Systems & Modules

1. User Management System

- *Functions: Registration, Authentication, Profile Management, Role-Based Access Control (RBAC).*
- *Interacts With: Every other system.*

2. Entity & Workflow Management System

- *Functions:*
    - *Entity Management: A unified CRUD engine for managing data models like:*
        - *Amenities/Services Catalog*
        - *Support Tickets*
        - *Vendor Profiles & Contracts*
        - *Society Assets & Inventory*
    - *Workflow Engine: Allows designers to attach custom workflows to any entity (e.g., `Ticket->Assign->Execute->Verify->Close`, `VendorOnboarding->Approve->SignContract->Activate`, `AssetMaintenance->Schedule->Perform->Inspect`).*
    - *Status Tracking & Escalations: A universal capability for all workflows.*
- *Interacts With: Booking System (for amenity data), Billing System (for vendor payout info, service charges), Payment System (to trigger payouts upon workflow completion), Communication Service.*

3. Booking & Service Management System

- *Functions: Display Real-time Availability, Process Bookings, Check Conflicts, Send Confirmations, Integrate with Calendar.*
- *Interacts With: Entity & Workflow System (gets amenity catalog, vendor details, creates service request tickets), Billing System (to generate invoices for bookings), Communication Service.*

4. Billing & Reporting System

- *Functions: Auto-generate Maintenance Bills; Create Invoices for Ad-hoc Services/Bookings; Handle Late Fees; Generate Financial Reports (Collections, Dues, Vendor Payouts); Export Data.*

- *Interacts With: Entity & Workflow System (to get vendor payment details, service records), Payment System (to request payment execution and receive confirmation).*

5. Payment Management System

- *Functions: Integrate with Payment Gateways (Razorpay, Stripe), Manage Payouts to Vendors, Handle Refunds, Generate Payment Receipts, Reconcile Transactions.*
- *Interacts With: Billing System (receives invoice-to-pay requests, confirms successful/failed payments).*

6. Visitor Management System

- *Functions: Pre-register Visitors, Generate QR/OTP, Log Entry/Exit, Notify Security & Resident, Vehicle Management.*
- *Interacts With: User Management (to verify resident identity), Communication Service (for all notifications).*

7. Communication Service

- *Functions: Send In-App Alerts, SMS, Emails; Manage Broadcasts; Power in-app Chat/Forum.*
- *Interacts With: All systems require it to talk to users.*

8. OneClick Help Bot (Chatbot)

- *Functions: Answer FAQs by querying the Entity & Workflow System (for rules, amenity info), Guide users to log tickets (by calling the E&W System API), Provide Status Updates (from the E&W System's workflows).*
- *Interacts With: Entity & Workflow System, Booking System.*

Core Entities & Actors

Actor/Entity	Description & Attributes	Key Relations
User (Base Class)	A generic user profile with common attributes. (ID,	Is extended by all specific user types. Linked to

	Name, Phone, Email, Hashed Password, Profile Pic, Address)	Communication, Auth, and Payment systems.
Apartment Owner (Extends User)	The legal owner of an apartment unit.	Linked to Apartment Unit, Billing System (maintenance), Forum Posts.
Tenant (Extends User)	A resident leasing an apartment unit. Attributes: Lease Start/End Date, Emergency Contact.	Linked to an Apartment Unit (via lease), Owner. Permissions can be controlled by the Owner.
Resident	A logical entity representing anyone living in a unit (either an Owner or an active Tenant).	Used for permissions to amenities, notifications for the unit, etc.
RWA Committee Member (Extends User)	An elected representative. Attributes: Role (President, Treasurer, etc.), Tenure.	Has elevated permissions for Approval Workflows, Financial Reporting, and Admin Oversight.
Vendor / Service Partner (Extends User)	B2B Partner (e.g., Grocery, Electrician, Plumber). Attributes: Company Name, GSTIN, Service Category, Description, Ratings, Contract Terms.	Linked to Services, Bookings, Payment System (to receive payments).

Employee (Extends User)	Staff employed by the RWA (e.g., Security Guard, Plumber, Gardener). Attributes: Employee ID, Salary, Shift.	Managed by Asset Mgmt (if assigned tools), Work Order System.
Domestic Help (Temporary) (Extends User)	Maids, cooks, drivers. Attributes: Aadhaar/ID details, Police Verification Status, Regular Visits Schedule.	Managed by Visitor Mgmt (for daily entry), often linked to a specific Vendor or Family.
Visitor	Anyone visiting a resident. Attributes: Name, Phone, Vehicle Number, Visit Purpose, Expected Duration.	Core entity for the Visitor Management System. Linked to a Resident as the host.
Apartment Complex	The entire society. Attributes: Name, Address, Total Towers, Total Floors, Amenities list.	The root entity. Contains all Towers, Units, Amenities.
Tower/Block	A building within the complex. Attributes: Tower Name/Number, Floors.	Child of Apartment Complex, parent of Apartment Unit.
Apartment Unit	An individual apartment. Attributes: Unit Number	Linked to an Owner and a Tenant (if rented). Source of all unit-specific Billing.

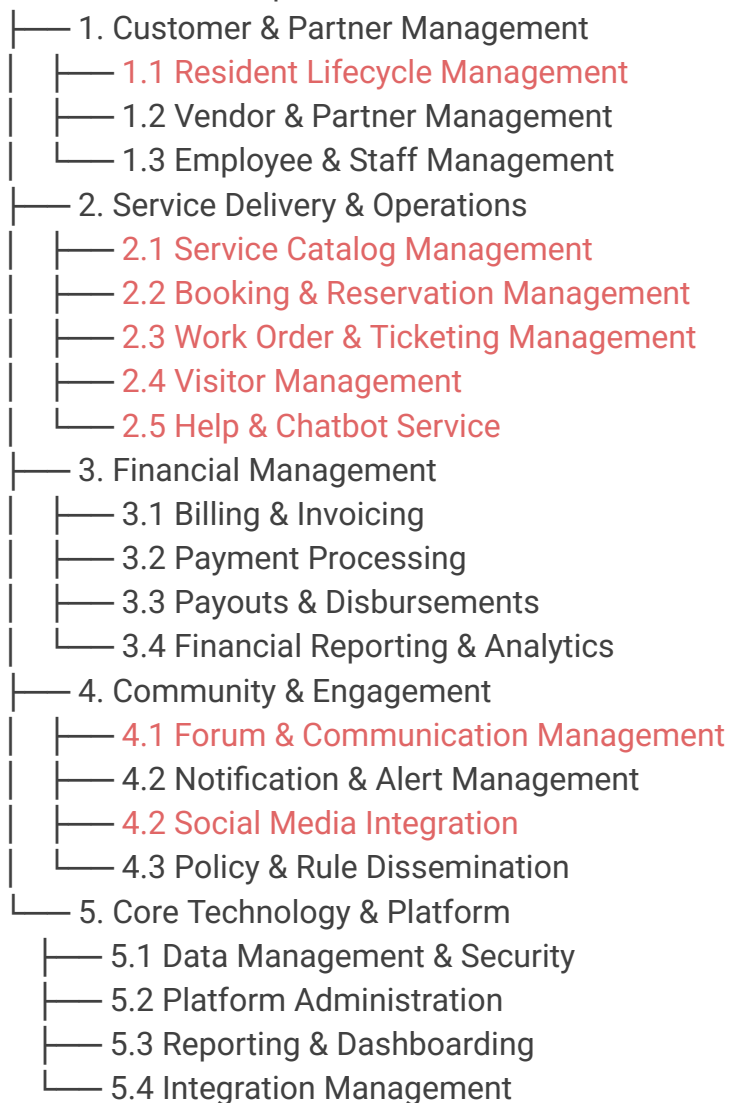|		
	(e.g., 101), Floor Area, Type (2BHK, 3BHK).	
Amenity	A bookable facility within the complex (e.g., Pool, Gym, Clubhouse, Badminton Court). Attributes: Name, Description, Capacity, Booking Rules, Slots, Fees.	Managed by Booking System.
Service	An offering, either by internal staff or an external vendor (e.g., Plumbing, Cleaning, Dog Walking, Gourmet Meal). Attributes: Name, Category, Description, Price, SLA.	Linked to Vendor or Employee. Requested via Booking/Service Mgmt.
Ticket/Complaint	A logged issue or request by a resident. Attributes: Title, Description, Category, Priority, Status (Open, In Progress, Resolved, Closed), Feedback.	Core entity of the Customer Support System.
Work Order	A specific task generated from a Ticket or directly. Assigns a task to a Vendor	Part of the Workflow Management System.

	or Employee. Attributes: Instructions, Deadline, Cost Estimates.	
Bill/Invoice	A request for payment. Attributes: Bill ID, Generation Date, Due Date, Period, Line Items, Taxes, Total Amount, Status (Pending, Paid, Overdue).	Core entity of the Billing & Reporting System. Can be for maintenance, amenity use, or ad-hoc services.
Payment Transaction	A record of a financial transaction. Attributes: Transaction ID, Amount, Timestamp, Payment Method (UPI, Card, Net Banking), Status (Success, Failed).	Managed by the Payment Management System. Linked to a Bill.
Forum Post	A message in a community discussion. Attributes: Title, Content, Category (Announcement, Discussion, Complaint), Comments.	Part of the Communication System.
Notification	An alert or message. Attributes: Title, Body, Timestamp, Type (Push,	Core entity of the Communication System.

SMS, Email), Recipient(s),
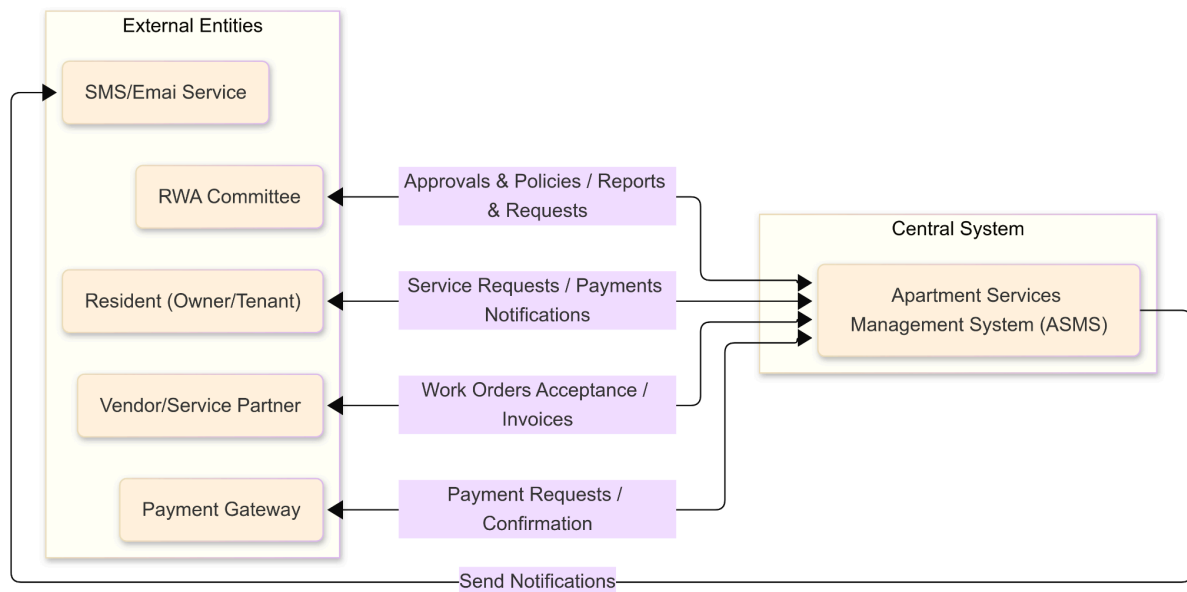
Status (Unread, Read).

Business Capability Diagram

As a startup, our strategy is to win on customer experience. Therefore, we must invest heavily in highlighted capabilities, i.e.

```
ASMS Business Capabilities
├── 1. Customer & Partner Management
│   ├── 1.1 Resident Lifecycle Management
│   ├── 1.2 Vendor & Partner Management
│   └── 1.3 Employee & Staff Management
├── 2. Service Delivery & Operations
│   ├── 2.1 Service Catalog Management
│   ├── 2.2 Booking & Reservation Management
│   ├── 2.3 Work Order & Ticketing Management
│   ├── 2.4 Visitor Management
│   └── 2.5 Help & Chatbot Service
├── 3. Financial Management
│   ├── 3.1 Billing & Invoicing
│   ├── 3.2 Payment Processing
│   ├── 3.3 Payouts & Disbursements
│   └── 3.4 Financial Reporting & Analytics
├── 4. Community & Engagement
│   ├── 4.1 Forum & Communication Management
│   ├── 4.2 Notification & Alert Management
│   ├── 4.2 Social Media Integration
│   └── 4.3 Policy & Rule Dissemination
└── 5. Core Technology & Platform
    ├── 5.1 Data Management & Security
    ├── 5.2 Platform Administration
    ├── 5.3 Reporting & Dashboarding
    └── 5.4 Integration Management
```

Business Context Diagram

Key Interactions Explained:

Flow	Interaction Description
1, 2, 3, 4, 5	The Resident interacts with the ASMS for all core services: booking amenities, making payments, logging complaints, registering visitors, and community engagement.
6, 7, 8	The Vendor/Partner receives work orders, submits invoices for payment, and updates their service catalog. The ASMS also sends them performance ratings.
9	The Payment Gateway is a critical two-way integration for processing payments from residents and sending payouts to vendors.

| 10, 11	The RWA Committee uses the system to approve decisions and set policies, while the system provides them with financial reports and operational dashboards.
12	The SMS/Email Service is a one-way conduit used by the ASMS to push out notifications and alerts to users.
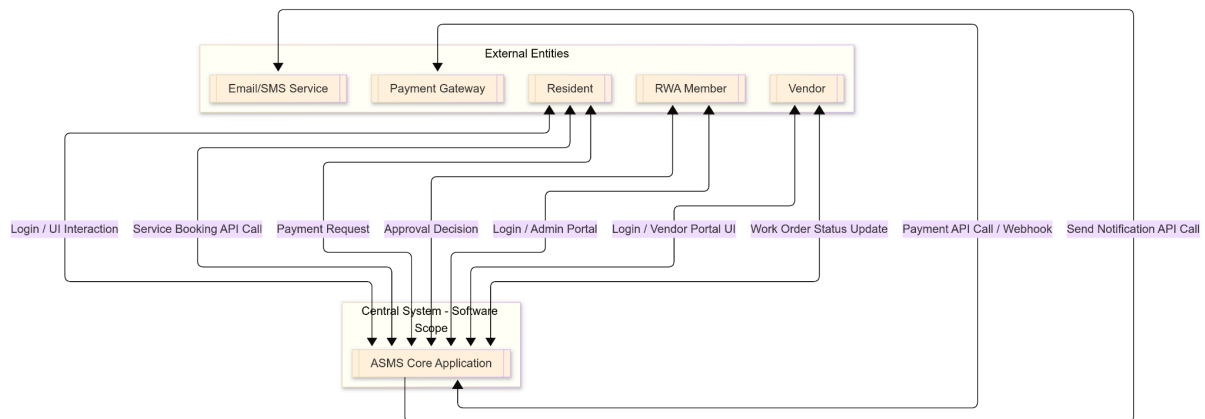
System Context Diagram

External Entities & Data Flows:

1. Resident (Actor)
   - To ASMS: Login Credentials, Service Booking JSON, Payment Details, Complaint Message, Visitor Registration Data.
   - From ASMS: HTML Pages (UI), Booking Confirmation JSON, Receipt PDF, Notification Data.
2. Vendor (Actor)
   - To ASMS: Login Credentials, Service Catalog Update API Call, Work Order Status Update.
   - From ASMS: Work Order API Response, Payout Details, Performance Dashboard.
3. Payment Gateway (External System)

- To ASMS: Payment Confirmation Webhook, Transaction Status API Response.
- From ASMS: Payment Request API Call, Payout Request API Call.
4. Email/SMS Service (External System)
    - From ASMS: Send Notification API Call (with recipient and message content). *(This is typically a one-way flow)*.
5. RWA Committee Member (Actor)
    - To ASMS: Login Credentials, Approval Decision, Policy Configuration Data.
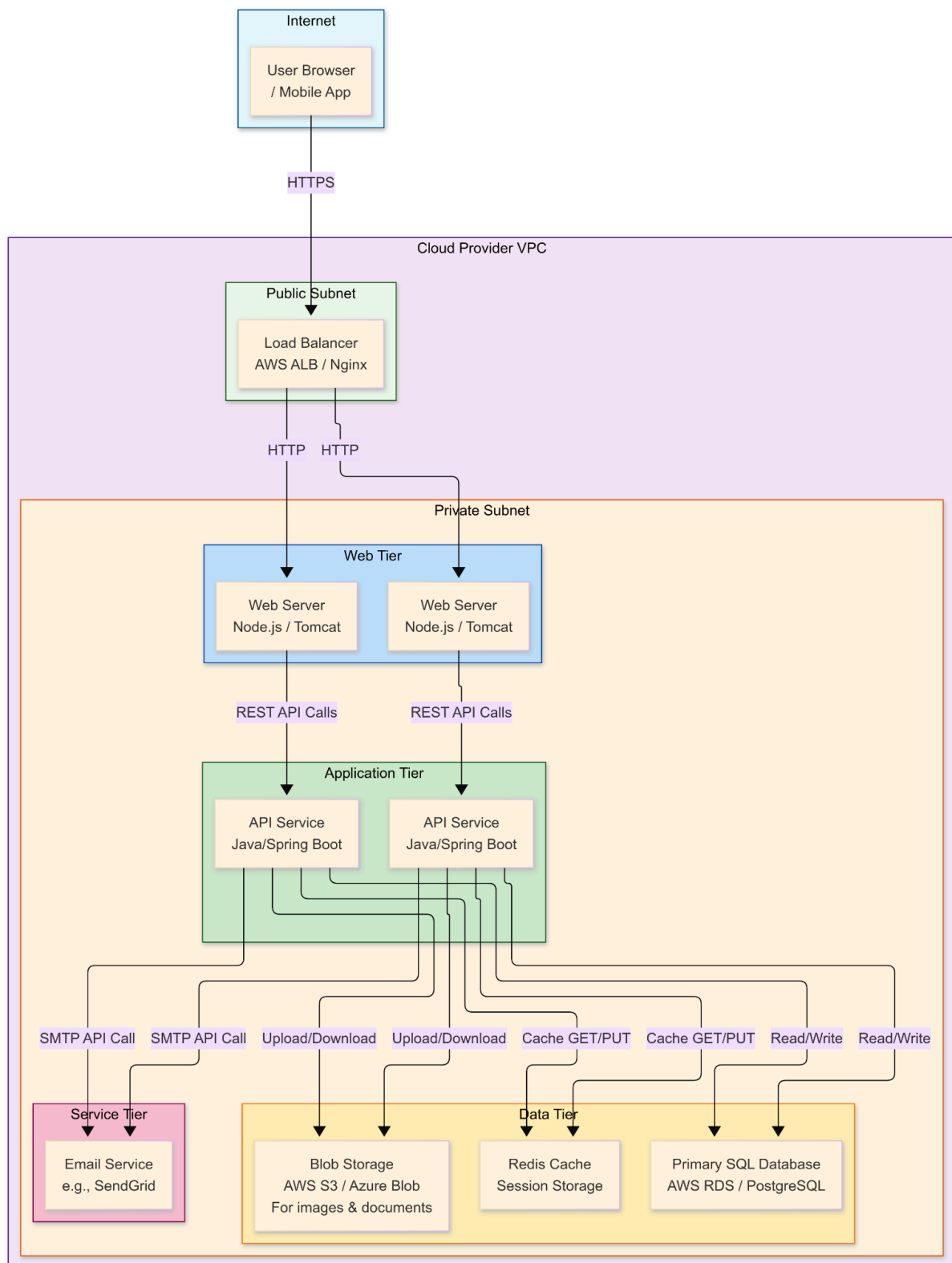   - From ASMS: Financial Report PDF, Dashboard Data, Approval Request Alert.

Logical Application Architecture (Layered) View
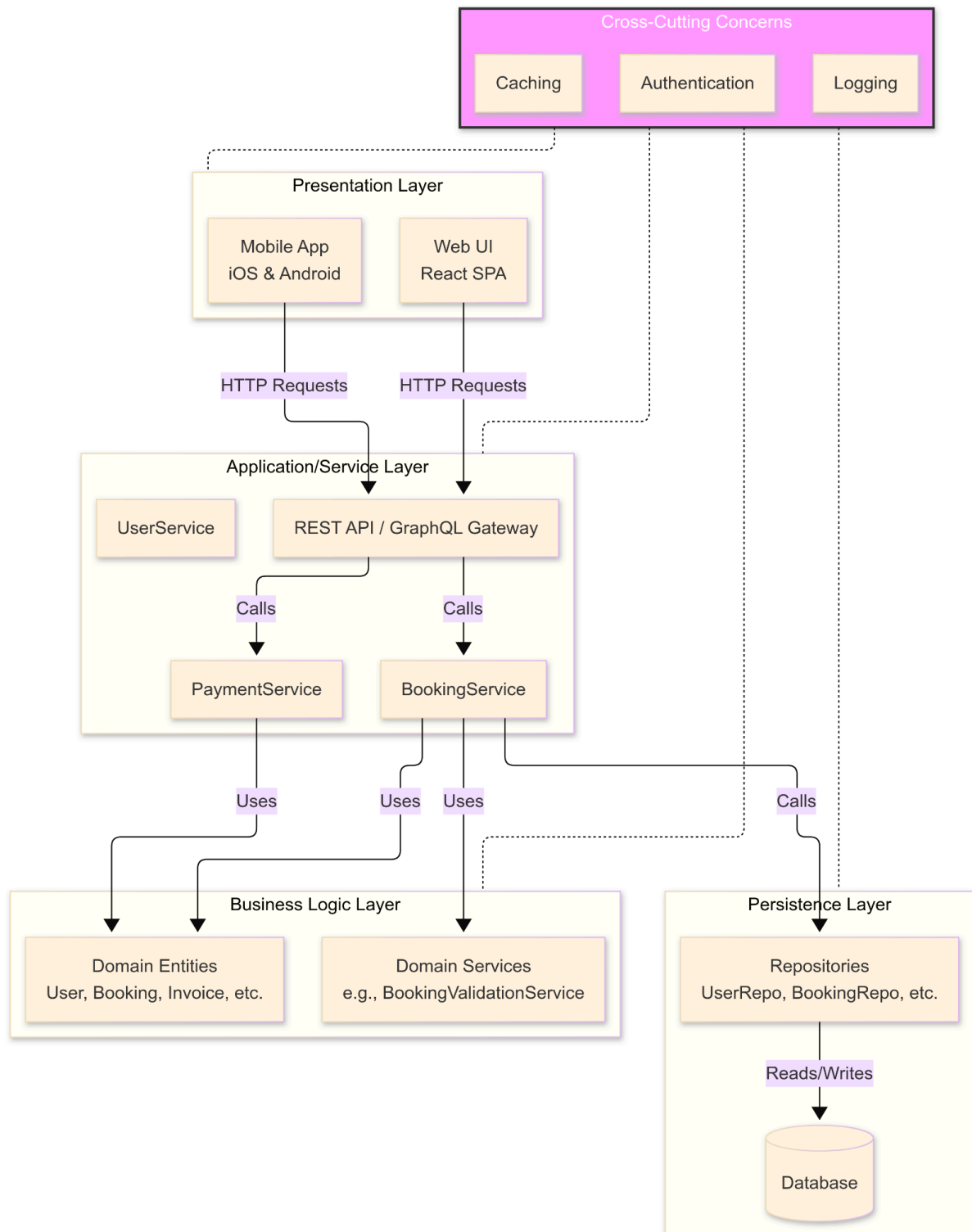
Key Data Flow for a Use Case: "A Resident Books a Gym Session"

1. Presentation Layer: The resident clicks "Book Now" on the Gym page in the React web app. The app gathers the data (time slot, user ID) and sends an HTTP POST request to `/api/bookings`.
2. Application Layer: The `BookingController` receives the request. It calls the `BookingService.createBooking()` method.
3. Business Logic Layer: The `BookingService`:
   ○ Uses the `User` and `Amenity` entities to validate the request.
   ○ Executes business rules (e.g., "is the resident's maintenance fee paid?", "is the time slot available?").
   ○ Creates a new `Booking` domain object.
4. Persistence Layer: The `BookingService` calls the `BookingRepository.save(booking)` method. The repository translates the `Booking` object into an SQL query and saves it to the database.
5. Return Journey: The generated booking confirmation travels back up the layers (Repository -> BookingService -> Controller) and is returned as a JSON response to the Presentation Layer, which then displays a success message to the resident.

Physical Deployment View

Internet
User Browser / Mobile App

HTTPS

Cloud Provider VPC

Public Subnet
Load Balancer
AWS ALB / Nginx

HTTP   HTTP

Private Subnet

Web Tier
Web Server
Node.js / Tomcat

Web Server
Node.js / Tomcat

REST API Calls   REST API Calls

Application Tier
API Service
Java/Spring Boot

API Service
Java/Spring Boot

SMTP API Call   SMTP API Call   Upload/Download   Upload/Download   Cache GET/PUT   Cache GET/PUT   Read/Write   Read/Write

Service Tier
Email Service
e.g., SendGrid

Data Tier
Blob Storage
AWS S3 / Azure Blob
For images & documents

Redis Cache
Session Storage

Primary SQL Database
AWS RDS / PostgreSQL

Core Components of a Deployment Diagram:

1. Node: A physical or virtual computational resource. Represented as 3D boxes.

- - Device: A physical hardware node (e.g., a mobile phone, a server, a sensor).
  - Execution Environment: A software node that hosts other software (e.g., a `web server`, a `database server`, a `Docker container`, a `JVM`).
2. Artifact: A tangible piece of software deployed on a node. Represented as rectangles with the `«artifact»` stereotype.
   - Examples: `«executable»`, `«library»`, `«config file»`, `«docker image»`.
3. Communication Path: A connection between nodes, indicating they can exchange signals or data (e.g., HTTP, TCP/IP, messaging queue). Represented as a solid line.
4. Deployment: The relationship that shows which artifact is deployed on which node. Represented as a dashed line with an arrow and the `«deploy»` stereotype.

Service Level Agreement

1. B2C (Residents: Owners & Tenants) SLA

This agreement covers the experience of individual residents using the platform for daily activities.

Service Credit: For any SLA breach, residents will receive a service credit applied to their next maintenance bill (e.g., 5% off for a minor breach, up to a full month's platform fee waiver for a severe outage).

Service Component	SLA Metric	Target Performance	Measurement & Exclusions	Consequence / Penalty
Platform Availability	Uptime	99.9% monthly availability for core services (login,	Measured server-side by minute. Excludes Scheduled	Credit: 10% of monthly platform fee for every hour of downtime

		dashboard, payments, booking).	Maintenance (< 4 hrs/month, announced 72 hrs prior) and Force Majeure.	beyond the 99.9% threshold.
Critical API Response Time	Latency	95% of requests respond in < 2 seconds (p95). APIs: Login, Payment Processing, Booking Creation.	Measured from load balancer to response. Excludes external gateway delays (e.g., bank redirects).	N/A (Handled by overall availability credit). Recurring performance issues trigger a dedicated performance review and remediation plan.
Ticket Resolution	Resoluti on Time	Priority 1 (Critical): < 4 hours (e.g., no water, power outage). Priority 2 (Major): < 24 hours (e.g., AC failure, plumbing leak).	The clock starts when the resident submits a correctly logged ticket. Resolution is defined as a vendor being dispatched and the resident notified.	Credit: 20% of the cost of the related service for each 24-hour period the resolution time is missed.

		Priority 3 (Minor): < 72 hours (e.g., dripping tap, peeling paint).		
Payment Processing	Success & Security	99.95% success rate for payment gateway integration. 100% commitment to PCI-DSS compliance.	Success rate measured by transaction confirmation.	For a payment failure caused by ASMS, we will expedite the transaction at no extra charge and apply a ₹100 credit for the inconvenience.
Notification System	Delivery Latency	99% of system-generated alerts (visitor approvals, urgent announcements) are delivered to the user's device within 60 seconds.	Measured from triggering event to receipt by push notification service (e.g., FCM/APNS).	N/A. However, a root cause analysis is initiated if latency exceeds targets consistently.

2. B2B (Service Partners & Vendors) SLA

This agreement covers the experience of businesses and professionals providing services through our platform. The consequences are more severe as their livelihood depends on the platform's reliability.

Service Credit: For any SLA breach, partners will receive a service credit on their platform commission fees (e.g., 10% credit for a breach, up to 100% credit for a severe outage).

Service Component	SLA Metric	Target Performance	Measurement & Exclusions	Consequence / Penalty
Partner Portal & API Uptime	Uptime	99.95% monthly availability for order management, payout, and profile modules.	Measured server-side by minute. Excludes Scheduled Maintenance.	Credit: 15% of monthly commission for every hour of downtime beyond the 99.95% threshold.
Work Order Assignment Latency	Latency	99% of new work orders are pushed to the vendor's app/portal within	Measured from resident confirmation to arrival in the partner's queue.	For each missed assignment, if it leads to a customer complaint, the

		5 minutes of resident booking.		partner's commission for that job is reduced by 50%.
Payout Processing	Timeliness	Approved payments will be processed and initiated within 7 business days of job completion and resident approval.	Clock starts when all conditions for payout are met (job completed, resident rated).	For every 24-hour delay in initiation beyond 7 days, ASMS will pay a penalty of 0.5% of the payout amount to the vendor.
Partner Support Response	Response Time	First response to partner-submitted critical tickets (e.g., "cannot access app") within 2 business hours.	Measured during business hours (9 AM - 6 PM, Mon-Sat).	N/A. Recurring failures will be reviewed with the account manager to improve support channels.
Profile & Listing Availability	Data Uptime	Vendor service listings and profiles will be 100% visible and searchable on the platform.	Excludes temporary removal for policy violations under review.	If a listing is incorrectly hidden due to an ASMS error for more than 4 hours, ASMS will

provide a ₹500 credit and feature the service prominently for a week.

General Terms & Conditions for All SLAs

1. Claim Process: To receive a service credit, the customer (B2C Resident or B2B Partner) must submit a claim via email to sla-claims@asms.com within 30 days of the incident. The claim must include specific details: date, time, description of the issue, and relevant ticket/transaction numbers.
2. Maximum Credit: The total service credits issued in a single billing month shall not exceed 50% of the monthly platform access fee for that customer.
3. Sole Remedy: The service credits outlined herein are the sole and exclusive remedy for any failure to meet the obligations set forth in this SLA.
4. Force Majeure: ASMS is not liable for any failure to perform its obligations due to causes beyond its reasonable control, including but not limited to internet outages, cloud provider outages, acts of war, natural disasters, or government restrictions.
5. Review: These SLAs are subject to review and amendment on an annual basis or as the service evolves. All customers will be notified 30 days in advance of any changes.