Database Proposal for Terrabase

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Brief Description

Terrabase is a web application that enables users to track cryptocurrencies while assessing their environmental sustainability. The platform ranks each token based on an AI-determined sustainability score, providing insights into the environmental impact of crypto assets.

1. Users Collection

```
{
  "_id": "65a6cd9ef1e2c3001c23d890",
  "username": "cryptoFan123",
  "hashed_password": "$2b$10$eImG6phJ6GkYH6tJgXYa6eG1QJd.Q8JxJ2o5uOmH2wUlgmlc0xz.a",
  "portfolioScore": 82.5,
  "watchlist": [
    "65a4bc7df1e2c3001c23a567",
    "65a4bc8df1e2c3001c23a568"
  ],
  "Role": "user"
}
```

Stores user information including credentials, portfolio score, and watchlist.

Field	Type	Description
_id	ObjectId	A unique identifier for the user
username	String	The username of the user
hashed_password	String	The hashed password for authentication

portfolioScore	Number	The average sustainability score of cryptos in the user's watchlist
watchlist	Array(ObjectId)	References to Cryptocurrencies the user is tracking
Role	String	Defines the user's role: "admin" or "user"

2. Cryptocurrencies Collection

```
{
  "_id": "65a7de5cf1e2c3001c23f901",
  "name": "Ethereum",
  "symbol": "ETH",
  "sustainability_score": 85,
  "score_explanation": "Ethereum's transition to proof-of-stake significantly reduces energy consumption compared to proof-of-work.",
  "news": [
    "65a8bc7df1e2c3001c23a567",
    "65a8bc8df1e2c3001c23a568"
  ],
  "hash_algorithm": "Ethash (PoW), now PoS",
  "coin_bio": "Ethereum is a decentralized platform that enables smart contracts and decentralized applications (DApps) to be built and operated without
  "logo": "https://example.com/logos/ethereum.png",
  "price_data": [
    { "timestamp": 1700000000, "price": 3100 },
    { "timestamp": 1700086400, "price": 3150 },
    { "timestamp": 1700172800, "price": 3080 }
  ],
  "market_cap_data": [
    { "timestamp": 1700000000, "market_cap": 380000000000 },
    { "timestamp": 1700086400, "market_cap": 385000000000 },
    { "timestamp": 1700172800, "market_cap": 378000000000 }
  ],
  "volume_data": [
    { "timestamp": 1700000000, "volume": 20000000000 },
    { "timestamp": 1700086400, "volume": 19500000000 },
    { "timestamp": 1700172800, "volume": 20500000000 }
  ],
  "white_paper": "https://ethereum.org/en/whitepaper/",
  "market_cap": 380000000000,
  "in_circulation": 120000000,
  "total_supply": 120000000,
  "max_supply": null,
  "all_time_high": 4878,
  "all_time_low": 0.42
}
```

Stores cryptocurrency details, sustainability scores, and financial data.

Field	Type	Description
_id	ObjectId	A unique identifier for the cryptocurrency
name	String	Name of the cryptocurrency
symbol	String	Cryptocurrency ticker symbol
sustainability_score	Number	AI-generated sustainability score

score_explanation	String	Explanation for the sustainability score
news	Array (ObjectId)	References to related news articles
hash_algorithm	String	The hashing algorithm used
coin_bio	String	Short description of the crypto
logo	String	Link to the logo of the crypto
price_data	Array	Array of price points with timestamps
market_cap_data	Array	Market cap data over time
volume_data	Array	Trading volume data over time
white_paper	String	Link to the crypto's white paper
market_cap	Number	Current market capitalization
in_circulation	Number	Circulating supply of coins
total_supply	Number	Total supply of coins mined so far
max_supply	Number	Maximum possible supply of coins
all_time_high	Number	The highest price the crypto has ever reached
all_time_low	Number	The lowest price the crypto has ever reached

3. Watchlist Collection

```json
{
  "_id": "65a9ef3cf1e2c3001c24a678",
  "user_id": "65a6cd9ef1e2c3001c23d890",
  "crypto_id": "65a7de5cf1e2c3001c23f901"
}
```

Tracks user watchlists separately for scalability.

Field	Type	Description
_id	ObjectId	A unique identifier for the watchlist entry
user_id	ObjectId	References the Users collection
crypto_id	ObjectId	References the Cryptocurrencies collection

4. News Collection

```json
{
  "_id": "65aa1f4df1e2c3001c25b789",
  "headline": "Ethereum Hits New High Amid DeFi Boom",
  "source": "https://www.example.com/articles/ethereum-defi-boom",
  "published_date": "2024-03-06T12:30:00Z",
  "related_cryptos": [
    "65a7de5cf1e2c3001c23f901",
    "65a4bc7df1e2c3001c23a567"
  ]
}
```

Stores sustainability-related news articles.

Field	Type	Description
_id	ObjectId	A unique identifier for the news article
headline	String	The title of the news article
source	String	The URL of the news article
published_date	Date	The date the article was published
related_cryptos	Array (ObjectId)	References Cryptocurrencies mentioned in the article

5. Transactions Collection (For Paper Trading)

```json
{
  "_id": "65ab2f5ef1e2c3001c26c890",
  "user_id": "65a6cd9ef1e2c3001c23d890",
  "crypto_id": "65a7de5cf1e2c3001c23f901",
  "quantity": 2.5,
  "price_at_trade": 3200,
  "transaction_type": "BUY",
  "created_at": "2024-03-06T14:45:00Z"
}
```

Stores user transactions for simulated trading.

Field	Type	Description
_id	ObjectId	A unique identifier for the transaction
user_id	ObjectId	References the Users collection
crypto_id	ObjectId	References the Cryptocurrencies collection
quantity	Number	The number of coins traded
price_at_trade	Number	The price at which the trade occurred
transaction_type	String ("BUY" or "SELL")	Indicates whether the user bought or sold
created_at	Date	Timestamp of the transaction

6. Admin Logs Collection

```json
{
  "_id": "65ac3f6df1e2c3001c27d901",
  "admin_id": "65a6cd9ef1e2c3001c23d890",
  "action": "Updated sustainability score for Bitcoin",
  "timestamp": "2024-03-06T15:30:00Z"
}
```

Tracks administrative actions such as manual updates.

Field	Type	Description
_id	ObjectId	A unique identifier for the admin log entry
admin_id	ObjectId	References the Users collection (admin role)
action	String	Description of the action performed
timestamp	Date	When the action was taken

API Data Sources

- **CoinGecko API:**
  - Coin Tickers by ID: https://docs.coingecko.com/reference/coins-id-tickers
  - Historical Chart Data by ID: https://docs.coingecko.com/reference/coins-id-market-chart
  - Coins List with Market Data: https://docs.coingecko.com/reference/coins-markets
- **News API (to be determined):**
  - CryptoNewsAPI: https://cryptonews-api.com/
  - NewsData.io: https://newsdata.io/crypto-news-api