

# HyperDB Workshop

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July 15<sup>th</sup>, 2025

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# Overview

- Holepunch stack overview
- Why Hyperdb?
- Building a hyperdb app (demo)
- Extending the app (assignment)

# Holepunch Stack

## DATA

### HyperDB

- Schemas
- Indices
- Search

### Hyperbee

- Database (B-tree)
- Lookup by key
- Iterators

### Hypercore

- Append-only log
- Sparse

## DISCOVERY

### Hyperswarm

- Swarming (continuous)
- Lookup (key → connections)
- Announce (key → connections)

### HyperDHT

- Create servers
- Announce topics (keys)
- Connect to peers (key → ip+port)
- Lookup topics (key → peer keys)

## Connections

### Protomux RPC

- Remote procedure calls

### Protomux

- Multiplex protocols

### Hyperswarm Secret Stream

- End-to-end encryption

### UDX

- Streams over UDP

# Why HyperDB?

- Efficient lookup
  - In Hyperbee:
    - ✓ Efficient lookup/search by key
    - ✗ Inefficient otherwise

En-fr → - driveKey: aaaa - type: 'translate'	En-it → - driveKey: bbbb - type: 'translate'	En-es → - driveKey: cccc - type: 'translate'	En-gen → - driveKey: dddd - type: 'generation'
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- ✓ Drive key of En-fr?
- ✓ All models starting with 'En'?
- ✗ Model name of 'aaaa'?
- ✗ All 'translate' models?

# Why HyperDB?

- Schemas + versioning + code generation
  - Hyperbee:
    - ✓ Do whatever you want
    - ✗ A lot of work
    - ✗ Easy to mess up
  - HyperDB (using hyperschema):
    - Define the schema in a build.js file
      - Encodings are automatically created
      - Extendible schema
      - Enforces correct versioning

# Demo + Assignment

<https://github.com/holepunchto/hyperdb-workshop>

- Define schemas
- Create queries for the API
  - Put
  - Get
  - Get by key
  - List models of type
  - [ASSIGNMENT] delete
- [ASSIGNMENT] Extend DB: add 'owner' field
- Add networking
  - [ASSIGNMENT] Remote lookup
  - [OUT OF SCOPE] Remote mutation
- Make resilient
  - [OUT OF SCOPE] Multiple writers with Autotbase