SMART INDIA HACKATHON 2025

TITLE PAGE

- **Problem Statement ID** –SIH25013
- **Problem Statement Title-** Real-Time Public Transport Tracking for Small Cities
- **Theme-** Transportation & Logistics
- **PS Category-** Software
- **Team ID-** 68635
- **Team Name:** Next Stop

Next Stop

IDEA TITLE

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Idea:

- **Real-time bus** tracking ecosystem tailored for small & tier-2 cities.
- Unified driver, commuter, and admin interfaces for **seamless integration**.
- GPS-driven **ETA engine** ensures predictable arrivals.
- **Lightweight** architecture for low-data consumption.
- **Multi-platform** support (Android, iOS, Web)

Problem Resolution:

- Eliminates **time wastage** & uncertainty at bus stops.
- Prevents chaotic **overcrowding** through transparent schedules.

Unique Value Proposition:

- **Low-bandwidth** resilience
- Low resource: **50–60 mAh/hr** battery, **5–20 MB/hr** data usage
- Authority insights via **analytics**

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TECHNICAL APPROACH

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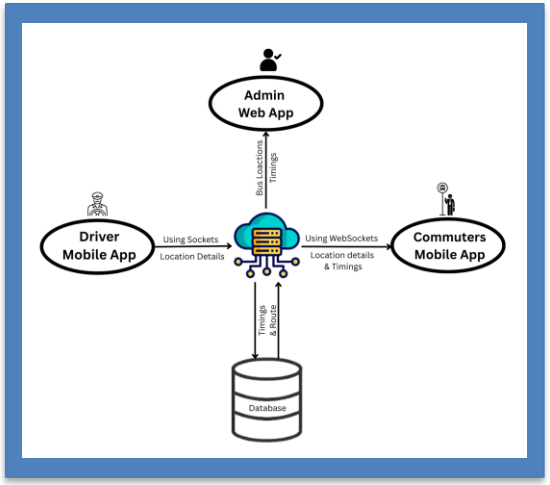
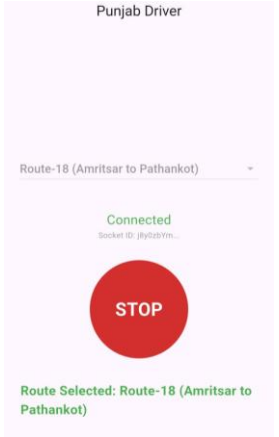
Tech Stack

- **Flutter:** cross-platform agility with a single codebase for smooth commuter and driver experience.
- **FastAPI:** lightweight, scalable real-time engine for fast responses.
- **SQLite:** scales seamlessly from pilot setups to city-wide deployments.
- **OpenStreetMap**: accurate ETAs and route visualization with local relevance.

ARCHITECTURE



Prototype



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FEASIBILITY AND VIABILITY

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Feasibility:

- Technical: GPS + cloud proven & cost-efficient.
- Operational: Minimal driver input
- Economic: Low-cost architecture; scalable ROI.
- Social: Builds commuter trust & reliability.

Viability Enhancers:

- Works on existing smartphones no infra needed.
- Upgradeable to GPS IoT devices if required.
- Cloud-first, modular APIs for future integrations.

Challenges & Mitigation:

- **Network blind spots:** use hybrid fallback offline caching + SMS alerts.
- **Driver reluctance:** frictionless driver-first UX with auto-start & battery optimization.
- **Budget:** pilot-first rollout to prove ROI & secure buy-in.
- **Hardware costs:** leverage public-private partnerships for cost-sharing.

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IMPACT AND BENEFITS

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Commuters

- Saves time & reduces uncertainty.
- Improves safety & convenience.
- Builds trust in public transport.

Authorities

- Data-driven fleet optimization.
- Reduced inefficiencies & costs.
- Predictive analytics for planning..

Environment

- Reduced dependency on private vehicles.
- Lower traffic congestion.
- Decrease in CO_2 emissions.

Cities

- Aligns with Smart City mission.
- Strengthens digital infrastructure.
- Creates a sustainable, scalable mobility model.

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RESEARCH AND REFERENCES

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- Urban Mobility India Report 2024 – inefficiencies in tier-2 transport.
- NITI Aayog 2023 – 60%+ commuters delayed without real-time data.
- Case Study: Indore iBus, Hyderabad TSRTC apps – adoption success.
- World Bank Transport Studies – urban mobility in developing regions.
- Research papers on GPS-based transit tracking in low-bandwidth contexts.
- Open-source examples (Transit APIs, Leaflet.js, OSM).
- Smart City policy papers on digital mobility infrastructure.