Contents

1 Overview

The purpose of this document is to present the technical design of [describe your system/project].

This document is intended for a technical audience with a background in [relevant fields]. Non-technical readers may find high-level summaries useful but should refer to supplementary documentation at the end of this document for background on the underlying mechanisms employed.

2 Problem

[Describe the current state and limitations]

2.1 The Core Problem

[Describe the specific problem your system addresses]

2.2 The Core Goal

The goal is to develop [describe your solution]:
Goal 1
Goal 2
Goal 3

3 Tenets

TODO! List the key principles or beliefs guiding the design decisions. Tenets help align teams and establish common ground on critical design questions.

4 Requirements

TODO! Describe all requirements imposed by the problem. Write from the end-user's perspective. Include user stories or use cases.

Example Use Cases

- As a [user type], I want to [action].
- As a [user type], I want [capability].

4.1 Out of Scope

TODO! List what is explicitly out of scope to avoid misunderstandings.

4.2 Success Criteria

TODO! Describe how success will be measured once the solution is in production. Include measurable metrics such as performance, scalability, or cost efficiency.

Example Metrics

Metric 1
Metric 2
Metric 3

5 Architecture

Describe the architecture of the proposed solution using text, diagrams, and bullet points. Explain why this design was chosen.

5.1 High-Level Overview (HLD)

List all logical system components:

- Component 1
- Component 2
- Component 3
- Component 4
- Component 5

Include diagrams as needed:

5.2 API Design

List all APIs used for interaction between users or services. Include HTTP methods, payloads, versions, and example requests/responses. Discuss future evolution of the APIs.

5.3 Data Storage and Model

Describe the data model and database choice. Estimate data volume, forecast growth, and justify scalability. Discuss data pipelines, ingestion, and pre-processing if applicable.

5.4 Application / Component Level Design (LLD)

Provide detailed design of each system component, including data flow and control flow diagrams.

6 Dependencies

List external and internal dependencies. Document assumptions and risks associated with these dependencies.

6.1 Design Alternatives Considered

Discuss alternative designs evaluated. Provide a comparison table highlighting trade-offs.

Option	**Pros**	**Cons**
Option A	[Advantages]	[Disadvantages]
Option B	[Advantages]	[Disadvantages]

7 Cost Analysis

Estimate infrastructure and operational costs. Plan for future growth and scalability.

8 Failures and Risks

Discuss potential system failures such as:

- Dependency failures
- Traffic overflow
- Performance degradation
- Logic bugs

Identify risks such as external dependencies or resource limitations. Include potential mitigation strategies.

9 Non-Functional Requirements

Cover scalability, availability, maintainability, reliability, latency, and security.

9.1 Scalability

Expected users, transactions, and data volume.

9.2 Latency and Availability

Define SLAs (e.g., P99, P50 latency targets).

9.3 Maintainability

Explain maintenance expectations and ownership.

9.4 Security

Describe security measures and required compliance levels.

10 Testing and Observability

Outline strategies for testing, monitoring, and alerting.

10.1 Testing

Explain testing approach: unit, integration, A/B, or stress tests.

10.2 Metrics and Alarms

List key performance metrics, dashboards, and alert configurations.

11 Future Improvements

List planned features or improvements for future releases.

12 FAQs

Include frequently asked questions and their answers.

[Question?] [Answer here]

A Appendix A: Subtitle (Optional)

Include detailed technical analysis or supporting data.

B Glossary

Term 1 Definition
Term 2 Definition

C References

Reference 1 : `https://example.com`
Reference 2 : `https://example.com`