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Project Close-out Report for:
Open-source Hydra Head L2 Web-based Explorer and API

Name of Project and Project URL on IdeaScale/Fund

- **Name:** Open-source Hydra Head L2 Web-based Explorer and API
- **URL:** Project on IdeaScale
- **Project Number ID:** 1200170
- **Name of Project Manager:** Roman Majovsky
- **Date Project Started:** July 19, 2024
- **Date Project Completed:** January 29, 2025

List of Challenge KPIs and How the Project Addressed Them

1. **Improved Accessibility for Hydra Development**
   - Provided a web-based explorer, eliminating the need for developers to manually parse Hydra logs.
   - Enabled real-time visualization of transactions, network status, and key Hydra metrics.

2. **Enhanced Developer Experience with an API**
   - Developed an API that allows programmatic access to Hydra Head data, ensuring ease of integration.
   - Delivered comprehensive API documentation to support developers.

3. **Open-source Contribution and Transparency**
   - Released the project as open-source, allowing the Cardano community to contribute and extend its functionality.
   - Provided structured guides, FAQs, and troubleshooting documentation to support adoption.

List of Project KPIs and How the Project Addressed Them

1. **Hydra Research and Documentation**
   - Conducted extensive research on Hydra's architecture and documented key insights.
   - Published structured technical documentation outlining different Hydra Head scenarios.

2. **Development of the L2 Explorer API**
   - Implemented an API that retrieves key Hydra data, ensuring accurate and reliable information for developers.
   - Created unit tests to validate all API endpoints and ensure stability.

3. **Functional Hydra Web Explorer**
   - Developed an interactive UI displaying key Hydra Head data:
     - **Transactions tab**: Displays all transactions inside the Hydra Head with parsed attributes (addresses, amounts, etc.).
     - **Committed UTXOs tab**: Shows UTXOs committed by Hydra Head participants.
     - **Peers tab**: Displays connected peers.
     - **Snapshots tab**: Lists confirmed Hydra Head snapshots.
     - **Protocol Parameters tab**: Retrieves and displays Hydra protocol parameters.
     - **Logs tab**: Provides raw Hydra logs with advanced filtering options.

4. **Comprehensive Developer Resources**
   - Published detailed setup guides, API documentation, FAQs, and troubleshooting instructions.
   - Structured documentation to make onboarding easy for developers.

Key Achievements

1. **Open-source Release**
   - The Hydra Head L2 Web-based Explorer and API is publicly available, allowing developers to deploy and use it freely.
2. **Structured API for Data Access**
   - Developers can now interact with Hydra Heads programmatically, reducing reliance on raw CLI logs.
3. **User-friendly UI**
   - Transactions and network data are now presented in an intuitive dashboard, making debugging more efficient.
4. **Built with Elixir and Phoenix**
   - Leveraging **Elixir** and **Phoenix**, the project ensures speed, efficiency, and scalability for real-time data updates.
5. **Dry-Run Mode for Easy Testing**
   - Developers without a Hydra Head setup can still test the Explorer using an **SQLite log file** that simulates real-world Hydra logs.
6. **Extensive Documentation and Support**
   - Created FAQs and troubleshooting guides to ensure easy adoption and minimize developer friction.

Key Learnings

1. **Developers Need an Intuitive Way to Interact with Hydra**
   - The original CLI-based approach was inefficient, highlighting the need for a structured UI and API.

2. **Iterative Development Led to Refinements**

- Internal testing and real-world use cases helped refine the API structure and improve visualization components.

3. **Real-time Data is Critical**
- Implementing real-time transaction tracking significantly improved the debugging experience.

Next Steps for the Product or Service Developed

1. **Expanding API Functionality**
    - Additional features such as multi-node monitoring and enhanced analytics.
2. **Further UI Improvements**
    - Adding visualization tools for Hydra transaction history and network metrics.
3. **Community Engagement and Adoption**
    - Encouraging developers to integrate and contribute to the project.

Final Thoughts/Comments

The **Open-source Hydra Head L2 Web-based Explorer and API** is a significant step forward in improving developer accessibility for Hydra Heads on Cardano.

By providing an intuitive interface and structured API access, the project removes barriers that previously made Hydra difficult to work with. Its open-source release ensures **long-term community collaboration and continuous improvements**.

Links to Other Relevant Project Sources or Documents

1. GitHub Repository – Hydra Explorer
2. API Documentation
3. Developer Setup Guide
4. FAQs
5. Troubleshooting Guide
6. Hydra Architecture Document
7. Video: API Demonstration
8. Video: Hydra Explorer Demonstration

Link to Close-out Video (YouTube or Vimeo)

- Close-out YouTube Video Link