Software Requirements Specification (SRS)

Project Title: Restaurant POS & Web Presence Platform (RPWP)
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Prepared by: Rachit Avasthi (Product Owner) & Team

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1. Introduction

1.1 Purpose

This SRS defines the requirements for building a multi-tenant SaaS that provides restaurants with a branded website/app, direct online ordering, and an integrated POS stack (billing, KOT, inventory, CRM, analytics). It targets cafés, fine-dine, QSRs, cloud kitchens, and multi-outlet franchises in India.

1.2 Scope

- **Frontend:** Client-facing website/app for each restaurant (ordering, menu, table booking) and internal dashboards (POS, KDS, Admin).

- **Backend:** Multi-tenant API, business logic, reporting, and integrations with payments, delivery aggregators, messaging, and printers.

- **Platforms:** Web (desktop/tablet/mobile PWA) + optional Android/iOS wrappers.

- **Hardware:** Works with commodity Android tablets/PCs, USB/Thermal/Bluetooth printers, barcode scanners, cash drawers.

1.3 Product Vision & Goals

- Give restaurants **full brand control** (custom domain, theme) + **0% commission direct orders**.

- Provide a **lightweight, fast POS** with offline-first capabilities.

- Offer **actionable analytics**, **inventory accuracy**, and **automated marketing** to increase repeat sales.

1.4 Stakeholders

- **Restaurant Owner (RO)**

- **Manager (RM)**

- **Staff/Waiter/Cashier (ST)**

- **Kitchen Staff (KS)**

- **Delivery Partner (DP)** (in-house)

- **Customer/Diner (CU)**

- **Platform Admin (PA)** (SaaS operator)

1.5 Definitions & Acronyms

- **POS**: Point of Sale

- **KOT**: Kitchen Order Ticket

- **KDS**: Kitchen Display System

- **SKU**: Stock Keeping Unit

- **PWA**: Progressive Web App

- **OTP**: One-Time Password

- **GST**: Goods & Services Tax (India)

- **HSM**: Hardware Security Module

2. Overall Description

2.1 System Context

RPWP is a multi-tenant SaaS. Each tenant (restaurant) has:

- A branded website/app for customers.

- A back-office (owner/manager) and POS terminals (cashier/waiter).

- Optional KDS screens in kitchen sections.

- Data lives in logically isolated schemas per tenant.

2.2 User Classes & Characteristics

- **CU:** Non-technical; expects speed, clear menus, UPI, live order tracking.

- **ST:** Needs minimal training; quick order entry and KOT printing.

- **RM/RO:** Wants inventory, pricing, offers, and outlet control.

- **KS:** Glanceable KDS, bump orders, course timing.

- **PA:** Multitenancy ops, billing, support, compliance.

2.3 Assumptions & Dependencies

- Reliable internet is not guaranteed in-store → **offline-first POS** with sync.

- Indian tax regime (GST) with HSN/SAC, e-invoicing optional for some businesses.

- Payment gateways (Razorpay/Paytm/Stripe) and messaging (WhatsApp/SMS).

- Third-party delivery integrations (Zomato/Swiggy) optional.

2.4 Constraints

- Must run on low-cost Android tablets and entry-level PCs.

- Receipt printers (58/80mm), USB/Bluetooth/TCP supported.

- Data residency: India-first hosting preferred.

- Privacy & security: PCI-DSS (for payments), ISO27001 best practices.

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3. Functional Requirements

Prioritisation: M (Must), S (Should), C (Could), W (Won't for v1).
 Traceability IDs: FR-x.y

3.1 Tenant Onboarding & Branding

- **FR-1.1 (M):** Sign-up with email/phone + OTP.

- **FR-1.2 (M):** Create restaurant profile (name, GSTIN, FSSAI, address, hours).

- **FR-1.3 (M):** Theme builder (logo, colours, fonts, hero images).

- **FR-1.4 (S):** Custom domain mapping with automated SSL via ACME.

- **FR-1.5 (S):** Template gallery (QSR, café, fine-dine, cloud kitchen).

3.2 Menu & Catalogue Management

- **FR-2.1 (M):** Categories & items with images, variants, add-ons, combos.

- **FR-2.2 (M):** Pricing by outlet; taxes (GST %), HSN/SAC mapping.

- **FR-2.3 (M):** Availability (out of stock, dayparting, seasonal).

- **FR-2.4 (S):** Allergen & dietary tags; nutrition facts.

- **FR-2.5 (C):** AI menu optimiser (popular combos, price suggestions).

3.3 Customer Website & Ordering (PWA)

- **FR-3.1 (M):** SEO-friendly menu & landing pages.

- **FR-3.2 (M):** Dine-in (QR on table), takeaway, delivery order flows.

- **FR-3.3 (M):** Cart, coupon codes, tip, address book, order tracking.

- **FR-3.4 (M):** Payments: UPI, cards, wallets; COD toggle.

- **FR-3.5 (S):** Time-slot delivery & curbside pickup.

- **FR-3.6 (S):** Google Maps delivery radius & fees tiers.

- **FR-3.7 (C):** Multi-language UI (EN + regional).

3.4 POS (Front-of-House)

- **FR-4.1 (M):** Quick order entry; table layout & merge/split bills.

- **FR-4.2 (M):** KOT printing by kitchen station; reprint; void with reason.

- **FR-4.3 (M):** Discounts (item/bill), service charge, tips.

- **FR-4.4 (M):** Multiple tenders (cash, card, UPI, vouchers).

- **FR-4.5 (S):** Offline mode with local cache & conflict-free sync.

- **FR-4.6 (S):** Hold/park order; recall; guest count & courses.

- **FR-4.7 (C):** Bill split by seat/course.

3.5 Kitchen Display System (KDS)

- **FR-5.1 (M):** Ticket view with prep timers; bump/recall.

- **FR-5.2 (S):** Course firing & expo screen; colour states.

- **FR-5.3 (C):** Sound/visual alerts; printer fallback.

3.6 Inventory & Recipe Management

- **FR-6.1 (M):** Ingredients, units, suppliers, par levels.

- **FR-6.2 (M):** Recipe BOM; auto stock deduction on sale.

- **FR-6.3 (S):** GRN, purchase orders, returns; cost of goods (COGS).

- **FR-6.4 (S):** Wastage logging; variance; stock audits.

- **FR-6.5 (C):** Batch/expiry tracking; production planning.

3.7 CRM, Loyalty & Marketing

- **FR-7.1 (M):** Customer profiles, order history, consent flags.

- **FR-7.2 (M):** Coupons (flat %, BOGO, min cart).

- **FR-7.3 (S):** Points-based loyalty; tiers; birthday/anniversary offers.

- **FR-7.4 (S):** WhatsApp/SMS/E-mail campaigns; templates & segments.

- **FR-7.5 (C):** Feedback & reviews widget; NPS.

3.8 Delivery & Integrations

- **FR-8.1 (S):** Third-party delivery (Swiggy/Zomato) order ingest (read-only at v1).

- **FR-8.2 (S):** In-house delivery app for drivers; OTP at handoff.

- **FR-8.3 (C):** Maps-ETA; route optimisation.

3.9 Payments, Billing & Taxation

- **FR-9.1 (M):** Gateways: Razorpay/Paytm/Stripe; UPI intent & collect.

- **FR-9.2 (M):** GST-compliant invoices; HSN/SAC, CGST/SGST/IGST; round-off.

- **FR-9.3 (S):** E-invoicing integration (IRP) for eligible businesses.

- **FR-9.4 (S):** Refunds, partial/ full; settlement reports.

3.10 Analytics & Reporting

- **FR-10.1 (M):** Sales dashboard (by day/hour/item/category/outlet).

- **FR-10.2 (M):** Top items, low movers, peak hours, AOV.

- **FR-10.3 (S):** Inventory valuation; COGS; GP%.

- **FR-10.4 (S):** Export CSV/PDF; scheduled e-mails/WhatsApp.

3.11 User Management & Roles

- **FR-11.1 (M):** Roles: RO, RM, ST, KS, PA with granular permissions.

- **FR-11.2 (S):** Audit logs (who did what, when).

- **FR-11.3 (C):** SSO (Google/Microsoft) for RO/RM.

3.12 Notifications

- **FR-12.1 (M):** Order status push/WhatsApp/SMS.

- **FR-12.2 (S):** Low-stock alerts; sales milestones.

3.13 Multitenancy & Billing (SaaS Operator)

- **FR-13.1 (M):** Tenant provisioning; plan limits; usage metrics.

- **FR-13.2 (M):** Subscription management; invoices; GST for SaaS.

- **FR-13.3 (S):** In-app upsell & add-on marketplace.

3.14 Content & SEO

- **FR-14.1 (M):** Pages (Home/Menu/About/Contact), blog, meta tags, sitemaps.

- **FR-14.2 (S):** Schema.org for menu, reviews, local business.

3.15 Accessibility & Localisation

- **FR-15.1 (M):** WCAG 2.1 AA for customer site.

- **FR-15.2 (S):** Multi-language content (EN/Hindi/regional) per restaurant.

3.16 Support & Helpdesk

- **FR-16.1 (S):** In-app chat; ticketing; knowledge base.

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4. Non-Functional Requirements (NFRs)

4.1 Performance & Scalability

- **NFR-1:** Customer pages TTFB < 300 ms (edge caching); P95 page load < 2.5 s on 3G.

- **NFR-2:** POS actions (add item, print KOT) P95 < 300 ms local; cloud sync within 5 s.

- **NFR-3:** Scale to 10k tenants, 50k DAU, 1k concurrent orders/minute.

4.2 Availability & Reliability

- **NFR-4:** 99.9% uptime for core APIs; POS offline mode up to 24h.

- **NFR-5:** Zero data loss on sync conflicts (CRDT/event-sourcing strategy).

4.3 Security & Compliance

- **NFR-6:** JWT/OAuth2; MFA for admin roles; RBAC enforced server-side.

- **NFR-7:** Data isolation per tenant (schema or row-level security).

- **NFR-8:** At-rest encryption (AES-256); in-transit TLS 1.2+; KMS/HSM for secrets.

- **NFR-9:** PCI-DSS scope minimised (tokenised payments only); GDPR/DPDP readiness; data retention policy.

4.4 Maintainability & Observability

- **NFR-10:** 80% unit test coverage of domain logic; CI/CD with blue-green deploys.

- **NFR-11:** Centralised logs, metrics, traces; SLOs & alerts (error rate, latency, dropped syncs).

4.5 Usability

- **NFR-12:** POS operable with one hand on 8-inch tablet; < 30 min training.

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5. System Architecture (High-Level)

5.1 Suggested Tech Stack

- **Frontend:** Next.js/React (PWA), React Native (optional), Tailwind, shadcn/ui.

- **POS App:** React (Electron or Tauri for desktop), React Native for Android; service worker for offline.

- **Backend:** Node.js (NestJS/Express) or Django/FastAPI; GraphQL/REST.

- **DB:** PostgreSQL (Row Level Security per tenant) + Redis (cache/queues).

- **Eventing:** Kafka/Redpanda or RabbitMQ for order/inventory events.

- **Storage:** S3-compatible (images, receipts).

- **Infra:** Vercel (web) + AWS/GCP (APIs/workers); Cloudflare CDN; Terraform/IaC.

5.2 Key Services (Microservice-friendly boundaries)

- **Identity & Tenancy**

- **Menu & Catalogue**

- **Orders & POS**

- **Inventory & Procurement**

- **Billing & Invoicing**

- **Payments**

- **CRM & Marketing**

- **Analytics & Reporting**

- **Integrations (Gateways, Delivery, WhatsApp/SMS)**

5.3 Data Model (Core Entities)

- Tenant, Outlet, Table, User, Role, Device

- MenuCategory, MenuItem, Variant, AddOn, Combo

- Order, OrderItem, KOT, Payment, Invoice, Coupon

- Customer, Address, LoyaltyPoint, Campaign, Message

- Ingredient, Recipe, StockLedger, Supplier, PurchaseOrder, GRN

- DeliveryAssignment, Driver

- WebPage, BlogPost, MediaAsset

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6. API Requirements (Representative)

Final API will be versioned (v1) and support REST + Webhooks. Sample endpoints:

- `POST /v1/auth/login`

- `POST /v1/tenants` (provision)

- `GET/POST /v1/outlets`

- `GET/POST /v1/menu/categories|items`

- `POST /v1/orders` (source: dine-in/takeaway/delivery/web)

- `POST /v1/orders/{id}/pay`

- `GET /v1/orders/stream` (SSE/WebSocket for POS/KDS)

- `POST /v1/kot`

- `POST /v1/inventory/consume`

- `POST /v1/coupons/validate`

- `POST /v1/campaigns/send` (provider=WhatsApp/SMS/Email)

- `POST /v1/integrations/razorpay/webhook`

- `POST /v1/integrations/zomato/webhook`

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7. Integrations

7.1 Payments

- Razorpay (UPI, cards), Paytm, Stripe (fallback). Webhooks for payments, refunds, settlements.

7.2 Messaging

- WhatsApp Business API provider (e.g., Gupshup/Meta BSP), SMS (Textlocal/Kaleyra), E-mail (SES/SendGrid).

7.3 Delivery

- Aggregators (read-only ingest initially), Maps (Google/Mapbox), in-house driver app (phase 2).

7.4 Printers & Peripherals

- ESC/POS printers over USB/BT/TCP; barcode scanners; cash drawers.

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8. Data & Privacy

- **Consent Management:** Marketing opt-ins per channel; purpose-specific consent.

- **PII Minimisation:** Store only necessary data; tokenise payment data.

- **Data Retention:** Orders 8 years (for GST); logs 90 days; revocable deletion for marketing data on request.

- **Backups:** Automated daily snapshots; PITR; encrypted at rest.

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9. Reporting & KPIs

- Sales by channel/outlet/waiter/hour.

- AOV, conversion rate, repeat rate, CLV.

- Inventory variance, wastage %, COGS %.

- Campaign ROI; coupon redemption.

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10. Acceptance Criteria (Samples)

- **AC-1:** A new tenant can sign up, publish a branded site on subdomain, accept UPI payments, and print KOT within 60 minutes of onboarding.

- **AC-2:** POS functions (add item → KOT → payment → invoice) complete in < 2 minutes with no network; sync reconciles when back online.

- **AC-3:** GST invoice matches configured tax rules; rounding per Indian standards.

- **AC-4:** Inventory deducts as per recipe on each sale; low-stock alerts trigger at par level.

- **AC-5:** Customer receives WhatsApp order confirmation within 10 seconds of successful payment.

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11. Test Strategy (High-Level)

- **Unit Tests:** Domain logic (orders, taxes, inventory).

- **Integration Tests:** Payments, webhooks, printer drivers (emulators).

- **E2E Tests:** Cypress/Playwright for web; scripted POS flows.

- **Load Tests:** Orders/min, POS concurrency, reporting queries.

- **UAT:** Pilot with 3–5 restaurants (QSR, café, cloud kitchen).

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12. Deployment & DevOps

- **Environments:** Dev, Staging, Prod; feature flags.

- **CI/CD:** Linting, tests, build artefacts, infra deploy (Terraform), blue-green.

- **Observability:** Centralised logs (ELK/CloudWatch), metrics (Prometheus), tracing (OTel).

- **Rollbacks:** One-click revert; DB migrations reversible.

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13. Rollout Plan (Phases)

1. **Phase 0 – MVP (8–10 weeks):** Tenant onboarding, menu, customer ordering (QR/delivery/takeaway), UPI payments, basic POS, KOT printing, basic reports.

2. **Phase 1 – Inventory & CRM (6–8 weeks):** Recipes, stock deduction, coupons, basic campaigns, WhatsApp confirmations.

3. **Phase 2 – Advanced POS & KDS (6–8 weeks):** Offline-first POS, KDS, table management, split bills.

4. **Phase 3 – Analytics & Integrations (6–8 weeks):** COGS/GP, aggregator ingest, scheduled reports, multi-language.

5. **Phase 4 – Franchise & Marketplace (ongoing):** Multi-outlet control, add-on marketplace, driver app.

14. Out of Scope (for v1)

- Aggregator order push-back (bi-directional) – read-only ingest only.

- Deep route optimisation; rider pay management.

- Full e-invoicing automation (pilot only).

- Native iOS (PWA/RN wrapper sufficient initially).

15. Risks & Mitigations

- **Printer compatibility issues:** Maintain tested hardware list; provide network print service; fall back to PDF.

- **Offline sync conflicts:** Use CRDT/event log; last-writer-wins with user prompts.

- **Regulatory changes:** Configurable tax engine; rule-driven invoices.

- **High churn of small restaurants:** Low-cost plans; concierge onboarding; fast support.

16. Pricing (Indicative for GTM)

- **Starter:** ₹999/mo/outlet – Website, direct orders, basic POS, UPI.

- **Growth:** ₹2,499/mo – Inventory, coupons, basic CRM, scheduled reports.

- **Premium:** ₹4,999/mo – Multi-outlet, advanced analytics, KDS, offline POS.

- **Setup:** ₹10,000–₹25,000 one-time (branding, domain, menu upload).

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17. Appendices

17.1 Primary Use Cases (UML-style, textual)

- **UC-01:** Customer scans table QR → browses menu → places order → pays UPI → KOT prints → KS prepares → order served → bill closed.

- **UC-02:** Owner updates prices & out-of-stock → changes reflect on site and POS in < 10 s.

- **UC-03:** New outlet added → inherits menu → overrides stock/pricing.

- **UC-04:** Low stock alert triggers → RM raises Purchase Order → GRN updates stock.

- **UC-05:** Campaign sent to segment (last 30 days buyers) → coupon redemptions tracked.

17.2 Sample Reporting Catalogue

- Daily Z-report; GST tax summary; item-wise sales; hourly heatmap; voids/discounts audit; staff performance; inventory consumption vs sales.

17.3 Accessibility Checklist

- Keyboard navigation; contrast ratios; alt text; focus states; error hints; form labels; ARIA roles.

End of Document