WeRideTransit Fare System Development Proposal

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1. Project Summary

WeRideTransit is a modular, secure, and open-source digital fare system designed to meet the needs of small- to mid-size transit agencies. It enables passengers to purchase fare tickets via Stripe, store them on mobile devices, and validate them using cryptographically signed QR codes. This proposal outlines the scope, completed milestones, pricing model, licensing terms, and future expansion potential.

2. Project Scope

This project includes the development, deployment, and maintenance of:

- A secure FastAPI-based backend server for user authentication, ticket generation, and validation
- A PySide6/QML-based frontend application with QR scanning and digital wallet functionality
- Stripe payment integration with webhook fulfillment
- Cryptographically signed tickets using Ed25519
- Ticket validation and single-use logic on the server

3. Technology Overview

- **Backend:** Python 3.11, FastAPI, SQLAlchemy (async), PostgreSQL/SQLite
- **Frontend:** PySide6, QML, OpenCV (QR scanner), QtMultimedia
- **Security:** Ed25519 digital signatures, OAuth2/JWT tokens

- **Payments:** Stripe Checkout Sessions and Webhooks

4. Completed Milestones

- Secure API for ticket generation and validation
- QR code payload generation and scanner integration
- Wallet UI and ticket list formatting
- Stripe payment integration and ticket issuance webhook
- Page-based frontend navigation with dynamic validation results

5. Cost Estimate

The following estimate is based on an hourly rate of $40/hour.

- Initial Backend Development: $2,500–$3,000
- Frontend Application: $1,800–$2,200
- Stripe Integration and Fulfillment: $800–$1,000
- Deployment and Configuration: $500–$800

Total Initial Deployment Estimate: $5,600–$7,000

6. Ongoing Support and Development

After deployment, maintenance and new feature development is offered at:

- **Monthly Support:** $400/month (up to 4 hrs/month)
- **On-Demand Rate:** $40/hour
- **Flat-rate features:** Quoted individually upon request

7. License and Code Ownership

The WeRideTransit system is developed and distributed under the GNU General Public License v3 (GPL-3.0). This guarantees:

- Continued public access to the code
- Modifications remain under GPL licensing

- The City may modify or deploy the code freely
- The original developer retains authorship and license rights

Full license text is available at: `https://www.gnu.org/licenses/gpl-3.0.html`

8. Future Add-Ons and Expansion Opportunities

The system is designed to evolve. All items below are modular, optional, and can be scoped separately.

1. Admin Dashboard and Reporting. A secure, web-based interface for transit administrators to monitor system usage, download records, and manage operational data.

- **Estimated Cost:** $1,200–$2,500
- **Includes:**
  - Ticket sales and usage analytics
  - Rider activity summaries and filtering by route
  - CSV export and dashboard visualizations
- **Benefits:**
  - Improves data transparency and decision-making
  - Reduces staff time spent on manual record queries

2. Offline Ticket Validation Mode. Support for ticket validation on devices that operate without consistent internet access, such as rural-route buses or mobile fare inspectors.

- **Estimated Cost:** $800–$1,500
- **Includes:**
  - Local cache of ticket ID and status
  - Secure fallback validation logic
  - Sync mechanism for online catch-up
- **Benefits:**
  - Ensures continuity of fare enforcement in remote or offline areas
  - Enables validation on the move without real-time network dependency

3. Kiosk Mode for Public Purchase Stations. A locked-down, touchscreen-compatible interface for riders to purchase tickets at transit centers or high-traffic stops.

- **Estimated Cost:** $1,000–$1,800
- **Includes:**
  - Touch-optimized UI layout
  - Persistent login for kiosk identity
  - Stripe-hosted checkout flow integration
- **Requirements:**
  - Commercial tablet or touch screen
  - Optional: printer integration or SMS ticket delivery
- **Benefits:**
  - Expands ticket access to unbanked and non-smartphone users
  - Reduces lines at customer service counters

4. Physical QR/NFC Card Support (Tap or Scan). This upgrade allows riders to use physical fare cards embedded with a QR code or contactless NFC chip. Cards can be distributed to riders without smartphones, used for pass programs, or issued for rapid boarding on high-volume routes.

- **Estimated Cost:** $1,800–$3,500
- **Includes:**
  - Backend logic to register and validate card IDs
  - Card issuing interface (admin or API)
  - QR-encoded card UID integration
  - Optional: MIFARE DESFire NFC support
- **Requirements:**
  - Physical card printing (typically $1–2 per card in bulk)
  - USB or serial NFC readers (if tap-to-ride is enabled)
  - Fare inspector or vehicle-mounted reader device
- **Benefits:**
  - Enables support for riders without mobile phones
  - Faster boarding on fixed-route buses
  - Durable, reusable fare media for passholders or youth programs

5. Multi-Language Support. Adds language toggle functionality to the user interface, enabling the display of all content in English, Lakota, Spanish, or other languages as needed.

- **Estimated Cost:** $600–$1,200
- **Includes:**
  - UI translation tables
  - Dynamic language toggle
  - Lakota and Spanish translation integration (where available)
- **Benefits:**
  - Increases accessibility for non-English speakers
  - Improves compliance with local and federal equity standards

6. Inspector/Admin Tablet Mode. Adds an inspection tool for fare enforcement personnel, with access to ticket validation tools, limited analytics, and offline fallback capability.

- **Estimated Cost:** $800–$1,500
- **Includes:**
  - Device-friendly layout for tablets
  - PIN-protected admin login mode
  - Real-time and offline ticket validation tools
- **Benefits:**
  - Streamlines fare enforcement on board buses
  - Reduces dependence on paper records or verbal verification

7. Ticket Sharing or Gifting. Enables riders to transfer tickets to another user or device, either permanently (gift) or for limited use (sharing window).

- **Estimated Cost:** $700–$1,200
- **Includes:**
  - Ticket ownership transfer logic
  - QR-scan or link-based acceptance flow
  - Audit trail and one-time-use token control
- **Benefits:**
  - Enables gifting to friends or dependents
  - Useful for youth programs, visitor passes, and parental sharing

8. Custom Branding and Theming. Applies visual design changes to match Rapid Transit or city branding standards.

- **Estimated Cost:** $400–$900
- **Includes:**
  - Custom color schemes and typefaces
  - Logo and graphic integration
  - Branded ticket UI and welcome screens
- **Benefits:**
  - Aligns visual identity with public-facing communications
  - Creates a more professional and polished rider experience

9. Route Map Integration with Trip Planning. Adds support for real-time route visualization and trip planning within the client interface. Riders can view system maps, route lines, scheduled stops, and select departure and destination points to preview optimal travel paths and service connections.

- **Estimated Cost:** $1,200–$2,500
- **Includes:**
  - Static GTFS route file integration and display
  - Stop lookup and trip path planning
  - Scheduled departure time display for each stop
- **Requirements:**
  - Transit route and stop data in GTFS or similar format
  - Optional: map tile hosting or open map provider (e.g., OpenStreetMap)
- **Benefits:**
  - Allows riders to plan trips and view transfers
  - Makes the app useful beyond fare purchase and validation
  - Enhances accessibility for new or infrequent riders

10. Live-Time GPS Bus Tracking. Adds real-time GPS tracking of active buses to allow riders to see current vehicle locations, estimated arrival times, and service delays on a live map.

- **Estimated Cost:** $1,800–$3,200
- **Includes:**

  - Live bus telemetry endpoint and storage
  - Frontend map integration with refreshable vehicle markers
  - ETA calculations based on headway and movement
- **Requirements:**
  - GPS tracking devices on buses (with cellular or Wi-Fi uplink)
  - Optional: existing AVL provider integration
- **Benefits:**
  - Provides greater rider confidence and system reliability
  - Enables dynamic service management during events or weather delays
  - Foundation for future features like disruption alerts or crowd estimation

All estimates are preliminary and based on a standard development rate of $40/hour. Bundled packages, pilot programs, or grant-funded collaborations may reduce the overall cost.

9. Conclusion

WeRideTransit is a practical, secure, and affordable fare solution for small transit agencies seeking modern features without enterprise-scale vendor lock-in. This proposal outlines a sustainable, community-driven deployment strategy that balances reliability, extensibility, and civic affordability.

For further questions, please contact:

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