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soarchain

Official Litepaper

Contents

The Challenge

Every day, over 1.3 billion vehicles move across the globe, generating an unimaginable amount of data—but almost all of it goes to waste. Billions of data points that could prevent accidents, reduce congestion, and unlock new business models are left untapped because the world of vehicle connectivity is fragmented, inefficient, and stuck in the past.

Car manufacturers operate in silos, there's no unified network, and the infrastructure to connect vehicles, pedestrians, and roads simply doesn't exist—until now.

Imagine a world where every vehicle, road, and pedestrian is connected, sharing data in real time. This isn't some distant future—it's possible today. Yet, the current systems are outdated and slow, unable to support the massive potential of real-time data that could save lives, reduce emissions, and power entirely new industries.

Key Challenges We're Tackling:

● **Fragmentation:**

Vehicles operate in isolation, wasting millions of data points daily due to the lack of a unified network.

● **Safety Gaps:**

Thousands of preventable accidents happen because vehicles and infrastructure don't communicate in real time.

● **Data Wastage:**

Vehicles are generating vast amounts of valuable data, but there's no scalable platform to collect and utilize it.

● **Missed Opportunities:**

Dynamic insurance, AI-driven road monitoring, and predictive maintenance are untapped markets, waiting to be unlocked by real-time vehicle data.

Soarchain – Solving the Mobility Challenge

Soarchain is transforming mobility by connecting vehicles, infrastructure, and data through a decentralized network. By bringing real-world vehicle data onto the blockchain, we're solving the core issues of fragmented systems and underused data, creating a solution that makes mobility smarter, safer, and more efficient.

How Soarchain Addresses Key Challenges:

- **Operating System for Cars:**
Soarchain connects vehicles, roads, and infrastructure, creating a unified mobility network that eliminates isolated systems.

- **Real-Time Data for Safer Roads:**
Vehicles continuously share real-time, vehicle-generated data improving safety and decision-making on the road.

- **Ecosystem for Mobility Partners:**
Soarchain provides a decentralized platform where automakers, infrastructure providers, and developers collaborate, building a connected mobility ecosystem.

- **Connected Mobility & Applications:**
Soarchain transforms vehicle data into insights, powering the development of innovative mobility applications.

- **Secure & Scalable:**
Soarchain uses blockchain to secure data, ensuring privacy and scalability for millions of vehicles worldwide.

- **Easy Access:**
Any vehicle can join the network with simple plug-and-play devices, instantly contributing data and becoming part of the connected ecosystem.

How Soarchain Works

Soarchain is a decentralized, real-time network where vehicles continuously share data, creating smarter, safer roads. Built on the Solana network, Soarchain connects vehicles in real time, enabling seamless data exchange on a global scale.

At the heart of Soarchain's system is the **Runner infrastructure**, which functions as both a verification layer and a data layer. It ensures that all data shared within the network is verified, trustworthy, and ready to be processed for mobility and AI-driven applications. Runner not only secures the data but also powers advanced AI computation, making the network more intelligent with each data point.

Plug-and-play devices make it easy for any vehicle to join the network, acting as real-time data nodes. These vehicles contribute valuable data—such as road conditions and traffic patterns—that are instantly shared and verified through the Runner infrastructure.

This verified data fuels Soarchain's expanding **application ecosystem**, which includes AI-powered road monitoring, predictive vehicle maintenance, and dynamic insurance models. By transforming real-time data into actionable insights, Soarchain drives the future of decentralized mobility and AI.

Features

DePIN for Mobility on Solana Network

Soarchain leverages Solana's blockchain infrastructure to power decentralized physical infrastructure networks (DePIN) for real-time mobility solutions for vehicles and more.

Verified Real-World Data

Soarchain's verification layer transforms real-world data into trusted digital assets, ensuring that only accurate, actionable information flows through the network, building a foundation of trust for all mobility applications.

Real-Time Data Exchange

Vehicles and infrastructure share critical information—such as vehicle generated data, traffic, road conditions, and hazards—in real time, enhancing safety and efficiency.

Features

Application Eco-system for Mobility

Soarchain's verified data fuels a growing application ecosystem, enabling advanced mobility solutions such as AI-driven road monitoring, predictive vehicle maintenance, and dynamic insurance models. This trusted, real-time data ensures that applications can operate with precise, actionable insights for smarter decision-making.

Incentive Structure

Participants are rewarded for contributing valuable data to the network, allowing them to monetize their data while driving active participation and continuous growth in the ecosystem.

Data Privacy & Security

Soarchain ensures data privacy at both the software and hardware level, using advanced encryption and zero-knowledge proofs (ZKPs). This guarantees that all sensitive data is secured without revealing personal information, while hardware-level security protects vehicles from tampering and unauthorized access.

Technology

Revolutionizing Mobility with a Multi-Layered Blockchain System:

Soarchain is revolutionizing mobility with a multi-layered blockchain system designed for the mobility sector. This system ensures seamless integration between entities, prioritizing data integrity and security.

Hardware Integration and Data Authentication:

Vehicles are equipped with specialized hardware that extracts data, secures it with hardware-specific private keys, and encrypts it when needed, ensuring confidentiality and authenticity.

Data Verification through Runners:

The signed data is transmitted to "Runners" for verification, ensuring its authenticity and reliability before entering the system.

State-Machine Replicated Data Network:

Once verified, the data is processed by a Byzantine Fault Tolerant protocol within a tokenless blockchain, ensuring redundancy, immutability, and censorship resistance.
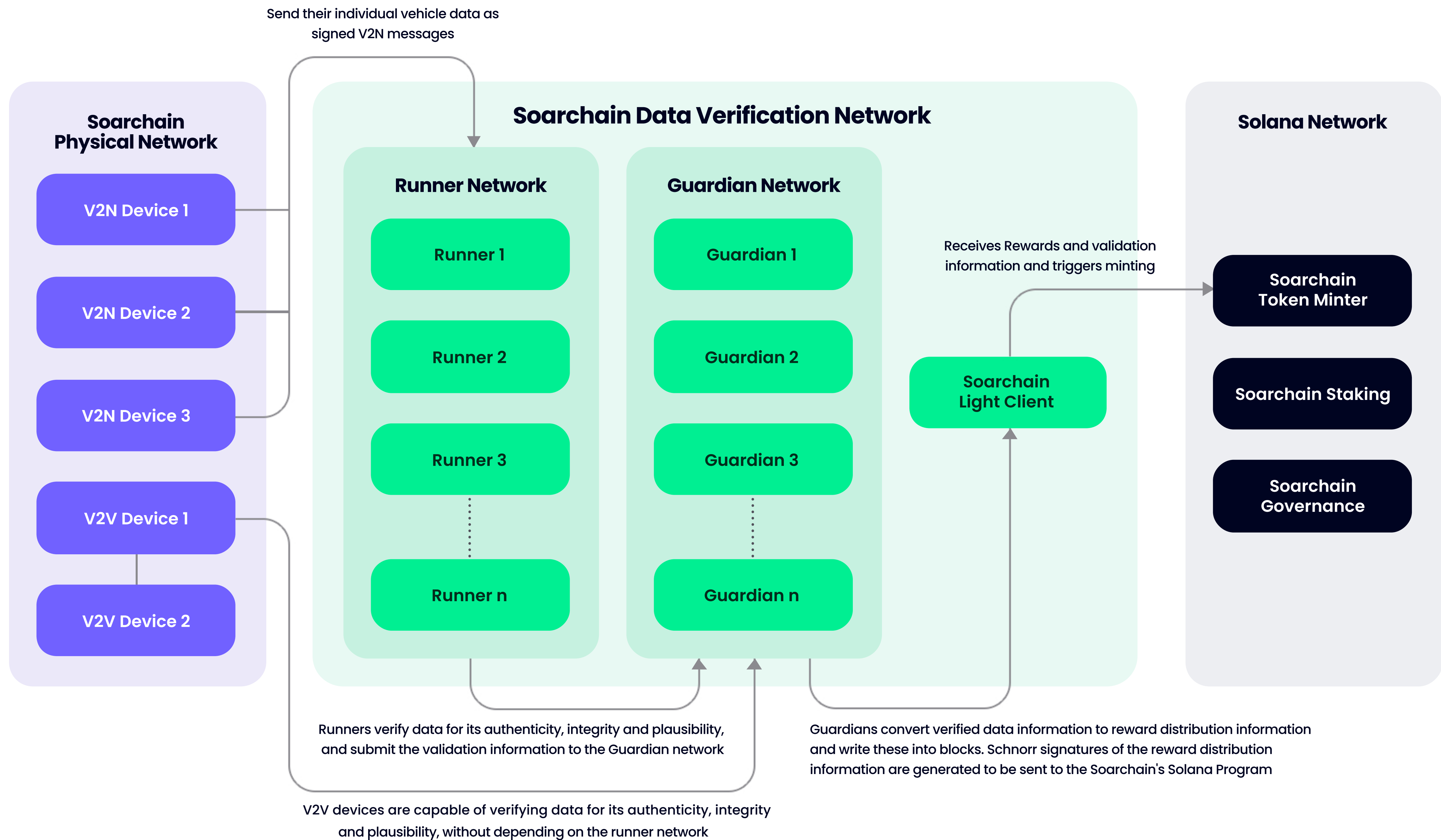
Reward Allocation by Guardians:

"Guardian" nodes assign rewards for verified data, which are recorded into blockchain blocks accessed by Soarchain Light Clients.

Token Minting on Solana:

Soarchain Light Clients trigger token minting on the Solana blockchain using Schnorr signatures, ensuring data consistency before minting tokens via Solana Programs (smart contracts).

Architecture

Send their individual vehicle data as
signed V2N messages

Soarchain Physical Network

V2N Device 1

V2N Device 2

V2N Device 3

V2V Device 1

V2V Device 2

Soarchain Data Verification Network

Runner Network

Runner 1

Runner 2

Runner 3

Runner n

Guardian Network

Guardian 1

Guardian 2

Guardian 3

Guardian n

Soarchain
Light Client

Receives Rewards and validation
information and triggers minting

Solana Network

Soarchain
Token Minter

Soarchain Staking

Soarchain
Governance

Runners verify data for its authenticity, integrity and plausibility,
and submit the validation information to the Guardian network

Guardians convert verified data information to reward distribution information
and write these into blocks. Schnorr signatures of the reward distribution
information are generated to be sent to the Soarchain's Solana Program

V2V devices are capable of verifying data for its authenticity, integrity
and plausibility, without depending on the runner network

Connecting Cars to Blockchain

Soarchain's plug-and-play devices connect any vehicle to the network, bringing real-world vehicle data directly onto the blockchain. These devices enable vehicles to continuously share valuable data in real time, forming the foundation of the decentralized mobility ecosystem.

By using these devices, users gain ownership of their data and can monetize it within the network, opening up new opportunities for services tailored to their driving patterns and vehicle usage. From enhanced insurance models to predictive maintenance, these devices enable a new era of data-driven mobility solutions.

Easy Installation:

No complicated setup. Just plug it in and you're connected.

Real-Time Data:

Continuously streams and verifies road, traffic, and safety data.

Secure:

Built with advanced encryption to ensure your data stays private.

Reward-Driven:

Vehicles earn incentives for every verified data contribution.

Application Ecosystem

Soarchain

Will unlock a new application ecosystem that will lead forward mobility on many fronts and enable apps for mobility. The vehicle-generated data can unlock novel revenue streams in the mobility space if stored and shared right.

- Safety & Emergency
- Artificial Intelligence
- Smart City
- Entertainment
- Insurance
- Manufacturers
- Advertisement
- Logistics
- Charging & Energy
- Maintenance
- Fleet Management
- Mobility Services

Our Vision

We envision safer and smarter mobility for everyone.

An ecosystem where participants, including vehicles, data providers, and developers, can interact and exchange value securely. It provides a platform for developers to build apps specific to the mobility industry, fostering innovation and collaboration.

The Team

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Find out more

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