# PRIVITY

## Private Equity Share Booking System

System Architecture & API Documentation

Version 2.0.0

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# 1. System Overview

PRIVITY is a comprehensive Private Equity Share Booking System designed for SMIFS. It manages the entire lifecycle of share bookings, from client onboarding to payment settlement, including support for Referral Partners, inventory management, and financial reporting.

### *Key Features:*

- Client & Vendor Management with document verification
- Stock/Security Master with corporate actions tracking
- Multi-level booking approval workflow
- Referral Partner (RP) commission system with bank details
- Real-time notifications via WebSocket
- Financial reporting with Excel/PDF exports
- Email audit logging for compliance
- Microsoft Azure AD Single Sign-On
- Role-based access control (7 user roles)

## 2. Technology Stack

| Layer | Technology | Version |
|---|---|---|
| Frontend Framework | React | 19.0.0 |
| UI Components | Shadcn/UI (Radix) | Latest |
| Styling | Tailwind CSS | 3.x |
| Backend Framework | FastAPI | 0.110.1 |
| ASGI Server | Uvicorn | 0.25.0 |
| Database | MongoDB | 6.x |
| DB Driver | Motor (async) | 3.3.1 |
| Authentication | JWT + MSAL | PyJWT 2.10.1 |
| Real-time | WebSockets | 15.0.1 |

# 3. Backend Architecture

The backend follows a modular architecture with 18 specialized routers, each handling a specific domain of the application.

## *Directory Structure:*

```
/app/backend/
■■■ server.py # Main FastAPI entry point
■■■ config.py # Configuration & constants
■■■ database.py # MongoDB connection + indexes
■■■ models/__init__.py # Pydantic data models
■■■ utils/auth.py # JWT utilities
■■■ services/ # Business logic services
■ ■■■ email_service.py # Email + audit logging
■ ■■■ notification_service.py
■ ■■■ ocr_service.py # Document OCR
■ ■■■ audit_service.py
■ ■■■ inventory_service.py
■ ■■■ azure_sso_service.py
■■■ routers/ # API endpoint modules (18 routers)
```

## *Router Modules:*

| Router | Prefix | Description |
|---|---|---|
| auth.py | /auth | Login, register, SSO, password management |
| analytics.py | /analytics | Performance metrics & summaries |
| audit_logs.py | /audit-logs | Activity audit trail |
| bookings.py | /bookings | Booking CRUD with approval workflow |
| clients.py | /clients | Client & document management |
| dashboard.py | /dashboard | Dashboard statistics |
| email_logs.py | /email-logs | Email audit logging |
| email_templates.py | /email-templates | Email template management |
| finance.py | /finance | Payments, refunds, RP commissions |
| inventory.py | /inventory | Stock inventory management |
| notifications.py | /notifications | Real-time alerts |
| purchases.py | /purchases | Purchase order management |
| referral_partners.py | /referral-partners | RP management |
| reports.py | /reports | P&L reports, exports |
| smtp_config.py | /smtp-config | SMTP configuration |
| stocks.py | /stocks | Stock/security master |
| users.py | /users | User management |
| database_backup.py | /backup | Database backup/restore |

# 4. Frontend Architecture

The frontend is built with React 19 and uses Shadcn/UI components based on Radix primitives. It follows a page-based structure with shared context providers for theme and notifications.

### *Key Frontend Dependencies:*

| Package | Purpose |
|---|---|
| react / react-dom | UI Framework (v19) |
| react-router-dom | Client-side routing |
| axios | HTTP client for API calls |
| @radix-ui/* | Shadcn UI primitives |
| tailwindcss | Utility-first CSS |
| lucide-react | Icon library |
| recharts | Charts and graphs |
| sonner | Toast notifications |
| @azure/msal-react | Microsoft SSO |
| date-fns | Date utilities |
| zod | Schema validation |

# 5. Database Schema

MongoDB is used as the primary database. Below are the main collections and their purposes.

| Collection | Description | Key Fields |
|---|---|---|
| users | User accounts | id, email, name, pan_number, role |
| clients | Clients & Vendors | id, name, pan_number, otc_ucc, is_vendor |
| stocks | Stock/Security master | id, symbol, name, isin_number, face_value |
| bookings | Share bookings | id, booking_number, client_id, stock_id, quantity, status |
| purchases | Purchase orders | id, po_number, vendor_id, stock_id, quantity |
| inventory | Stock inventory | id, stock_id, available_qty, total_value |
| referral_partners | RP records | id, rp_code, name, pan_number, bank_details |
| rp_payments | RP commissions | id, booking_id, rp_id, amount, status |
| employee_commissions | Employee share | id, booking_id, employee_id, amount |
| refund_requests | Client refunds | id, booking_id, amount, status |
| notifications | Real-time alerts | id, user_id, message, read, created_at |
| audit_logs | Activity trail | id, action, entity_type, user_id, created_at |
| email_logs | Email history | id, to_email, subject, status, template_key |
| email_templates | Email templates | key, subject, body, is_active |
| email_config | SMTP settings | smtp_host, smtp_port, smtp_username |

## 6. User Roles & Permissions

| Role ID | Name | Access Level |
|---|---|---|
| 1 | PE Desk | Super Admin - Full system access |
| 2 | PE Manager | Admin - Most features except system config |
| 3 | Compliance | Compliance oversight and approvals |
| 4 | Employee | Create bookings, clients, RPs |
| 5 | Viewer | Read-only access |
| 6 | Client | External - Booking confirmation only |
| 7 | Finance | Finance dashboard, payments, refunds |

# 7. API Documentation

Base URL: All endpoints are prefixed with /api
Authentication: Bearer token (JWT) in Authorization header
Content-Type: application/json

## 7.1 Bookings

| Method | Endpoint | Description |
|---|---|---|
| GET | `/api/bookings/check-client-rp-conflict/{cl...` | Check Client Rp Conflict |
| POST | `/api/bookings` | Create Booking |
| GET | `/api/bookings` | Get Bookings |
| PUT | `/api/bookings/{booking_id}/approve` | Approve Booking |
| PUT | `/api/bookings/{booking_id}/void` | Void Booking |
| GET | `/api/bookings/{booking_id}` | Get Booking |

## 7.2 Clients

| Method | Endpoint | Description |
|---|---|---|
| POST | `/api/clients` | Create Client |
| GET | `/api/clients` | Get Clients |
| GET | `/api/clients/pending-approval` | Get Pending Clients |
| GET | `/api/clients/{client_id}` | Get Client |
| PUT | `/api/clients/{client_id}` | Update Client |
| DELETE | `/api/clients/{client_id}` | Delete Client |
| PUT | `/api/clients/{client_id}/approve` | Approve Client |
| PUT | `/api/clients/{client_id}/suspend` | Suspend Client |
| PUT | `/api/clients/{client_id}/unsuspend` | Unsuspend Client |

## 7.3 Database Management

| Method | Endpoint | Description |
|---|---|---|
| GET | `/api/database/backups` | List Backups |
| POST | `/api/database/backups` | Create Backup |
| GET | `/api/database/backups/{backup_id}` | Get Backup Details |
| DELETE | `/api/database/backups/{backup_id}` | Delete Backup |
| POST | `/api/database/restore` | Restore Database |
| GET | `/api/database/stats` | Get Database Stats |
| DELETE | `/api/database/clear` | Clear Database |
| GET | `/api/database/backups/{backup_id}/download` | Download Backup |
| POST | `/api/database/restore-from-file` | Restore From File |

## 7.4 Email Logs

| Method | Endpoint | Description |
|---|---|---|
| GET | `/api/email-logs` | Get Email Logs |
| GET | `/api/email-logs/stats` | Get Email Log Stats |
| GET | `/api/email-logs/{log_id}` | Get Email Log Detail |
| GET | `/api/email-logs/by-entity/{entity_type}/{e...` | Get Emails By Entity |
| DELETE | `/api/email-logs/cleanup` | Cleanup Old Email Logs |

## 7.5 Finance

| Method | Endpoint | Description |
|---|---|---|
| GET | `/api/finance/payments` | Get All Payments |
| GET | `/api/finance/summary` | Get Finance Summary |
| GET | `/api/finance/rp-payments` | Get Rp Payments |
| GET | `/api/finance/rp-payments/summary` | Get Rp Payments Summary |
| PUT | `/api/finance/rp-payments/{payment_id}` | Update Rp Payment |
| GET | `/api/finance/employee-commissions` | Get Employee Commissions |
| GET | `/api/finance/employee-commissions/summary` | Get Employee Commissions Summary |
| PUT | `/api/finance/employee-commissions/{booking...` | Mark Commission Paid |

## 7.6 Other

| Method | Endpoint | Description |
|---|---|---|
| PUT | `/api/bookings/{booking_id}` | Update Booking |
| DELETE | `/api/bookings/{booking_id}` | Delete Booking |
| POST | `/api/clients/{client_id}/bank-account` | Add Bank Account |
| PUT | `/api/clients/{client_id}/employee-mapping` | Update Client Employee Mapping |
| GET | `/api/finance/refund-requests` | Get Refund Requests |
| GET | `/api/finance/refund-requests/{request_id}` | Get Refund Request |
| PUT | `/api/finance/refund-requests/{request_id}` | Update Refund Request |
| PUT | `/api/finance/refund-requests/{request_id}/...` | Update Refund Bank Details |
| GET | `/api/finance/export/excel` | Export Finance Excel |
| GET | `/api/email-templates` | Get Email Templates |
| GET | `/api/email-templates/{template_key}` | Get Email Template |
| PUT | `/api/email-templates/{template_key}` | Update Email Template |
| POST | `/api/email-templates/{template_key}/reset` | Reset Email Template |
| POST | `/api/email-templates/{template_key}/preview` | Preview Email Template |
| POST | `/api/stocks` | Create Stock |
| GET | `/api/stocks` | Get Stocks |
| GET | `/api/stocks/{stock_id}` | Get Stock |

| | | |
|---|---|---|
| PUT | `/api/stocks/{stock_id}` | Update Stock |
| DELETE | `/api/stocks/{stock_id}` | Delete Stock |
| POST | `/api/stocks/bulk-upload` | Bulk Upload Stocks |
| GET | `/api/inventory` | Get Inventory |
| GET | `/api/inventory/{stock_id}` | Get Stock Inventory |
| DELETE | `/api/inventory/{stock_id}` | Delete Inventory |
| POST | `/api/corporate-actions` | Create Corporate Action |
| GET | `/api/corporate-actions` | Get Corporate Actions |
| DELETE | `/api/corporate-actions/{action_id}` | Delete Corporate Action |
| GET | `/api/users` | Get Users |
| PUT | `/api/users/{user_id}/role` | Update User Role |
| GET | `/api/analytics/summary` | Get Analytics Summary |
| GET | `/api/analytics/stock-performance` | Get Stock Performance |
| GET | `/api/analytics/employee-performance` | Get Employee Performance |
| GET | `/api/analytics/sector-distribution` | Get Sector Distribution |
| GET | `/api/analytics/daily-trend` | Get Daily Trend |
| GET | `/api/audit-logs` | Get Audit Logs |
| GET | `/api/audit-logs/stats` | Get Audit Stats |
| GET | `/api/dashboard/stats` | Get Dashboard Stats |
| GET | `/api/dashboard/analytics` | Get Dashboard Analytics |
| POST | `/api/purchases` | Create Purchase |
| GET | `/api/purchases` | Get Purchases |
| GET | `/api/purchases/{purchase_id}/payments` | Get Purchase Payments |
| POST | `/api/purchases/{purchase_id}/payments` | Add Purchase Payment |
| DELETE | `/api/purchases/{purchase_id}` | Delete Purchase |
| GET | `/api/reports/pnl` | Get Pnl Report |
| GET | `/api/reports/export/excel` | Export Excel |
| GET | `/api/reports/export/pdf` | Export Pdf |
| POST | `/api/auth/register` | Register |
| POST | `/api/auth/login` | Login |
| GET | `/api/auth/me` | Get Me |
| POST | `/api/auth/change-password` | Change Password |
| GET | `/api/auth/sso/config` | Get Sso Config |
| POST | `/api/auth/sso/login` | Sso Login |
| POST | `/api/auth/forgot-password` | Forgot Password |
| POST | `/api/auth/reset-password` | Reset Password |
| POST | `/api/clients/{client_id}/documents` | Upload Client Document |
| GET | `/api/clients/{client_id}/documents/{filename}` | Download Client Document |
| POST | `/api/ocr/preview` | Ocr Preview |

| | | |
|---|---|---|
| GET | `/api/clients/{client_id}/documents/{filena...` | Get Document Ocr |
| GET | `/api/employees` | Get Employees |
| POST | `/api/clients/bulk-upload` | Bulk Upload Clients |
| POST | `/api/clients/{client_id}/clone` | Clone Client Vendor |
| PUT | `/api/corporate-actions/{action_id}/apply` | Apply Corporate Action |
| GET | `/api/booking-confirm/{booking_id}/{token}/...` | Client Confirm Booking Get |
| POST | `/api/booking-confirm/{booking_id}/{token}/...` | Client Confirm Booking Post |
| PUT | `/api/bookings/{booking_id}/approve-loss` | Approve Loss Booking |
| GET | `/api/bookings/pending-loss-approval` | Get Pending Loss Bookings |
| GET | `/api/bookings/pending-approval` | Get Pending Bookings |
| GET | `/api/bookings-export` | Export Bookings |
| POST | `/api/bookings/{booking_id}/payments` | Add Payment Tranche |
| GET | `/api/bookings/{booking_id}/payments` | Get Booking Payments |
| POST | `/api/bookings/{booking_id}/insider-form` | Upload Insider Form |
| GET | `/api/bookings/{booking_id}/insider-form` | Download Insider Form |
| DELETE | `/api/bookings/{booking_id}/payments/{tranc...` | Delete Payment Tranche |
| GET | `/api/dp-transfer-report` | Get Dp Transfer Report |
| GET | `/api/dp-transfer-report/export` | Export Dp Transfer Report |
| PUT | `/api/bookings/{booking_id}/confirm-transfer` | Confirm Stock Transfer |
| POST | `/api/bookings/bulk-upload` | Bulk Upload Bookings |
| GET | `/api/clients/{client_id}/portfolio` | Get Client Portfolio |
| GET | `/api/notifications` | Get Notifications |
| GET | `/api/notifications/unread-count` | Get Unread Count |
| PUT | `/api/notifications/{notification_id}/read` | Mark Notification Read |
| PUT | `/api/notifications/read-all` | Mark All Notifications Read |
| POST | `/api/payments/upload-proof` | Upload Payment Proof |

## 7.7 Referral Partners

| Method | Endpoint | Description |
|---|---|---|
| POST | `/api/referral-partners` | Create Referral Partner |
| GET | `/api/referral-partners` | Get Referral Partners |
| GET | `/api/referral-partners/{rp_id}` | Get Referral Partner |
| PUT | `/api/referral-partners/{rp_id}` | Update Referral Partner |
| POST | `/api/referral-partners/{rp_id}/documents` | Upload Rp Documents |
| PUT | `/api/referral-partners/{rp_id}/toggle-active` | Toggle Rp Active |
| GET | `/api/referral-partners/{rp_id}/bookings` | Get Rp Bookings |
| GET | `/api/referral-partners-pending` | Get Pending Referral Partners |
| GET | `/api/referral-partners-approved` | Get Approved Referral Partners |
| PUT | `/api/referral-partners/{rp_id}/approve` | Approve Referral Partner |

### 7.8 Reports

| Method | Endpoint | Description |
|---|---|---|
| GET | `/api/reports/client-portfolio/{client_id}` | Get Client Portfolio |

### 7.9 SMTP Configuration

| Method | Endpoint | Description |
|---|---|---|
| GET | `/api/smtp-config` | Get Smtp Config |
| PUT | `/api/smtp-config` | Update Smtp Config |
| POST | `/api/smtp-config/test` | Test Smtp Connection |
| GET | `/api/smtp-config/presets` | Get Smtp Presets |

### 7.10 Users

| Method | Endpoint | Description |
|---|---|---|
| POST | `/api/users` | Create User |
| PUT | `/api/users/{user_id}` | Update User |
| DELETE | `/api/users/{user_id}` | Delete User |
| POST | `/api/users/{user_id}/reset-password` | Reset User Password |
| GET | `/api/users/hierarchy` | Get User Hierarchy |
| PUT | `/api/users/{user_id}/assign-manager` | Assign Manager |
| GET | `/api/users/{user_id}/subordinates` | Get Subordinates |
| GET | `/api/users/managers-list` | Get Managers List |

## 8. Third-Party Integrations

| Service | Status | Purpose | Configuration |
|---|---|---|---|
| OpenAI (Emergent Key) | Active | Document OCR | Uses Emergent LLM Key |
| Microsoft Azure AD | Ready | SSO Login | Requires AZURE_TENANT_ID, AZURE_CLIENT_ID |
| SMTP Email | Configurable | Email notifications | Configurable via UI |
| Stripe | Available | Payment processing | API key in environment |

## 9. Security Features

• JWT-based authentication with configurable expiry

• Password hashing using bcrypt

• Role-based access control (RBAC) with 7 permission levels

• Microsoft Azure AD Single Sign-On support

• OTP-based password reset with rate limiting

• PAN number validation and uniqueness enforcement

• Entity separation rules (Client ≠ RP ≠ Employee)

• Comprehensive audit logging for all actions

• Email audit trail for compliance

• CORS configuration for API security

• Input validation using Pydantic models

— End of Documentation —