NexInvo

by Chinmay Technosoft Private Limited

Complete GST-Ready Invoicing SaaS Platform

Development Specification for Claude Code Implementation

# Product & Company Overview

**Product Name:** NexInvo - Next-Generation GST Invoicing Platform

**Company:** Chinmay Technosoft Private Limited

**Business Model:** Software as a Service (SaaS) platform for CA practices and SMEs

**Target Market:** Chartered Accountant firms, SMEs, and businesses requiring GST-compliant invoicing in India

**🔧 Technology Stack:** Python 3.13.5 (Django 5.x + DRF), PostgreSQL 16+, React 18+ TypeScript, Ubuntu 24 + Nginx + systemd

**🔗 Core Integrations:** Tally Prime XML, Zoho Books API, Dynamics 365, e-Invoice IRP, GSTR-1/3B Export, Multi-channel Payment Reminders

# CLAUDE CODE IMPLEMENTATION INSTRUCTIONS

**IMPORTANT:** This is a comprehensive development specification for Claude Code to implement the complete NexInvo platform. Follow each phase sequentially with complete testing before proceeding to the next phase.

## Implementation Approach for Claude Code

1. **Backend Development:** Complete Django application with all models, APIs, business logic, and integrations
2. **Frontend Development:** React TypeScript application with modern UI/UX, responsive design, and complete user workflows
3. **UI/UX Design:** Professional interface design with Tailwind CSS, shadcn/ui components, and CA practice-optimized layouts
4. **System Integration:** All external integrations including Tally, Zoho, e-Invoice IRP, and automation platforms
5. **Documentation:** Complete API documentation, deployment guides, user manuals, and system administration documentation

# Core Business Requirements

## Primary Business Goals

* Multi-tenant SaaS platform for GST-compliant invoicing designed specifically for CA practices and SMEs
* Complete GST Rule-46 compliance with dynamic rate management, HSN/SAC validation, and audit trails
* Professional invoice templates with visual drag-drop designer and brand customization
* Full e-Invoice IRP integration with complete lifecycle management (generate, submit, cancel, track)
* B2C Dynamic QR codes for UPI payments with intelligent placement logic
* Automated payment reminder system with multi-channel support and auto-stop on payment
* Enterprise ERP integrations: Tally Prime XML export, Zoho Books OAuth2, Dynamics 365 APIs
* GSTR-1, GSTR-3B preparation and export with reconciliation capabilities
* CA practice features: client segregation, digital signatures, professional compliance, audit trails

# Technical Architecture Specification

## System Architecture (Non-Docker Ubuntu Deployment)

| **Layer** | **Technology** | **Implementation Requirements** |
| --- | --- | --- |
| **Backend API** | Django 5.x + DRF + Python 3.13.5 | REST API with OAuth2, JWT tokens, comprehensive business logic, GST compliance engine, multi-tenant RLS |
| **Frontend App** | React 18+ TypeScript + Vite | Modern SPA with Tailwind CSS, shadcn/ui, React Query, responsive design, PWA capabilities |
| **Database** | PostgreSQL 16+ with RLS | Row Level Security for tenant isolation, optimized for financial data, automated backups, audit logging |
| **Background Jobs** | Celery + Redis | Email sending, IRP submissions, ERP sync, payment reminders, PDF generation queue |
| **File Storage** | Local + Cloud Backup | Local storage for performance, automated cloud sync for disaster recovery, tenant-isolated directories |

# Complete Data Model Specification

All tables must include: tenant\_id, created\_at, updated\_at, created\_by, updated\_by for complete audit trails and multi-tenancy.

| **Table Name** | **Fields & Business Logic** |
| --- | --- |
| **tenants** | id, name, business\_type (ca\_firm/sme/enterprise), aato\_threshold, e\_invoice\_enabled, b2c\_qr\_enabled, company\_details (JSON: GSTIN, address, logo), gst\_settings (JSON: rates, compliance rules), subscription\_plan, billing\_details |
| **users** | Django User model extended with: phone, designation, ca\_registration\_no, digital\_signature\_cert, two\_factor\_enabled, last\_login\_ip |
| **tenant\_memberships** | user\_id, tenant\_id, role (ca\_owner/admin/finance\_user/viewer/client\_readonly), permissions (JSON), joined\_at, invited\_by, is\_active |
| **clients** | tenant\_id, name, client\_code, client\_type (b2b/b2c), gstin, pan, email, phone, billing\_address (JSON), shipping\_address (JSON), state\_code, pos\_default, credit\_terms\_days, bank\_details (JSON), contact\_persons (JSON) |
| **items** | tenant\_id, name, item\_code, sku, description, hsn\_sac, uqc, default\_rate, current\_gst\_rate, current\_cess\_rate, item\_category, is\_service, is\_active |
| **gst\_rate\_history** | item\_id, hsn\_sac, effective\_from, effective\_to, cgst\_rate, sgst\_rate, igst\_rate, cess\_rate, notification\_reference, change\_reason |
| **invoices** | tenant\_id, client\_id, invoice\_type (proforma/taxable), series, number, date, due\_date, place\_of\_supply, reverse\_charge, currency, exchange\_rate, subtotal, discount\_amount, taxable\_amount, total\_tax, round\_off, grand\_total, payment\_status, notes, terms\_conditions |
| **invoice\_lines** | invoice\_id, item\_id, line\_number, description, hsn\_sac, quantity, uqc, rate, discount\_percent, discount\_amount, taxable\_value, cgst\_rate, sgst\_rate, igst\_rate, cess\_rate, cgst\_amount, sgst\_amount, igst\_amount, cess\_amount, line\_total |
| **einvoice\_details** | invoice\_id, irp\_status, irn, ack\_no, ack\_date, qr\_code\_image, signed\_invoice\_hash, irp\_request\_payload (JSON), irp\_response\_payload (JSON), cancellation\_date, cancellation\_reason |
| **invoice\_templates** | tenant\_id, name, template\_type (invoice/email), html\_template, css\_styles, json\_layout (drag-drop config), is\_default, is\_system\_template, mandatory\_fields (JSON), preview\_image |
| **email\_communications** | tenant\_id, invoice\_id, to\_email, cc\_email, bcc\_email, subject, body, attachment\_paths (JSON), status, provider\_message\_id, sent\_at, delivered\_at, opened\_at, bounce\_reason, retry\_count |
| **payment\_reminders** | tenant\_id, invoice\_id, reminder\_type (gentle/firm/final/custom), schedule\_rule (JSON), channel (email/sms/whatsapp), template\_id, status, last\_sent\_at, next\_send\_at, auto\_stop\_enabled, max\_attempts, custom\_message |
| **integrations** | tenant\_id, integration\_type (tally/zoho/d365/smtp/webhook), name, credentials\_encrypted (JSON), configuration (JSON), is\_active, last\_sync\_at, sync\_status, error\_log, webhook\_secret |
| **audit\_logs** | tenant\_id, user\_id, entity\_type, entity\_id, action, before\_data (JSON), after\_data (JSON), ip\_address, user\_agent, session\_id, is\_financial\_transaction, compliance\_relevant, timestamp |

# Complete API Specification

Base URL: /api/v1/ • Authentication: JWT + OAuth2 • All POST requests require Idempotency-Key header

| **Endpoint** | **Methods** | **Business Logic & Features** |
| --- | --- | --- |
| /auth/login, /auth/token, /auth/refresh | POST | JWT authentication, 2FA for CA users, session management, role-based access control |
| /tenants/me, /tenants/settings | GET/PATCH | Tenant profile, GST settings, branding configuration, subscription management |
| /clients, /clients/{id} | CRUD | Client management, GSTIN validation, address management, credit terms, bulk operations |
| /items, /items/{id}, /items/bulk | CRUD | Item master, HSN/SAC management, rate history tracking, bulk import/export |
| /invoices, /invoices/{id} | CRUD | Invoice creation with auto-GST calculation, Rule-46 validation, sequence management |
| /invoices/{id}/pdf | GET | PDF generation with template selection, QR code embedding, digital signatures |
| /invoices/{id}/email | POST | Email delivery with attachment, delivery tracking, bounce handling |
| /invoices/{id}/einvoice/submit | POST | e-Invoice IRP integration, INV-01 JSON generation, IRN/QR storage |
| /invoices/{id}/sync/{integration} | POST | ERP synchronization (Tally XML, Zoho API, Dynamics 365) |
| /gstr/export | GET | GSTR-1, GSTR-3B export in CSV/JSON format with reconciliation data |
| /reminders, /reminders/{id}/schedule | CRUD | Payment reminder automation with multi-channel support, auto-stop logic |
| /templates, /templates/{id}/validate | CRUD | Template management, drag-drop designer, mandatory field validation |
| /webhooks/{tenant\_id} | POST | Webhook endpoints for external automation platforms (Make, Zapier, n8n) |

# Frontend UI/UX Requirements

## Core User Interface Components

* **Authentication & Onboarding:** Modern login/signup flows, tenant setup wizard, role-based dashboards, 2FA setup for CA users
* **Dashboard & Analytics:** Revenue analytics, GST liability forecasting, client-wise reports, payment aging, compliance status
* **Invoice Management:** Invoice creation wizard, line item management, tax calculation preview, template selection, bulk operations
* **Template Designer:** Drag-drop visual editor, real-time preview, brand customization, template library, validation feedback
* **Client & Item Management:** Data grid with search/filter, bulk import/export, address management, relationship tracking
* **Compliance Center:** GST filing calendar, compliance checklists, e-Invoice status, GSTR preparation, audit trails
* **Integration Hub:** ERP connection setup, sync status monitoring, webhook configuration, API key management
* **Settings & Administration:** Tenant configuration, user management, billing settings, security preferences, backup management

## Design System & Branding

* **Color Scheme:** Professional blue theme (#1B365D, #2E5984) with gold accents (#D4AF37) for premium features
* **Typography:** Arial font family for universal compatibility and professional appearance
* **Component Library:** shadcn/ui components with Tailwind CSS for consistent, accessible design
* **Responsive Design:** Mobile-first approach with tablet and desktop optimizations for CA practice workflows
* **Accessibility:** WCAG 2.1 AA compliance, keyboard navigation, screen reader support, high contrast mode

# 10-Week Implementation Roadmap

**IMPORTANT FOR CLAUDE CODE:** Implement each phase completely with testing before proceeding. Each phase builds upon the previous one.

| **Phase** | **Implementation Requirements** | **Success Criteria** |
| --- | --- | --- |
| **Phase 0** (Week 1) | Project setup: Django backend with PostgreSQL RLS, React TypeScript frontend, authentication system, basic tenant isolation, systemd services configuration | ✓ Two tenants with proven data isolation ✓ Basic login/signup flows working ✓ All services auto-start and restart |
| **Phase 1** (Weeks 2-3) | Core invoice system: Client/item CRUD, invoice creation with GST calculations, PDF generation with 2 templates, email system with tracking, logo/branding | ✓ Accurate CGST/SGST/IGST calculations ✓ Professional PDF generation ✓ Email delivery with attachments |
| **Phase 2** (Weeks 4-5) | GST compliance engine: Rule-46 validation, HSN/SAC enforcement, rate history, payment reminders, CA features (digital signatures, audit trails) | ✓ AATO triggers HSN validation ✓ Reminders auto-stop on payment ✓ Complete audit trails functional |
| **Phase 3** (Weeks 6-7) | ERP integrations: Tally Prime XML export, Zoho Books OAuth2, Dynamics 365 APIs, webhook system for automation platforms, sync status tracking | ✓ Tally XML imports successfully ✓ Zoho sync with identical values ✓ Webhooks delivered reliably |
| **Phase 4** (Weeks 8-9) | e-Invoice & QR systems: IRP integration with INV-01 JSON, B2C Dynamic QR for UPI, QR placement logic, cancellation workflows | ✓ Valid IRN and QR from IRP ✓ QR codes scan correctly ✓ Cancellation within time window |
| **Phase 5** (Week 10) | Production ready: GSTR-1/3B export, security hardening, performance optimization, monitoring setup, complete documentation, testing | ✓ GSTR exports match totals ✓ Security tests pass ✓ 100+ concurrent users supported |

# External Integration Specifications

## Tally Prime Integration

* **XML Export Format:** Generate compliant Tally XML with complete GST breakdown, ledger mappings, and tax allocations
* **Data Mapping:** Map NexInvo invoices to Tally sales vouchers with proper party ledgers and tax calculations
* **Export Options:** Download XML files or direct POST to Tally Gateway URL for automatic import

## Zoho Books Integration

* **OAuth2 Flow:** Complete OAuth2 implementation for secure API access with token refresh
* **Data Sync:** Bidirectional sync of customers, items, and invoices with conflict resolution
* **Status Tracking:** Monitor sync status, store Zoho IDs, handle API rate limits and errors

## e-Invoice IRP Integration

* **INV-01 JSON Generation:** Create compliant e-invoice JSON payload with all mandatory fields
* **IRP Communication:** Secure API calls to IRP with authentication, error handling, and retry logic
* **QR Code Management:** Store and embed signed QR codes in PDF invoices with proper placement

# Security & Compliance Requirements

## Data Security

* **Encryption:** All PII data encrypted at rest, TLS 1.3 for data in transit, encrypted database backups
* **Access Control:** Role-based permissions, 2FA for CA users, session management, IP whitelisting
* **Audit Logging:** Complete audit trails for all financial transactions with immutable logs

## GST Compliance

* **Rule-46 Validation:** Real-time validation of all 15 mandatory fields for taxable invoices
* **HSN/SAC Enforcement:** Automatic digit validation based on annual turnover thresholds
* **Rate Management:** Historical rate tracking with effective dates for audit compliance

# Documentation Requirements

**CRITICAL:** Claude Code must generate complete documentation as the final step of implementation.

## Technical Documentation

* **API Documentation:** Complete OpenAPI/Swagger documentation with examples, authentication details, and error codes
* **Database Schema:** ERD diagrams, table relationships, indexes, constraints, and migration guides
* **Deployment Guide:** Step-by-step Ubuntu deployment instructions, systemd configuration, security hardening
* **Integration Guides:** Detailed setup instructions for Tally, Zoho, Dynamics 365, and webhook integrations

## User Documentation

* **User Manual:** Comprehensive guide for CA practices and SMEs with screenshots and workflows
* **Admin Guide:** System administration, tenant management, backup procedures, security settings
* **Compliance Guide:** GST compliance checklist, e-invoice setup, GSTR preparation procedures
* **Troubleshooting:** Common issues, error resolution, FAQ, and support procedures

# Quality & Testing Standards

## Code Quality Requirements

* **Python Standards:** PEP 8 compliance, type hints, comprehensive docstrings, 80%+ test coverage
* **TypeScript Standards:** Strict mode enabled, complete interface definitions, proper component typing
* **Security Standards:** No PII in logs, encrypted credentials, SQL injection prevention, CSRF protection

## Testing Requirements

* **Unit Tests:** Comprehensive test coverage for all business logic, GST calculations, and compliance rules
* **Integration Tests:** API endpoint testing, database operations, external service integrations
* **Security Tests:** Tenant isolation verification, access control testing, vulnerability assessments

# Final Success Metrics

| **Category** | **Target Metric** | **Verification Method** |
| --- | --- | --- |
| **Performance** | 100+ concurrent users, <2s API response, <5s PDF generation | Load testing with automated tools, performance monitoring |
| **Security** | Zero tenant data leakage, complete audit trails, encrypted PII | Penetration testing, tenant isolation verification, security audit |
| **Compliance** | 100% GST Rule-46 compliance, successful IRP integration | CA firm validation, IRP test transactions, compliance audit |
| **Integration** | Tally, Zoho, D365 sync 100% successful, reliable webhooks | Real-world testing with partner systems, sync verification |

# FINAL INSTRUCTIONS FOR CLAUDE CODE

**IMPLEMENTATION ORDER:**

1. **Backend Development:** Start with Django backend, implement all models, APIs, business logic, and integrations according to the data model and API specifications
2. **Frontend Development:** Build React TypeScript application with all UI components, responsive design, and complete user workflows
3. **Integration Implementation:** Implement all external integrations (Tally, Zoho, e-Invoice IRP, webhooks) with proper error handling
4. **Testing & Quality:** Comprehensive testing including unit tests, integration tests, and security verification
5. **Documentation:** Generate complete technical and user documentation as specified in the documentation requirements

**QUALITY CHECKPOINTS:**

* Test each phase thoroughly before proceeding to the next
* Verify tenant isolation at every development step
* Validate GST calculations with real-world scenarios
* Ensure professional UI/UX meets CA practice standards
* Complete security testing before final delivery

# Project Summary

NexInvo by Chinmay Technosoft Private Limited represents a complete GST-ready invoicing SaaS platform designed specifically for the Indian market. This comprehensive specification provides everything needed to build a production-ready system that serves CA practices and SMEs with enterprise-grade functionality at SME-friendly pricing.

**Key Differentiators:**

* Complete GST compliance with Rule-46 validation and dynamic rate management
* CA practice-optimized features with professional compliance and audit capabilities
* Cost-effective non-Docker deployment with 40-50% infrastructure savings
* Enterprise ERP integrations with Tally, Zoho, and Dynamics 365
* Modern, responsive UI/UX designed for accounting professionals

**Expected Outcome:** A market-ready SaaS platform that positions Chinmay Technosoft as a leader in GST-compliant business software for the Indian market, with significant competitive advantages in cost-effectiveness and professional feature set.