

Portfolio Management System

Product Requirements Document (PRD)

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1. Executive Summary

Purpose: Develop a web-based Portfolio Management System to automate portfolio performance reporting, eliminate manual data entry in spreadsheets, and provide real-time performance analytics for multiple investment portfolios with flexible portfolio grouping capabilities.

Scope: The system will handle data import from in-house trading software, perform automated calculations using FIFO methodology, generate comprehensive dashboards with performance metrics (XIRR, ROCE, Alpha, Benchmark comparisons), support custom portfolio combinations, and provide downloadable reports in multiple formats.

2. Project Overview

2.1 Current State

Currently, portfolio performance tracking involves:

- Manual data entry into Google Sheets on a daily basis
- Multiple separate spreadsheets for different portfolios
- Manual calculation of performance metrics
- Difficult to view combined performance of selected portfolios
- Time-consuming report generation process
- Risk of data duplication and manual errors

2.2 Future State

The new system will provide:

- Automated data import from source trading system
- Centralized database with validation rules
- Real-time dashboard with interactive data tables
- Flexible portfolio combination groupings

- Automated calculation of all performance metrics
- One-click report generation in multiple formats
- Role-based access control (Admin vs Regular users)

3. System Architecture

3.1 Technology Stack

Frontend: HTML5, CSS3 (Bootstrap 5), JavaScript (jQuery)

Backend: PHP 8.4

Server: Linux with Apache web server

Database: MySQL/MariaDB (recommended for financial data)

Design Approach: Mobile-first, responsive, elegant design

3.2 Database Schema

Table: portfolios

Field	Type	Description
portfolio_id	INT (PK, AI)	Unique portfolio identifier
portfolio_name	VARCHAR(100)	Portfolio name (e.g., Port A, Port B)
portfolio_type	ENUM	Own/Portfolio Manager/Unlisted & AIF
created_at	TIMESTAMP	Record creation date
status	ENUM	Active/Inactive

Table: portfolio_combinations (NEW)

Field	Type	Description
combination_id	INT (PK, AI)	Unique combination identifier
combination_name	VARCHAR(100)	User-defined name (e.g., Combo 1, High Risk Group)
description	TEXT	Optional description of the combination
created_by	INT (FK)	User who created the combination
created_at	TIMESTAMP	Record creation timestamp

Table: portfolio_combination_mapping (NEW)

Field	Type	Description
mapping_id	INT (PK, AI)	Unique mapping identifier
combination_id	INT (FK)	Reference to portfolio_combinations
portfolio_id	INT (FK)	Reference to portfolios table

Table: transactions

Field	Type	Description
transaction_id	INT (PK, AI)	Unique transaction identifier
portfolio_id	INT (FK)	Reference to portfolios table
transaction_date	DATE	Trade execution date
stock_code	VARCHAR(50)	Stock symbol (e.g., NSE:HINDUNILVR)
stock_name	VARCHAR(200)	Company name
instrument_type	VARCHAR(50)	Spot/Future/Option
transaction_type	ENUM	BUY/SELL
quantity	DECIMAL(15,2)	Number of shares
price	DECIMAL(15,4)	Transaction price per share
transaction_value	DECIMAL(18,2)	Total transaction amount
expiry_date	DATE	For F&O contracts (nullable)
strike_price	DECIMAL(15,2)	For options (nullable)
upload_date	TIMESTAMP	When data was uploaded
source_file	VARCHAR(255)	Original filename
created_at	TIMESTAMP	Record creation timestamp

Table: holdings

Field	Type	Description
holding_id	INT (PK, AI)	Unique holding identifier
portfolio_id	INT (FK)	Reference to portfolios table
stock_code	VARCHAR(50)	Stock symbol
stock_name	VARCHAR(200)	Company name
current_quantity	DECIMAL(15,2)	Open position quantity
avg_cost_price	DECIMAL(15,4)	Weighted average cost (FIFO)
total_invested	DECIMAL(18,2)	Total capital invested
current_market_price	DECIMAL(15,4)	Latest market price
current_value	DECIMAL(18,2)	Current position value
unrealized_pl	DECIMAL(18,2)	Mark-to-market P&L
last_updated	TIMESTAMP	Last calculation timestamp

Table: realized_pl

Field	Type	Description
pl_id	INT (PK, AI)	Unique P&L record identifier
portfolio_id	INT (FK)	Reference to portfolios table
stock_code	VARCHAR(50)	Stock symbol
sell_date	DATE	Sale transaction date
quantity_sold	DECIMAL(15,2)	Quantity sold
sell_price	DECIMAL(15,4)	Sale price per share
avg_buy_price	DECIMAL(15,4)	FIFO cost basis
realized_pl	DECIMAL(18,2)	Booked profit/loss
created_at	TIMESTAMP	Record creation timestamp

Table: benchmark_data

Field	Type	Description
benchmark_id	INT (PK, AI)	Unique benchmark identifier
index_name	VARCHAR(50)	NIFTY50, SENSEX, NIFTY500, etc.
date	DATE	Trading date
close_value	DECIMAL(15,2)	Index closing value
return_pct	DECIMAL(10,4)	Daily return percentage
created_at	TIMESTAMP	Record creation timestamp

4. Functional Requirements

4.1 User Management

- Admin User Role
 - Upload raw data files (Excel/CSV)
 - Manage portfolios (add/edit/deactivate)
 - Manage portfolio combinations (create/edit/delete)
 - Configure benchmark indices
 - Replace/delete uploaded files
 - Access all system features
- Regular User Role
 - View dashboards and reports
 - Filter and analyze data
 - View and use portfolio combinations
 - Download reports
 - No access to data upload or configuration

4.2 Portfolio Combination Management (Admin)

4.2.1 Create Portfolio Combination

- Admin can create custom portfolio groupings
- Interface to select multiple portfolios from a list
- Assign a meaningful name to the combination (e.g., "Combo 1", "High Risk Group", "Tech Stocks Portfolio")
- Add optional description
- Save combination for future use

Example Use Cases:

- Combo 1 = Port A + Port C + Port E (for comparing specific client groups)
- Combo 2 = Port A + Port B + Port D (for different analysis)
- Family 1 = All portfolios belonging to a specific family
- High Risk = All portfolios with aggressive investment strategy

4.2.2 Manage Combinations

- View list of all created combinations
- Edit existing combinations (add/remove portfolios)
- Rename combinations
- Delete combinations (with confirmation)
- View which portfolios are included in each combination

4.2.3 Combination Interface

- Simple checkbox-based multi-select interface
- Search/filter portfolios while creating combinations
- Visual indicators showing which portfolios are selected
- Prevent creation of empty combinations
- Validation to ensure unique combination names

4.3 Data Import Module (Admin Only)

4.3.1 File Upload Interface

- Support for Excel (.xlsx, .xls) and CSV formats
- Drag-and-drop file upload functionality
- Upload history with date, filename, and status
- Option to replace existing file for specific date

4.3.2 Data Validation

- Validate file format and structure

- Check for required columns: Date, Stock Code, Stock Name, Transaction Type, Quantity, Price
- Detect duplicate transactions (same date + same transaction details)
- Flag missing or invalid data (e.g., negative quantities, missing prices)
- Display validation report before final import
- Allow user to review and confirm/reject import

4.3.3 Data Transformation (ETL Process)

- Parse data from uploaded files
- Clean and normalize data (remove extra spaces, standardize formats)
- Map portfolio names to portfolio_id
- Extract transaction date, stock details, transaction type, quantity, and price
- Calculate transaction values
- Insert validated data into transactions table

4.4 Portfolio Calculation Engine

4.4.1 FIFO (First-In-First-Out) Implementation

- Process transactions chronologically by date
- For each BUY transaction: Add to holdings with cost basis
- For each SELL transaction:
 - Match against oldest BUY lots first
 - Calculate realized P&L: $(\text{Sell Price} - \text{Buy Price}) \times \text{Quantity}$
 - Update holdings to reflect remaining quantity
 - Store realized P&L in realized_pl table
- Maintain running balance of open positions

4.4.2 Combination Calculations

- When a combination is selected, aggregate data from all portfolios in that combination
- Calculate combined metrics:
 - Sum of all invested amounts across selected portfolios
 - Sum of current values
 - Sum of booked and unrealized P&L
 - Weighted XIRR calculation considering all cash flows from selected portfolios
 - Combined ROCE calculation
- Maintain portfolio-level detail within combination view

4.4.3 Performance Metrics Calculation

A. Percentage Metrics:

XIRR (Extended Internal Rate of Return)

- Formula: Solve for rate r where $NPV = 0$
 - $NPV = \sum (\text{Cash Flow} / (1 + r)^{((\text{Date} - \text{Start Date})/365))$
- Cash flows include all investments (negative) and current value (positive)
- Calculate separately for each portfolio
- Calculate for portfolio combinations (aggregated cash flows)
- Calculate for consolidated portfolio (all portfolios combined)

Annualized Return on Average Capital

- Formula: $(\text{Total P\&L} / \text{Average Capital}) \times (365 / \text{Days})$
 - $\text{Average Capital} = (\text{Opening Capital} + \text{Closing Capital}) / 2$
- Calculate for selected financial year
- Calculate on cost basis (FY opening price)

Return on Capital Employed (ROCE)

- Formula: $\text{Total P\&L} / \text{Total Invested Amount}$
- Calculate for individual portfolios
- Calculate for portfolio combinations
- Calculate for selected period

Alpha

- Formula: $\text{Portfolio Return} - \text{Benchmark Return}$
- Compare portfolio performance against selected benchmark index
- Calculate for selected period

Benchmark Performance

- Formula: $((\text{Closing Value} - \text{Opening Value}) / \text{Opening Value}) \times 100$
- Fetch benchmark data from benchmark_data table
- Calculate for same period as portfolio

B. Monetary Metrics:

- Current Value: $\sum (\text{Current Quantity} \times \text{Current Market Price})$
- Invested Amount: $\sum (\text{All Buy Transactions})$
- Booked P&L: $\sum (\text{Realized P\&L from all closed positions})$

- Unrealized P&L (MTM): $\sum((\text{Current Price} - \text{Avg Cost}) \times \text{Current Quantity})$
- Total P&L: Booked P&L + Unrealized P&L

4.5 Dashboard Features

4.5.1 Primary Dashboard View

- Main View Selector (Dropdown/Radio Buttons):
 - Consolidated (All Portfolios)
 - Portfolio Combination (Select from saved combinations)
 - Individual Portfolio (Select specific portfolio)
- Additional Filters:
 - Financial Year selector (FY 2024-25, FY 2025-26, All Years)
 - Custom date range picker
 - Benchmark index selector (NIFTY50, SENSEX, NIFTY500, etc.)

4.5.2 Consolidated Portfolio Dashboard

Key Metrics Section (displayed as cards):

Percentage Metrics	Monetary Metrics (₹)
<ul style="list-style-type: none">• XIRR• Annualized Return on Avg Capital• Return on Average Capital• Alpha• Benchmark Performance	<ul style="list-style-type: none">• Current Value• Invested Amount• Booked P&L• Unrealized P&L• Total P&L
Sub-grouped by: <ul style="list-style-type: none">• Own Portfolios• Portfolio Managers• Unlisted & AIF	Breakdown by portfolio type

Portfolio Summary Table:

- List all portfolios with aggregate metrics
- Columns: Portfolio Name, Invested Amount, Current Value, Unrealized P&L, Booked P&L, Total P&L, % Return, XIRR, Benchmark
- Sortable and filterable
- Click on portfolio name to drill down to individual view
- Color-coded profit (green) and loss (red) values

4.5.3 Portfolio Combination Dashboard

Combination Selector:

- Dropdown showing all saved combinations
- Display which portfolios are included in selected combination

Key Metrics Section (same structure as consolidated):

- Aggregated metrics for all portfolios in the combination
- Side note showing "Combination: [Name] - Includes: Port A, Port C, Port E"

Breakdown Table:

- Show individual portfolio performance within the combination
- Columns: Portfolio Name, Invested Amount, Current Value, Unrealized P&L, Booked P&L, Total P&L, % Return
- Summary row at bottom showing combined totals

Combined Holdings Table:

- All stocks across selected portfolios in the combination
- Group by stock with portfolio-wise breakdown
- Show which portfolios hold each stock

4.5.4 Individual Portfolio Dashboard

Key Metrics Section:

Percentage Metrics	Monetary Metrics (₹)
<ul style="list-style-type: none"> • XIRR • ROCE • Benchmark Returns 	<ul style="list-style-type: none"> • Current Value • Invested Amount • Booked P&L • Unrealized P&L • Total P&L

Holdings Table:

- Columns: Company Name, Buy Date, Buy Qty, Buy Rate, Sale Date, Sell Rate, Open/Close, Invested Amount, Current Investment, Sale Amount, Current Market Price, Current Value, MTM, Booked P&L, Benchmark Performance
- Show both open and closed positions
- Color-code profit (green) and loss (red)
- Sortable and filterable by stock, date, or status

4.5.5 Consolidated Stock Holdings

- Combined view of all stocks across selected portfolios/combinations

- Columns: Stock Name, Total Quantity, Weighted Avg Price, Current Market Price, Portfolio-wise Quantity, Weightage (% of portfolio), Total Value
- Identify concentration risk
- Available for: All Portfolios, Specific Combination, or Individual Portfolio

4.5.6 Year-wise Performance Comparison

- Side-by-side comparison of FY 2024-25 vs FY 2025-26
- Show Net P&L and % Return for each year
- Calculate returns both on cost basis and FY-wise (FY opening price as cost)
- Available for all view types: Consolidated, Combination, Individual

4.6 Data Tables & Display

- All data displayed in responsive, sortable tables
- Search functionality within tables
- Pagination for large datasets (show 25/50/100 rows per page)
- Column-specific filtering
- Export table data to Excel/CSV directly from table
- Responsive design - tables adapt to mobile screens
- Loading indicators while data is being fetched

4.7 Report Download

- Download consolidated portfolio report
- Download portfolio combination report
- Download individual portfolio report
- Download multiple reports in single export
- Format options: PDF, Excel (XLSX), CSV
- PDF reports should be professionally formatted with:
 - Company logo/header
 - Report date and parameters (including combination details if applicable)
 - Summary metrics
 - Detailed tables
- Excel reports should include:
 - Multiple sheets for different views
 - Sheet for each portfolio in combination (if applicable)
 - Raw transaction data
 - Calculated metrics
 - Formulas preserved for further analysis

4.8 Drawdown Report

- Calculate maximum drawdown for selected period
- Formula: $\text{Max Drawdown} = (\text{Trough Value} - \text{Peak Value}) / \text{Peak Value} \times 100$
- Show drawdown statistics:
 - Maximum drawdown percentage
 - Duration of drawdown
 - Recovery time
- Display as tabular data with daily/monthly values
- Generate for individual stocks, portfolios, combinations, or consolidated view
- Export drawdown data to Excel/CSV

5. Non-Functional Requirements

5.1 Performance

- Dashboard should load within 3 seconds
- File upload and validation should complete within 30 seconds for files up to 10MB
- Report generation should complete within 15 seconds
- Combination calculations should complete within 5 seconds
- Support concurrent access by up to 20 users

5.2 Security

- Role-based access control (Admin vs Regular users)
- Secure user authentication with password hashing
- Session management with timeout
- SQL injection prevention
- XSS (Cross-Site Scripting) protection
- CSRF (Cross-Site Request Forgery) tokens
- Encrypted database connections
- Audit trail for data uploads and changes
- Combination management restricted to Admin users

5.3 Usability

- Mobile-first, responsive design (Bootstrap 5)
- Works on desktop, tablet, and mobile devices
- Intuitive navigation with clear menu structure
- Consistent UI/UX across all pages
- Tooltips and help text for complex features
- Loading indicators for long-running operations
- Error messages should be clear and actionable

- Easy-to-use combination selector with visual feedback

5.4 Reliability

- System uptime: 99.5% or higher
- Automated database backups (daily)
- Transaction rollback on calculation errors
- Graceful error handling with user-friendly messages

5.5 Maintainability

- Clean, well-documented code
- Modular architecture for easy updates
- Configuration files for easy parameter changes
- Logging for debugging and monitoring

6. System Data Flow

Step 1: Data Export

- Admin exports raw transaction data from in-house trading software
- Files in Excel or CSV format
- Sample files analyzed: AS_ON_22-09, UPTO_22-09, Portfolio_Performance_Report_22-09

Step 2: File Upload (Admin Panel)

- Admin logs into system
- Navigates to Data Upload section
- Uploads file via drag-and-drop or file picker

Step 3: Data Cleaning & Validation

- System parses uploaded file
- Validates required columns exist
- Checks for duplicate transactions (same date or transaction ID)
- Validates data types and ranges
- Flags any issues and displays validation report
- Admin reviews and confirms or corrects issues

Step 4: Data Transformation (ETL)

- Normalize and clean data
- Map portfolio names to IDs
- Extract transaction details
- Calculate derived fields (transaction value, etc.)
- Insert data into transactions table

Step 5: Portfolio Calculations

- Apply FIFO logic to calculate:
 - Open positions and average cost
 - Realized P&L for closed positions
 - Update holdings table
- Calculate performance metrics (XIRR, ROCE, Alpha)
- Map benchmark index values from benchmark_data table
- Store calculated metrics for quick dashboard retrieval

Step 6: Combination Management

- Admin creates/edits portfolio combinations
- System stores combination definitions in database
- Combinations available for selection by all users

Step 7: Dashboard Display

- User logs in and selects view type (Consolidated/Combination/Individual)
- If Combination selected, user picks from saved combinations
- User applies additional filters (date range, benchmark)
- System queries database for relevant data
- For combinations, system aggregates data from all included portfolios
- Renders dashboard with metrics and tables
- User can drill down into individual portfolios

Step 8: Report Generation

- User selects report type and format
- System generates report based on current view and filters
- Report includes combination details if applicable
- Report available for download (PDF/Excel/CSV)

7. Source File Structure Analysis

7.1 AS_ON_22-09_Sample_Excel_trade_file.xlsx

Purpose: Snapshot of current holdings as of specific date

Structure:

- Header: Report title and date
- Hierarchy: Group Name → Client Name (Portfolio) → Assets
- Columns: Asset, Instr. Type, Expiry, Strike, Buy Qty, Buy Avg, Sell Qty, Sell Avg, Booked P/L, C/F Qty, Avg.Cost (Residual), Close Price (Instr), Close Price (Asset), MTM, Total P/L, Exposure
- Contains current positions with MTM calculations

7.2 UPTO_22-09_Sample_File.xlsx

Purpose: Cumulative transactions up to specific date

Structure:

- Similar to AS_ON file but includes all historical transactions
- Shows both open and closed positions
- Running P&L calculations

7.3 Portfolio_Performance_Report_22-09_Sample_File.xlsx

Purpose: Detailed transaction-level data

Structure:

- Columns: ClientName, Product, Op.Qty, Op.Value, AvgCost, BuyQty, BuyValue, BuyAvg, SellQty, SellValue, SellAvg, SqrQty
- Transaction-by-transaction breakdown
- Useful for audit and reconciliation

7.4 Dashboard_File_for_Automation.xlsx

Purpose: Reference for expected dashboard output

Key Features:

- Main Dashboard sheet with consolidated metrics
- Separate sheets for each portfolio (Port A, Port B, Port C)
- XIRR calculation sheets for each portfolio
- Performance working sheet for calculations
- Uses Google Finance API for real-time price fetching
- Year-wise performance comparison (FY 25-26 vs FY 24-25)

8. User Interface Design

8.1 Layout Structure

- Top Navigation Bar:
 - Logo and system name
 - User profile dropdown (logout, settings)
 - Notification bell (for data upload status)
- Sidebar Menu (collapsible on mobile):
 - Dashboard (default landing page)
 - Portfolios (list view)
 - Combinations (Admin: Manage, User: View)
 - Reports
 - Data Upload (Admin only)
 - Settings
- Main Content Area:
 - Dynamic content based on selected menu item
 - Breadcrumb navigation

8.2 Dashboard Page

View Selector (prominent at top):

- Radio buttons or segmented control:
 - [All Portfolios] [Combination] [Individual Portfolio]

- When "Combination" selected, show dropdown of saved combinations
- When "Individual Portfolio" selected, show dropdown of portfolios

Filters Section:

- Date range picker (FY / Custom / All)
- Benchmark index selector
- Apply button

Metrics Cards (grid layout):

- Large, colorful cards displaying key metrics
- Use icons for visual appeal
- Positive values in green, negative in red
- For combinations, show note: "Viewing: Combo 1 (Port A, Port C, Port E)"

Data Tables:

- Responsive tables with search and sort
- Export buttons (Excel, CSV, PDF) for each table
- Pagination controls

8.3 Combination Management Page (Admin)

- List of Existing Combinations:
 - Table showing: Name, Description, Portfolios Included, Actions
 - Actions: Edit, Delete, View Details
- Create New Combination Button (prominent)
- Create/Edit Modal:
 - Input field for combination name
 - Textarea for optional description
 - Multi-select checklist of portfolios
 - Search box to filter portfolio list
 - Visual indication of selected portfolios
 - Save and Cancel buttons

8.4 Data Upload Page (Admin)

- File Upload Area:
 - Drag-and-drop zone
 - File picker button
 - Supported formats displayed

- Upload History Table:
 - Columns: Date, Filename, Status, Actions (View/Replace/Delete)
- Validation Report Modal:
 - Shows validation results before import
 - Lists errors and warnings
 - Confirm/Cancel buttons

8.5 Color Scheme & Branding

- Primary Color: Professional blue (#007bff)
- Secondary Color: Dark gray (#343a40)
- Success: Green (#28a745)
- Danger/Loss: Red (#dc3545)
- Warning: Orange (#ffc107)
- Background: Light gray (#f8f9fa)
- Card Background: White (ffffff)

9. Implementation Phases

Phase 1: Foundation (Weeks 1-2)

- Set up development environment (Linux, Apache, PHP 8.4, MySQL)
- Design and create database schema (including combination tables)
- Implement user authentication and authorization
- Create basic frontend structure with Bootstrap 5
- Deliverable: Login system and database structure

Phase 2: Data Import (Weeks 3-4)

- Develop file upload interface (Admin)
- Implement file parsing for Excel/CSV
- Build data validation logic
- Create ETL pipeline for data transformation
- Implement duplicate detection
- Deliverable: Working data import module with validation

Phase 3: Calculation Engine (Weeks 5-6)

- Implement FIFO logic for P&L calculation
- Develop XIRR calculation algorithm
- Implement other performance metrics (ROCE, Alpha, Annualized Return)
- Build benchmark comparison logic

- Implement combination aggregation calculations
- Create automated calculation triggers
- Deliverable: Fully functional calculation engine

Phase 4: Combination Management (Week 7)

- Build combination management interface (Admin)
- Implement create/edit/delete functionality
- Create combination selector for dashboard
- Implement combination-based data filtering
- Deliverable: Working combination management system

Phase 5: Dashboard Development (Weeks 8-10)

- Build consolidated portfolio dashboard
- Build combination view dashboard
- Build individual portfolio dashboard
- Implement view selector and filters
- Create consolidated stock holdings view
- Implement responsive data tables
- Deliverable: Interactive, responsive dashboards with all views

Phase 6: Reporting (Weeks 11-12)

- Implement PDF report generation
- Implement Excel report export with formulas
- Add combination details to reports
- Develop drawdown report
- Deliverable: Comprehensive reporting system

Phase 7: Testing & Refinement (Weeks 13-14)

- Conduct unit testing for all modules
- Test combination functionality thoroughly
- Perform integration testing
- User acceptance testing (UAT)
- Performance optimization
- Bug fixes and refinements
- Deliverable: Production-ready system

Phase 8: Deployment & Training (Week 15)

- Deploy to production server
- Configure automated backups
- Create user documentation (including combination management)
- Conduct user training sessions

- Go-live support
- Deliverable: Live system with trained users

10. Technical Considerations

10.1 Libraries & Dependencies

- Backend (PHP):
 - PHPSpreadsheet - for Excel file parsing
 - TCPDF or mPDF - for PDF generation
 - PHPMailer - for email notifications (optional)
- Frontend (JavaScript):
 - jQuery 3.x
 - Bootstrap 5.x
 - DataTables - for interactive tables
 - Select2 - for enhanced dropdowns and multi-select
 - Date Range Picker - for date selection

10.2 Combination Query Optimization

- Use JOIN operations to efficiently fetch combination data
- Cache combination calculations for frequently accessed combinations
- Index combination_id and portfolio_id in mapping table
- Pre-calculate aggregates when possible

10.3 API Integration (Optional Future Enhancement)

- Integrate with stock price APIs for real-time market data
- Options: NSE/BSE APIs, Yahoo Finance, Alpha Vantage
- Automatic daily price updates

10.4 Performance Optimization

- Database indexing on frequently queried columns
- Caching of calculated metrics
- Lazy loading for large datasets
- Asynchronous processing for heavy calculations
- CDN for static assets

11. Assumptions & Constraints

11.1 Assumptions

- Data exported from in-house software will follow consistent format
- All transactions are in INR (₹)
- Server has sufficient resources (min 4GB RAM, 100GB storage)
- Users have modern web browsers (Chrome, Firefox, Safari, Edge)
- Benchmark index data will be manually updated or imported separately
- A portfolio can belong to multiple combinations

11.2 Constraints

- System must work on client's existing Linux server with Apache
- Cannot use external paid APIs without client approval
- Must maintain compatibility with PHP 8.4
- Bootstrap 5 for frontend (no earlier versions)
- Charts/visualizations deferred to Phase 2 (future enhancement)

12. Future Enhancements (Post-MVP)

Phase 2 Features (Charts & Visualizations)

- Performance Line Charts: Portfolio value over time vs Benchmark
- Equity Curve: Visual drawdown analysis showing peak-to-trough decline
- Pie Charts: Asset allocation by stock, sector, or portfolio type
- Bar Charts: P&L by stock, P&L by month/quarter/year
- Heatmap: Stock performance across portfolios
- Combination performance comparison charts
- Toggle between Chart and Table views

Other Future Enhancements

- Mobile application (iOS/Android)
- Real-time alerts and notifications
- Automated email reports (daily/weekly/monthly)
- Integration with accounting software
- AI-powered insights and recommendations
- Portfolio rebalancing suggestions
- Tax reporting and optimization
- Multi-currency support
- WhatsApp/Telegram notifications
- Advanced risk analytics (Sharpe ratio, Beta, Standard Deviation)
- Combination templates for quick setup

- Historical combination performance tracking

13. Acceptance Criteria

- Admin can successfully upload Excel/CSV files
- System validates uploaded data and displays clear error messages
- System prevents duplicate data entry
- FIFO calculations match manual Excel calculations
- XIRR calculations are accurate within 0.01%
- Dashboard displays all required metrics correctly
- Admin can create, edit, and delete portfolio combinations
- Users can select and view combination dashboards
- Combination calculations aggregate correctly from included portfolios
- Users can filter data by portfolio, combination, date range, and benchmark
- Data tables are responsive and work correctly on all devices
- PDF reports are professionally formatted and match dashboard data
- Excel exports include all data and working formulas
- Reports include combination details when applicable
- System loads within performance requirements (3 seconds for dashboard)
- Mobile responsive design works on phones and tablets
- User roles and permissions function correctly

14. Glossary

Term	Definition
Portfolio Combination	User-defined grouping of multiple portfolios for combined analysis
XIRR	Extended Internal Rate of Return - annualized return considering irregular cash flows
FIFO	First-In-First-Out - inventory/cost accounting method where earliest purchases are sold first
ROCE	Return on Capital Employed - profitability ratio measuring return on invested capital
Alpha	Excess return of portfolio relative to benchmark index
MTM	Mark-to-Market - unrealized profit/loss based on current market prices
Booked P&L	Realized profit/loss from closed positions
Unrealized P&L	Paper profit/loss on open positions
FY	Financial Year - typically April 1 to March 31 in India
ETL	Extract, Transform, Load - data integration

	process
Benchmark	Market index used as standard for comparison (e.g., NIFTY50, SENSEX)
Holdings	Current open positions in portfolio
Drawdown	Peak-to-trough decline in portfolio value
Equity Curve	Graphical representation of portfolio value over time
Cost Basis	Original purchase price of asset (for tax/P&L calculation)
Weightage	Percentage allocation of specific stock in portfolio
F&O	Futures and Options - derivative instruments
C/F Qty	Carry Forward Quantity - open position quantity
Avg Cost	Average cost of acquisition (weighted average for multiple purchases)
AIF	Alternative Investment Fund - category of investment fund in India

15. Conclusion

This Portfolio Management System represents a significant upgrade from manual spreadsheet-based tracking to an automated, web-based platform. By implementing this system, the firm will achieve:

- Elimination of manual data entry and associated errors
- Real-time visibility into portfolio performance
- Flexible portfolio grouping with custom combinations
- Standardized calculations using FIFO methodology
- Professional reporting capabilities
- Scalable architecture for future enhancements (including charts/visualizations)

The system will be delivered in phases over 15 weeks, with each phase building upon the previous to ensure a stable, well-tested production system. The mobile-first, responsive design ensures accessibility across all devices, while the robust security measures protect sensitive financial data.

The portfolio combination feature provides unprecedented flexibility in analyzing groups of portfolios, enabling users to view performance across any custom grouping they define, making the system highly adaptable to various business needs.

16. Appendix

A. Sample Calculation Formulas

FIFO Example:

Buy 100 shares @ ₹50 on Jan 1

Buy 50 shares @ ₹60 on Feb 1

Sell 120 shares @ ₹70 on Mar 1

Calculation:

- First 100 shares: $(₹70 - ₹50) \times 100 = ₹2,000$ profit
- Next 20 shares: $(₹70 - ₹60) \times 20 = ₹200$ profit
- Total Realized P&L: ₹2,200
- Remaining: 30 shares @ ₹60 (average cost)

XIRR Example:

Jan 1, 2024: Invest ₹1,00,000 (cash outflow: -₹1,00,000)

Jun 1, 2024: Invest ₹50,000 (cash outflow: -₹50,000)

Dec 31, 2024: Portfolio value ₹1,80,000 (cash inflow: +₹1,80,000)

XIRR = Rate at which NPV = 0 \approx 32.5% (annualized)

Combination XIRR Example:

Combo 1 = Port A + Port C

Port A: Jan 1 invest ₹1,00,000, Jun 1 invest ₹50,000, Dec 31 value ₹1,80,000

Port C: Feb 1 invest ₹2,00,000, Dec 31 value ₹2,40,000

Combined cash flows:

- Jan 1: -₹1,00,000
- Feb 1: -₹2,00,000
- Jun 1: -₹50,000
- Dec 31: +₹4,20,000 (₹1,80,000 + ₹2,40,000)
- Combined XIRR = Rate at which NPV = 0 (calculated from all cash flows)

B. Database ER Diagram Description

The database consists of 7 core tables with the following relationships:

- portfolios (1) → (Many) transactions
- portfolios (1) → (Many) holdings
- portfolios (1) → (Many) realized_pl
- portfolio_combinations (1) → (Many) portfolio_combination_mapping
- portfolios (1) → (Many) portfolio_combination_mapping
- Indexes should be created on:
 - transactions: portfolio_id, transaction_date, stock_code
 - holdings: portfolio_id, stock_code
 - realized_pl: portfolio_id, sell_date
 - benchmark_data: index_name, date
 - portfolio_combination_mapping: combination_id, portfolio_id (composite)

C. File Format Specifications

Required Columns in Upload Files:

Column Name	Data Type	Required
Transaction Date	Date (DD-MM-YYYY)	Yes
Portfolio/Client Name	Text	Yes
Stock Code	Text	Yes
Stock Name	Text	Yes
Transaction Type	BUY/SELL	Yes
Quantity	Number	Yes
Price	Number (decimal)	Yes
Instrument Type	Text (Spot/Future/Option)	No

D. Portfolio Combination Examples

Use Case Scenarios:

Combination Name	Portfolios Included	Purpose
Combo 1	Port A, Port C, Port E	Custom analysis group 1
Combo 2	Port A, Port B, Port D	Custom analysis group 2
Smith Family	Port A, Port F, Port G	All portfolios for Smith family
High Risk Portfolios	Port C, Port D, Port H	Aggressive investment portfolios
Conservative Group	Port B, Port E, Port I	Low-risk portfolios