



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.