



ChainLynx Bikepacking App – Architecture Overview

Pre-Release Technical Documentation — November 2025

The ChainLynx Bikepacking App is built on a hybrid, privacy-first architecture that prioritizes user sovereignty, offline accessibility, and secure community interaction.

- 1. Architectural Philosophy** ChainLynx follows a "privacy by design" approach. The system is decentralized in practice—core features such as journaling, AI assistance, and data backups operate locally or through user-owned cloud storage. Community data, like trail reports and meetups, reside in a minimal backend built only for shared interactions.
- 2. Core Layers**
 - **Device Layer** — The heart of the app, responsible for local storage, offline maps, journaling, and AI inference. All user actions begin and end here.
 - **Personal Cloud Layer** — Connects the app to user-selected services (iCloud, Google Drive, OneDrive). Stores encrypted journals, settings, and AI models. Each user fully controls this data.
 - **Community Cloud Layer** — A minimal shared environment storing anonymous trail reports, points of interest, meetups, and shared journals. Data is stripped of identifying metadata.
 - **Object Storage** — Handles public media assets such as route photos and videos, accessed via pre-signed URLs to preserve data isolation.
 - **Ephemeral GPS Layer** — Manages live location sharing sessions that expire automatically when deactivated.
- 3. Security and Data Protection** All communication uses TLS 1.3 for transport security. Sensitive data is encrypted locally using AES-256 before any upload. User identifiers are hashed, and the backend never stores raw personal information.
- 4. Scalability and Modularity** The architecture is modular. Each subsystem—maps, journals, AI, messaging—operates as a pluggable module communicating via defined APIs. This allows incremental updates, offline functionality, and integration of future modules such as weather and bike shop directories without altering the core.
- 5. Future Expansion** The design anticipates integration with decentralized identity systems, alternative storage providers (Nextcloud, WebDAV), and additional communication protocols. This ensures long-term sustainability while preserving ChainLynx's privacy principles. The hybrid model allows ChainLynx to combine the best of offline autonomy and online collaboration, creating a platform where data ownership and usability coexist seamlessly.