Waku Service Marketplace

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Introduction to Waku

Waku is a family of open-source, modular P2P communication protocols that are:

- permissionless
- decentralized
- privacy-preserving
- censorship-resistant

Waku is used by Status, Railgun, and The Graph, among others.

Waku Network Architecture

Waku nodes choose which protocols to run:

- **RLN-Relay**, the backbone of the network;
- **Light protocols** suited for resource-restricted devices.

Rate Limiting Nullifiers (RLN)

Waku defends against DoS attacks using ZK-based Rate Limiting Nullifiers (RLN).

RLN works as follows:

- Users register a membership in a smart contract;
- Users attach a proof of membership to each message;
- Relay nodes only propagate messages with valid proofs.

Waku Light Protocols

Resource-restricted *Edge nodes* may request services from *Service nodes*:

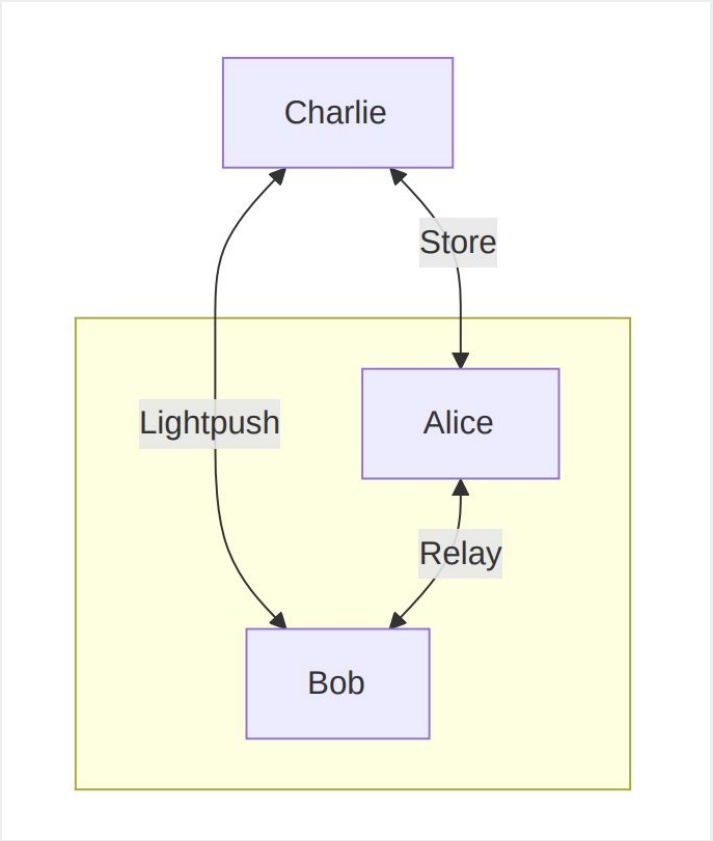
- **Filter**: subscribe to a subset of relayed messages;
- **Lightpush**: publish a message to the network;
- **Store**: query historic messages.

Service Nodes and Edge Nodes

Alice and Bob are Service nodes.

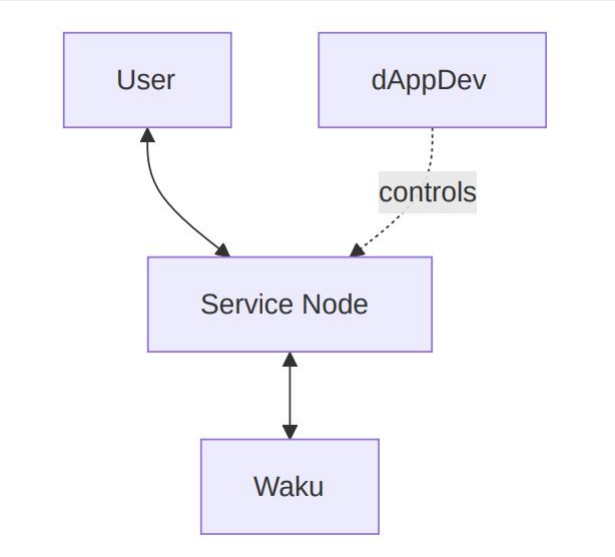
Charlie is an Edge node.

The Waku Relay network in yellow.



Who Runs Service Nodes?

Usually, d(App) developers run service nodes for the users of their (d)App.



Drawbacks of Centralized Service Provision

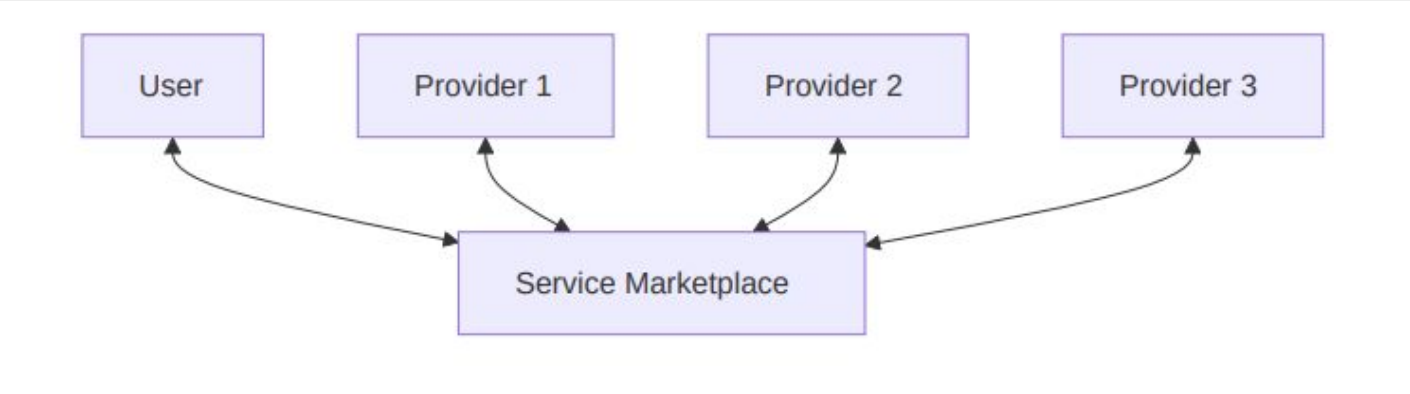
- Central point of failure
- Maintenance and operational expertise required
- Censorship and privacy risks

If dApp devs have to run infrastructure, it is not truly decentralized!

Can We Decentralize Waku Service Provision?

The Waku Service Marketplace Vision

Independent providers to deliver Waku services directly to users off-chain.



Two User Interaction Models

- Subsidized Model
  - dApp devs pay for the Waku services on behalf of its users.
  - Reduces user friction, "free-tier" experience.
  - Funds can be allocated via a smart contract.
- Sovereign Model
  - Users choose and pay service providers directly via the marketplace.
  - Greater control over privacy and setup.
  - Analogous to users paying blockchain transaction fees.

Benefits of the Marketplace Approach

- "No-devops" model
  - Devs focus on dApp development, not on node maintenance
- Flexibility
  - Users choose service providers that best suit their needs
- Free market
  - Competition among providers incentivizes lower cost and higher quality
- Resilience and Censorship resistance
  - Misbehaving providers are easy to replace

Research Directions

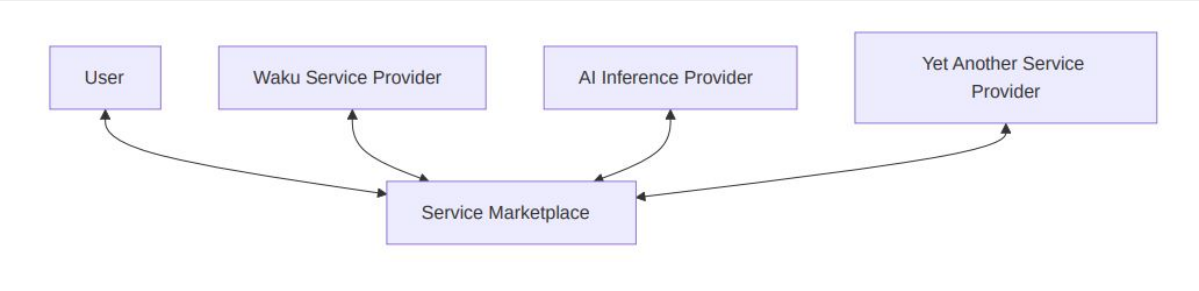
The Waku Marketplace is a concept and a work in progress. Challenges to be addressed:

- Discovery
  - "Needle in the haystack" - how to find which nodes provide a given service?
- Pricing
  - How to set and negotiate prices?
- Payment mechanism
  - How to pay and verify payments?
- Reputation
  - How to track and exclude malicious or low-quality service nodes?

Long-Term Vision: A Generalized Service Marketplace

A marketplace where anyone can provide a discoverable, incentivized service (think AI inference). More on that topic:

https://forum.vac.dev/t/waku-service-marketplace-for-all-services/440



Help Us Build a Decentralized Services Marketplace!

Join the discussion:

https://blog.waku.org/explanation-series-waku-service-marketplace/

Thank you!

Protocol BERG v2

The decentralized protocol and infrastructure conference.

June 12-13, Prenzlauer Berg, Berlin;
a Department-of-Decentralization event;
edition 0b11111100112.