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IF InFlow



Software Engineering - Group 302



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Context

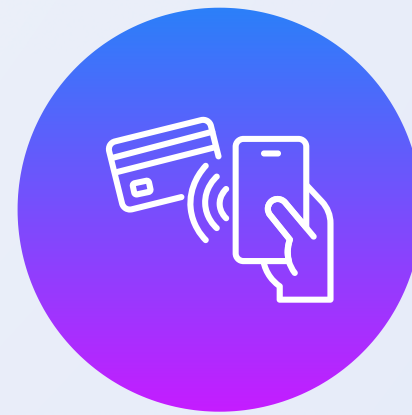
- InFlow is an accessible Payment and Billing system based on a microservices architecture
- Designed to integrate and communicate with services developed by other groups
- Automates the entire billing and payment lifecycle
- Supports invoicing, payment processing, and financial transaction tracking

Serves multiple user roles:

- **Finance/Billing Staff**
- **Customers**
- **Auditors & Compliance Officers**

Key features include:

- Invoice generation and recurring billing
- Payment processing
- Reporting dashboards and audit trails



Personas

Three Core Personas



Maria Pereira

Billing Administrator

- Automated invoices generation
- Payment tracking



Saves 80%
of time with automation



Guilherme Manuel

Customer

- Quick, secure online payments
- Secure transactions



Bank-grade security



Ricardo Almeida

Auditor

- Full compliance verification
- Transaction traceability



Immutable audit
trail + GDPR

Core User Stories

US1: Invoice customers

As a

Billing Administrator,

I want

to generate and send invoice to customers,

So that

customers are billed correctly.

US2: View Invoices Online

As a

Customer/Client,

I want

to be able to see my invoices online,

So that

I can know what payments I have made.

US5: Pay invoice online

As a

Customer/Client,

I want

to pay my invoice using a credit card, bank transfer, or digital wallet,

So that

I have flexibility and convenience in payments.

US6: Apply payments to correct invoice

As a

Billing Administrator,

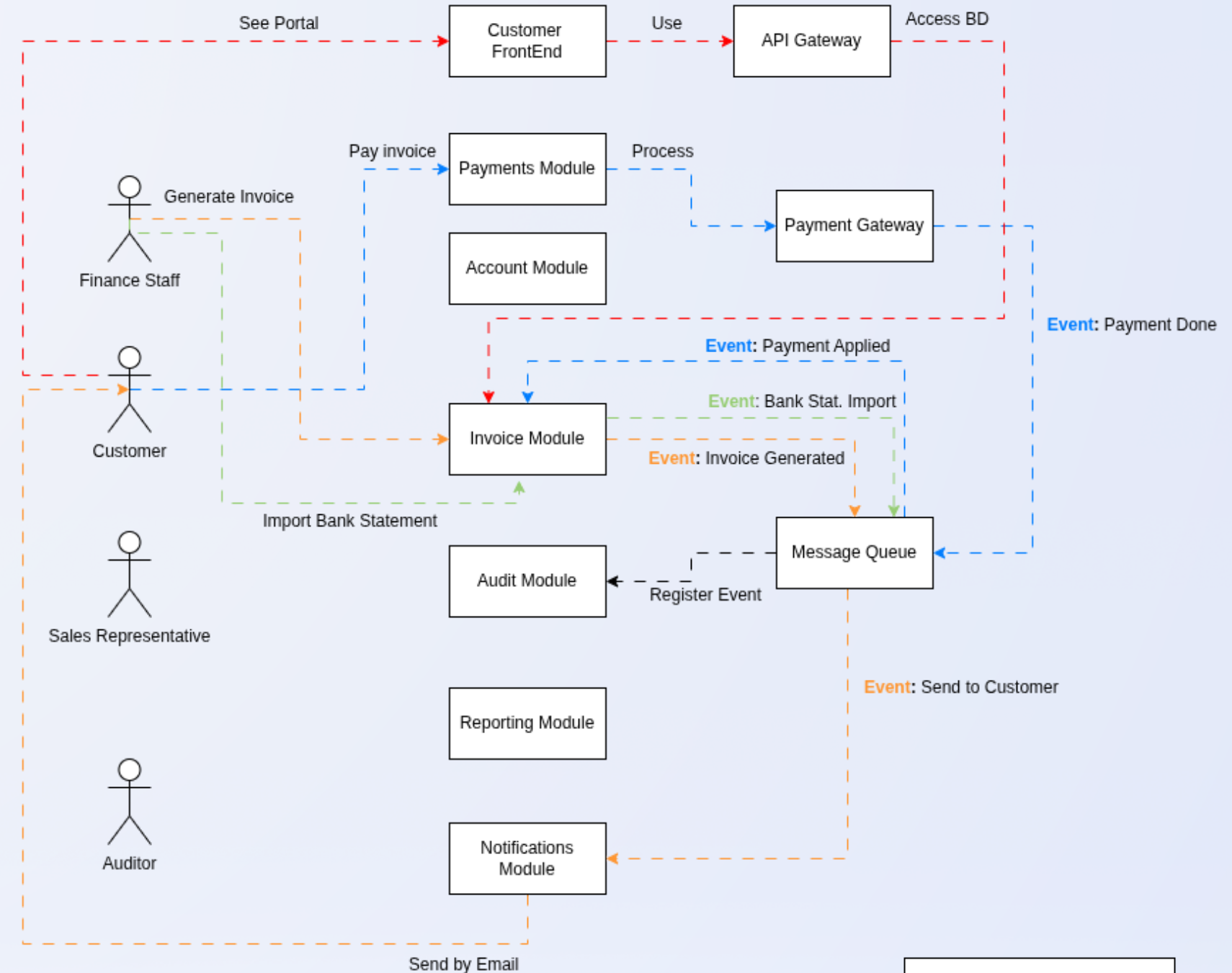
I want

payments to be automatically reconciled,

So that

invoices are always updated correctly.

Interaction Diagram



- Legenda:**
- Orange: User Story 2
 - Blue: User Story 14
 - Green: User Story 4
 - Red: User Story 13
 - Black: Comum

Functional Requirements



User Roles & Security

Multi-role access control, secure authentication, authorization, encryption, and data protection.



Invoice Management

Create, edit, and deliver one-time and recurring invoices with full details and status tracking.



Payments & Reconciliation

Support multiple payment methods with automatic and manual reconciliation, refunds, and dispute handling.



Customer Account Management

Manage customers, services, billing details, and financial activity in one place.



Notifications & Accessibility

Real-time alerts, dashboards, payment notifications, and responsive web/mobile access.



Reporting & Audit Trails

Configurable dashboards, exportable reports, and immutable audit logs for compliance.

Non-Functional Requirements

Built for Scale, Security & Reliability

Quality Guarantees:

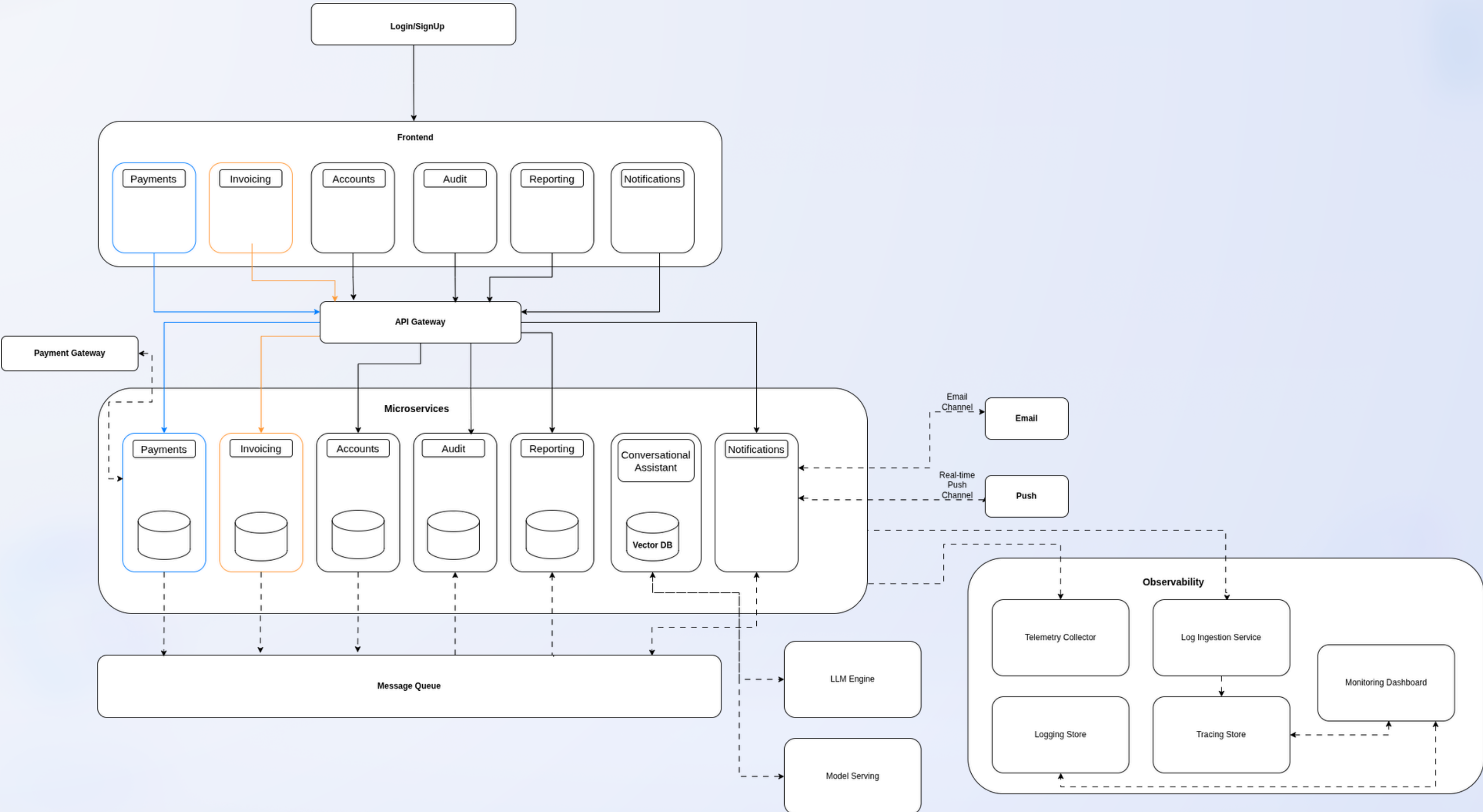
- Performance: < 2s response times, 1000+ concurrent users
- Security: TLS 1.3, Keycloak auth, PCI DSS compliant (Stripe)
- Availability: 99% uptime, microservices fault isolation
- Observability: Grafana + Loki + Tempo monitoring stack, etc.
- Maintainability: CI/CD with GitHub Actions, Docker deployment



Architecture:

- Microservices for independent scaling
- Kong API Gateway for load balancing
- Infrastructure as Code (Terraform)

Architecture



Assistant

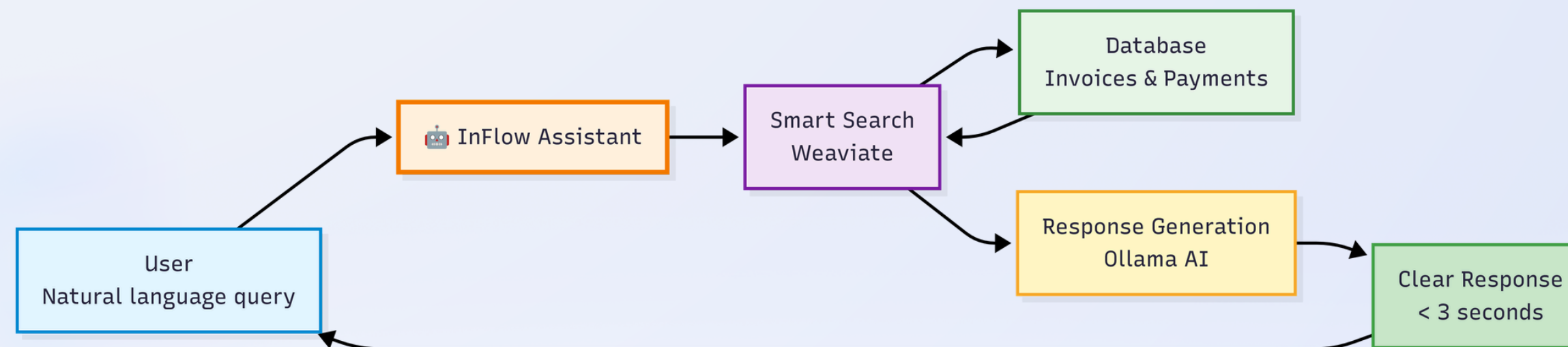
Intelligent Support with Retrieval-Augmented Generation

How It Works:

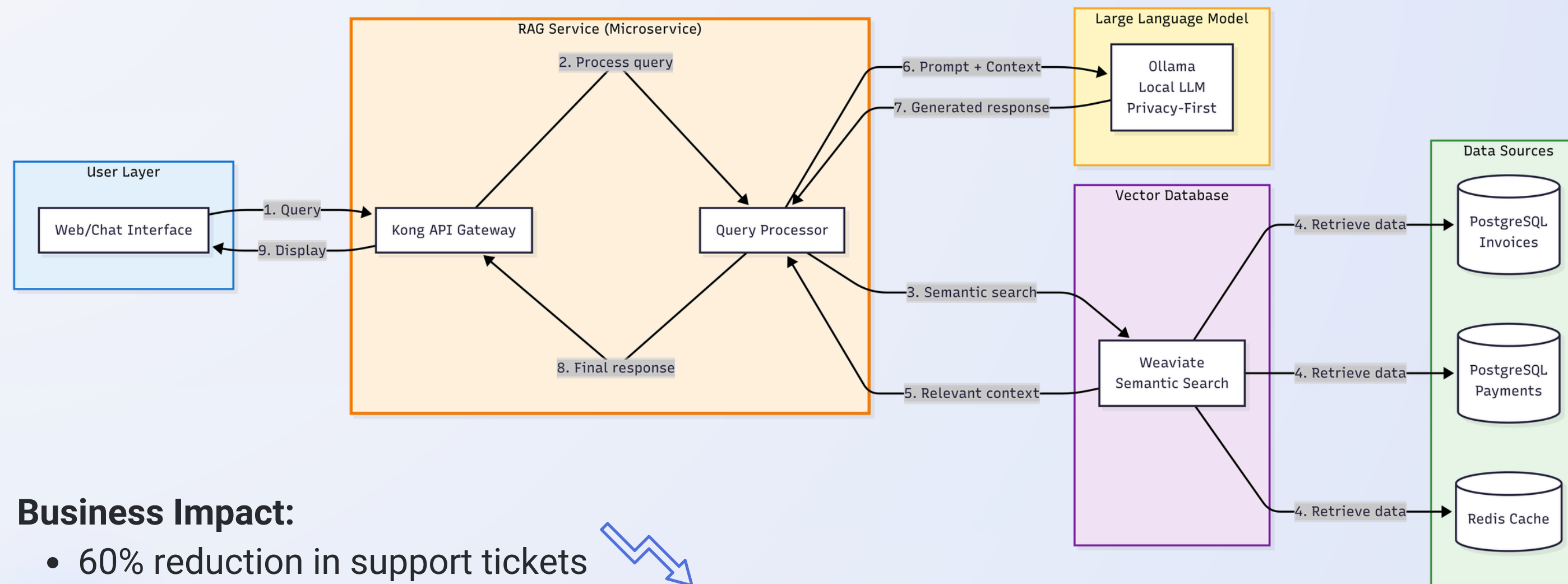
1. User asks: "Show unpaid invoices"
2. Weaviate: vector search retrieves relevant data
3. Ollama LLM: generates natural language answer
4. Result: Accurate, context-aware response in < 3 seconds

Technology Stack:

- Weaviate - Semantic search
- Ollama - Local LLM



Assistant



Business Impact:

- 60% reduction in support tickets
- 85% accuracy on queries
- Instant access to invoice/payment history

API

invoice-controller

PUT /api/invoices/{id}/mark-paid

POST /api/invoices

GET /api/invoices/{id}/attachment

POST /api/invoices/{id}/attachment

GET /api/invoices/{id}

DELETE /api/invoices/{id}

GET /api/invoices/created-by/{adminId}

GET /api/invoices/client/{clientId}

client-controller

PUT /api/clients/{id}/billing Atualiza dados de faturação do cliente (aplica a futuras faturas)

GET /api/clients Lista todos os clientes (paginado)

GET /api/clients/{id} Obtém um cliente por ID

subscription-controller

GET /api/subscriptions

POST /api/subscriptions

POST /api/subscriptions/{id}/process

user-controller

POST /api/register

GET /api/users/roles

GET /api/users/by-email

stripe-webhook-controller

POST /api/payments/webhook

refund-controller

POST /api/payments/refund/{paymentIntentId}

bank-reconciliation-controller

POST /api/payments/reconciliation/match/{paymentId}/{invoiceId}

POST /api/payments/reconciliation/import

GET /api/payments/reconciliation/unmatched

GET /api/payments/reconciliation/matched

digital-wallet-controller

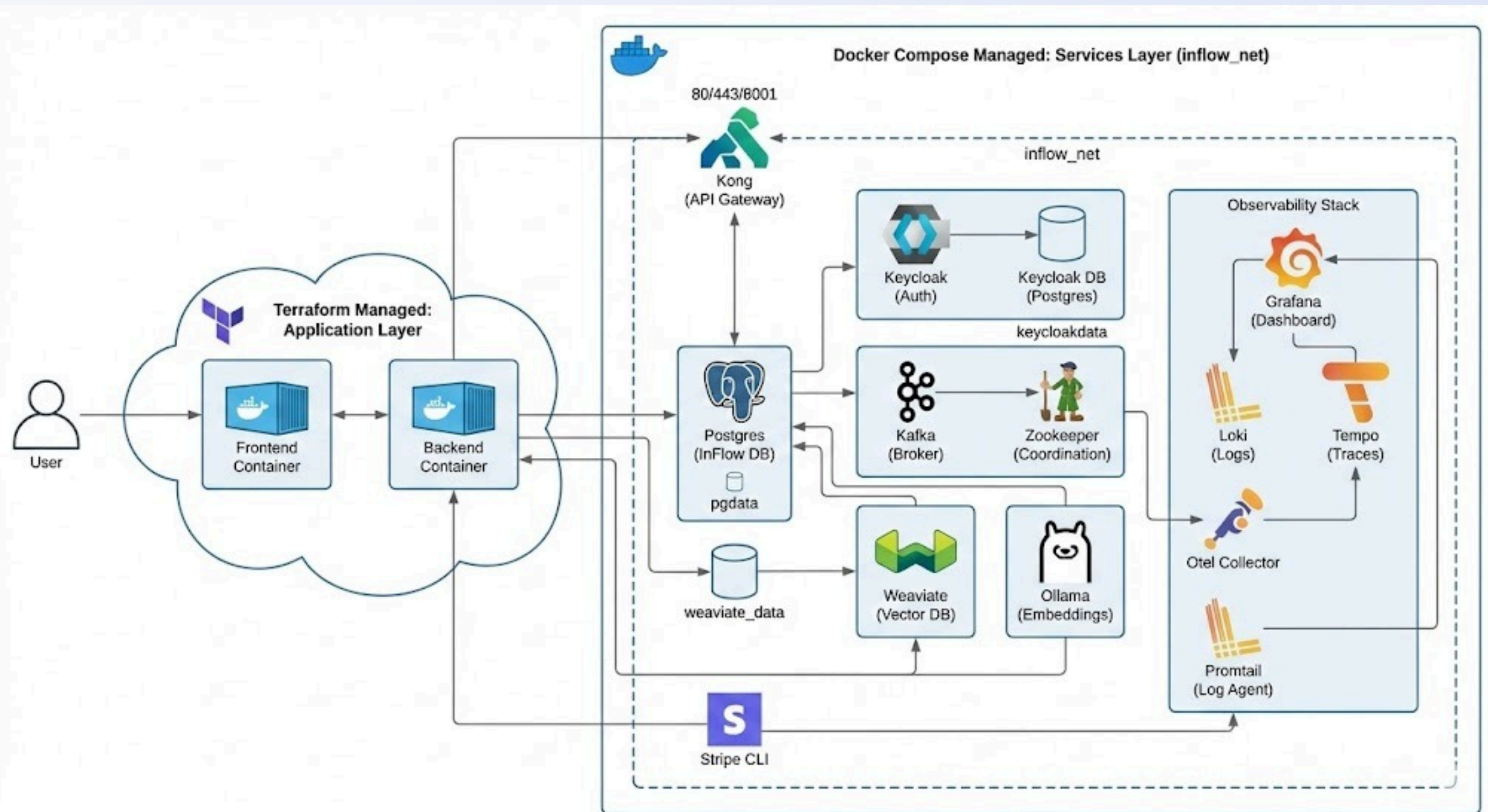
POST /api/payments/pay-digital-wallet

payment-controller

POST /api/payments/pay-bank-transfer

POST /api/payments/create-intent

Deploy Diagram



Demo

Gustavo Silva

Outstanding Invoices
Nenhuma fatura em falta!

Quick actions
Change Billing information

Frequently Asked Questions
Some common questions. [See all](#)

- How do I log in?**
Use your organization email and password on the login page. If you have no account yet, use "Register" to create one (fill all fields with correct information).
- I forgot my password. What do I do?**
Click "Forgot password" on the login screen (not available yet) or contact your administrator to trigger a reset link.
- Where can I find my invoices?**
Go to "Invoices" in the sidebar. Use filters or quick actions to open details. Recent invoices also appear in dashboard widgets.

localhost:5173/inflow/app/invoices

Backlog

The screenshot shows a Jira backlog for the project 'detiuaveiro/group-project-es2526_302'. The backlog is organized into columns: Backlog (5 items), Todo (0 items, 'This item hasn't been started'), In Progress (0 items, 'This is actively being worked on'), Review (0 items, 'Being Reviewed by Project Members'), and Done (152 items, 'This has been completed'). The backlog items are listed in the Backlog column and include:

- group-project-es2526_302 #11: Epic 3 - Notifications (epic)
- group-project-es2526_302 #16: US13: New Customer notification (Epic 3 - Notifications #11, minor_priority)
- group-project-es2526_302 #25: Epic 5 - Sales Representative Functions (epic)
- group-project-es2526_302 #26: US21: View Customer's Payment History (Epic 5 - Sales Representative Functions #25, low_priority)
- group-project-es2526_302 #27: US22: View Account Status (Epic 5 - Sales Representative Functions #25, low_priority)

On the right side of the backlog, there is a list of issues:

- group-project-es2526_302 #284: logs audit (bug)
- group-project-es2526_302 #275: Change Kong configurations for VM (high_priority)
- group-project-es2526_302 #266: Continue Project Report (Architecture, Functionality, Services, ...) (category:documentation, high_priority)
- group-project-es2526_302 #307: payment with transfer method on email (bug)
- group-project-es2526_302 #274: Payment Method Transfer on Email Notification (bug)
- group-project-es2526_302 #246: Vetorial BD for conversational agent (category:assistant)
- group-project-es2526_302 #253: 21-us17-export-financial-reports
- group-project-es2526_302 #23: US19: Revenue and payment dashboard (medium_priority)
- group-project-es2526_302 #21: US17: Export financial reports (Epic 4 - Audit #18, medium_priority)

Problems:

- Member withdrawal
- Docker
- Containers
- Keycloak
- Terraform
- VM
- Stripe



- Backlog** 5
- Todo** 0
This item hasn't been started
- In Progress** 0
This is actively being worked on
- Review** 0
Being Reviewed by Project Members
- Done** 152
This has been completed

detiuaveiro/group-project-es2526_302 157

- group-project-es2526_302 #11
Epic 3 - Notifications
epic
- group-project-es2526_302 #16
US13: New Customer notification
Epic 3 - Notifications #11 **minor_priority**
- group-project-es2526_302 #25
Epic 5 - Sales Representative Functions
epic
- group-project-es2526_302 #26
US21: View Customer's Payment History
Epic 5 - Sales Representative Functions #25
low_priority
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US22: View Account Status
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US19: Revenue and payment dashboard
medium_priority
- group-project-es2526_302 #21
US17: Export financial reports
Epic 4 - Audit #18 **medium_priority**

Future Work

- Add role of Sales Representative
- Add New Client Notification for Finance Administrator
- Add payment methods
- Multi-currency support
- Advanced fraud detection and compliance support
- Comprehensive usability and accessibility evaluation



Conclusion

Complete Payment & Billing Solution

What We Delivered:

- 3 Core Personas - Billing admins, customers, auditors
- 27 User Stories - Automated invoicing, secure payments, full audit trails
- Production-Ready - < 2s response, 99% uptime, bank-grade security
- AI Innovation - RAG assistant (fewer support tickets)



<http://35.228.22.234/inflow/>

Scalable microservices platform with Stripe integration, Keycloak auth, and intelligent support.