

# DRIVEMERGE

UNIFIED CLOUD STORAGE MANAGEMENT

## TEAM

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# Problem Statement

## STORAGE LIMIT

Google Drive limits individual storage to 15 GB (free tier)

## ACCOUNT SWITCHING OVERHEAD

Users must manage multiple accounts separately

## DUPLICATED FILE DISCOVERY

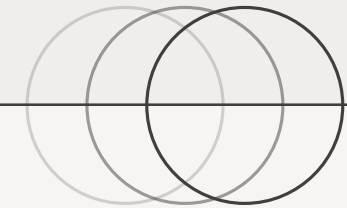
Files spread across accounts make search and discovery inconsistent.

## IMPACT

Users cannot efficiently manage storage, upload large files, or maintain a unified view of their data.



# Proposed Solution



## UNIFIED INTERFACE

Seamlessly combines multiple Google Drive accounts into a single, intuitive interface for effortless management.

## AUTOMATED SEGMENTATION

Files are automatically segmented and intelligently distributed across linked accounts to optimize total storage usage.

## TRANSPARENT RECONSTRUCTION

Files are transparently reconstructed on download, providing a seamless user experience without manual intervention.

## SECURE ACCESS

Leverages industry-standard OAuth 2.0 for secure, credential-less access to linked Google Drive accounts.

# System Architecture

## FRONTEND LAYER

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React with TypeScript delivers a responsive, type-safe user interface with real-time storage visualisation and intuitive file management

## BACKEND SERVICES

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Node.js with Express handles API routing, OAuth flows, file chunking logic, and coordinates parallel upload operations

## DATABASE LAYER

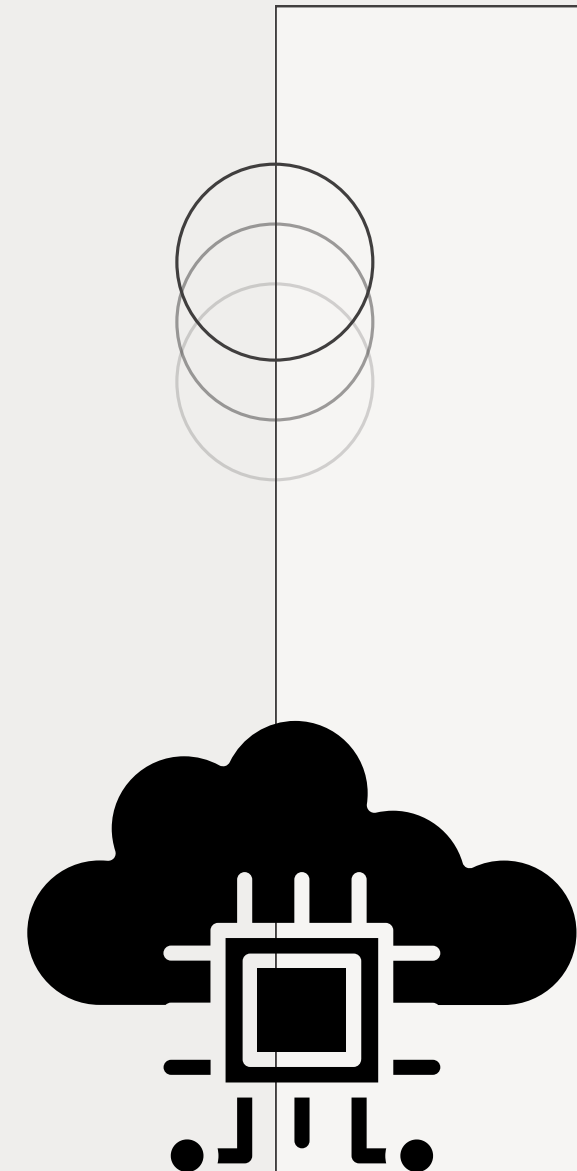
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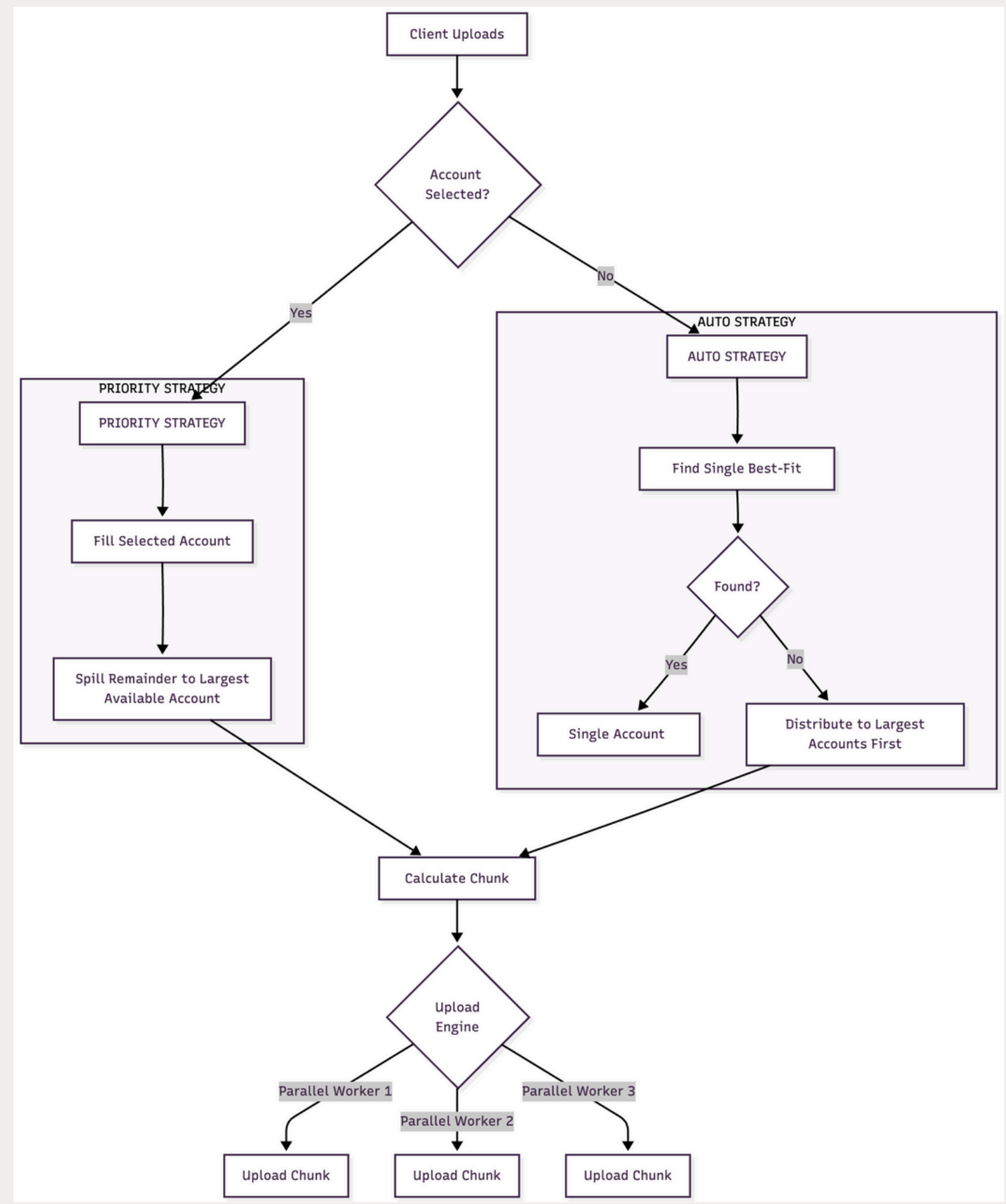
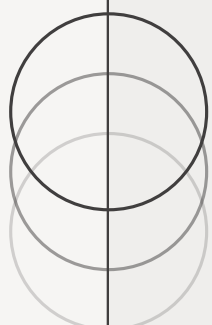
MySQL with Prisma ORM maintains user accounts, file metadata, chunk locations, and storage allocation mappings

## CLOUD INTEGRATION

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Google Drive API manages authentication, file operations, and storage quota monitoring across multiple accounts





# SEGMENTATION LOGIC

# Upload & Download Mechanisms

## UPLOAD PROCESS



### File Reception

Frontend uploads file to backend server for processing

### Chunk Creation

File split into optimal segments based on storage analysis

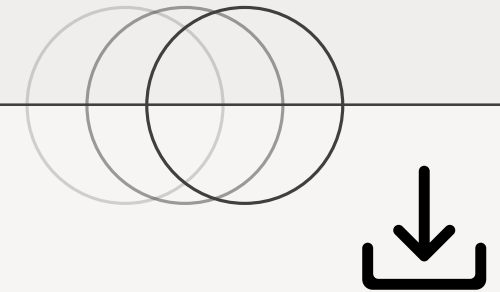
### Parallel Distribution

3 concurrent uploads push chunks to designated accounts

### Metadata Logging

Database records chunk locations and reconstruction map

## Download Process



### Request Initiation

User selects file for download from unified interface

### Metadata Retrieval

System queries database for chunk locations across accounts

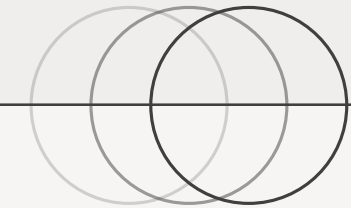
### Sequential Fetching

Chunks retrieved in order for streaming reconstruction

### File Assembly

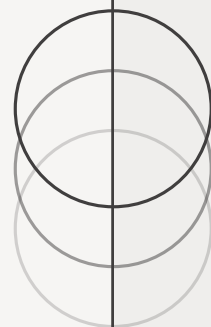
Backend merges chunks and delivers complete file to user

# Key Features



- Multi-account OAuth login
- Secure Google authentication and account linking
- Unified storage management interface
- Combined dashboard showing total & used storage
- Real-time storage capacity tracking
- Automatic file chunking and smart distribution
- Parallel chunk uploads to multiple accounts
- Account-priority upload support
- Seamless file reconstruction during download
- Memory-safe streaming downloads for large files



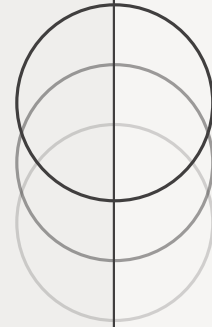


# DEMO



 **DriveMerge**





# Performance Evaluation

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## PARALLEL CHUNK UPLOADS

enable up to 3 concurrent transfers,  
significantly reducing overall upload time.

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## STORAGE-AWARE DISTRIBUTION

ensures efficient usage of available  
space across connected accounts.

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## LARGE FILE HANDLING

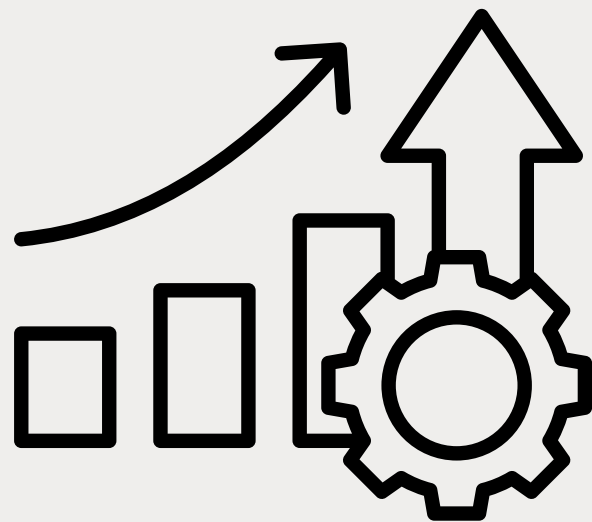
Supports uploads beyond single-account  
storage limits through automatic chunking.

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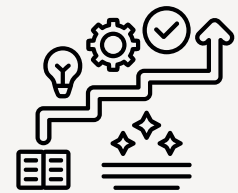
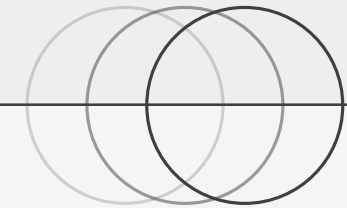
## UNIFIED AGGREGATION

Delivers seamless multi-account  
storage without user complexity.

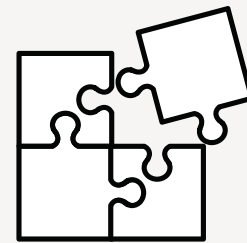
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# Challenges & Learnings



## CHALLENGES



Handling OAuth for multiple accounts

Storage-aware chunk planning

Managing parallel uploads safely

Google Drive API test-mode restrictions

## LEARNINGS

Concurrency handling

large files handling

OAuth workflows & token management

Real-world distributed storage concepts



# Future Scope

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## END-TO-END ENCRYPTION

Client-side encryption before upload to ensure zero-knowledge data privacy and protection from unauthorized access.

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## MULTI-CLOUD SUPPORT

Extend integration to platforms like Dropbox, OneDrive, and other cloud providers for a universal storage aggregation system.

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## ADVANCED FILE VERSIONING

Introduce version control and rollback capabilities to track file changes and restore previous states across all connected accounts.

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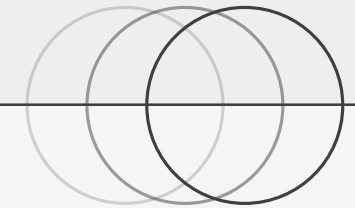
## ADVANCED ANALYTICS DASHBOARD

Provide detailed insights on storage usage trends, distribution patterns across accounts, and system performance metrics.

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# Conclusion



## **Unified Storage Platform**

Combines multiple Google Drive accounts into one easy-to-use system.

## **Efficient Large File Handling**

Uses smart chunking and parallel uploads to overcome storage limits.

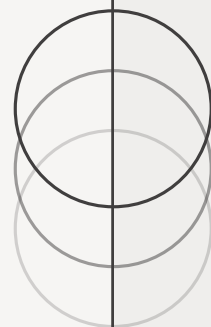
## **Seamless User Experience**

Removes manual account switching and simplifies file management.

## **Scalable for Future Growth**

Built to support encryption, analytics, and multi-cloud expansion.





# THANK YOU