



Empyreal

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1. Executive Summary

EmpyrealSDK is an innovative development toolkit that aims to bridge the gap between the growing Web3 landscape and traditional developers. By providing an intuitive interface for developers who may not be familiar with blockchain-centric languages like Solidity, EmpyrealSDK seeks to drive widespread adoption and foster creativity within the crypto space. It also streamlines the creation and management of decentralized applications by offering a modular approach, real-time data streaming, flexible automation, and end-to-end privacy right out of the box. Complementing this toolkit is the Enclave, a product that emphasizes wallet abstraction, privacy, and security. Together, EmpyrealSDK and the Enclave strive to make Web3 development more accessible, efficient, and cost-effective.



2. Introduction

a. Background

The Web3/crypto domain has evolved similarly to the early stages of the internet. Its vast potential remains largely untapped due to accessibility challenges. Most frameworks are very low level and require domain understanding of Solidity. For example, a developer typically will not be able to make a swap transaction without an understanding of transaction gas, priority fees, contract ABIs, DEX architectures, and many more concepts. There are very few tools that facilitate interacting with decentralized protocols. In addition to this, monitoring and automation infrastructure is very limited outside of Keeper networks, which also require a significant amount of domain expertise.

b. Motivation

EmpyrealSDK is driven by a vision to democratize the crypto space, similar to how Shopify revolutionized ecommerce and Stripe streamlined payments processing for everyday users. With the SDK, we aim to empower developers, regardless of their blockchain knowledge, to contribute to Web3 innovations.

Complementing this is the Enclave, an award-winning pioneering solution that merges privacy with yield generation. Utilizing the first integration of Oasis Privacy Layer on the market, the Enclave facilitates encrypted state and transaction activities, ensuring holders can wrap tokens, execute transactions, and unwrap back to their wallets with robust end-to-end encryption.



c. Problem Statement

The majority of developers, skilled in conventional programming languages, feel disconnected from the Web3 landscape due to the unique demands of languages like Solidity. This disconnect not only hinders individual developers but also prevents enterprises from integrating Web3 functionalities. EmpyrealSDK aims to bridge this gap by opening the doors of crypto innovation to a broader developer community.



3. EmpyrealSDK Solution

a. Modular Approach

EmpyrealSDK adopts a unique modular approach, consisting of distinct modules within the SDK that serve as self-contained units of execution and can be stacked as needed to create or support individual products. Each module simplifies and encapsulates a specific functionality, such as a swapping mechanism in the DEX module. This approach reduces the need for users to possess in-depth knowledge of smart contract architecture and specialized domain expertise.

While our development team is currently spearheading the creation of these modules, we also have a forward-looking interest in initiating open-source development and collaborating with external project teams.

Furthermore, while we initially focus on specific applications to meet current demands, we also intend to generalize these modules to enhance their utility across various use cases. For example, with our Data Streaming module we aim to provide an efficient means of aggregating and collecting real-time price and market data for the DeFi space, where such functionality is currently lacking despite the publicly accessible nature of this data on-chain. Likewise, there is a lot of complexity in wallet abstraction and secure management of users for application developers. There is a significant benefit to developers in providing them with a framework that can abstract a significant amount of the complexity in their Web3 integrations.

b. Language Integration

EmpyrealSDK is built using a REST API and cloud native infrastructure for its backend, and an object-oriented SDK that abstracts this SDK for users. Initially, we targeted Python for development, anticipating its rising popularity in data-centric blockchain application development.



However, we also recognize the predominant position of TypeScript/JavaScript and plan to release a TypeScript SDK once the API is stable.

One significant advantage of our approach is that it eases the complexity inherent in Web3 development. Typically, developers need a deep understanding of Solidity and knowledge of the Application Binary Interface (ABI) for contract interaction. EmpyrealSDK simplifies the interaction with smart contracts, eliminating the need to delve into method invocations and related complexities. This enables a smoother development pathway for applications like automated trading systems and market making, without requiring mastery of Solidity or in-depth understanding of each protocol's intricacies.

Furthermore, our approach offers flexibility and adaptability in developing various trading systems and strategies. For example, it enables the creation of monitors to detect large trades in the mempool and dynamically adjust collateral or leverage in response to potential risks in a cross-margin system.

c. The Enclave & Oasis Sapphire Integration

EmpyrealSDK includes the Enclave module, a solution in decentralized finance (DeFi) that combines transaction privacy with yield generation, and which won top prize in its category in Oasis's Privacy4Web3 Hackathon 2023 for "Best use of Sapphire for scalable privacy." By integrating an encryption methodology for transactions and enabling yield generation, EmpyrealSDK aims to bridge the gap between financial privacy and capital efficiency. This is achieved through the use of the first confidential Ethereum Virtual Machine (EVM), which overlays on Oasis Sapphire, resulting in an encrypted state. With this mechanism, token holders can participate in activities such as wrapping into the Enclave, executing transactions, and unwrapping tokens back to their chosen wallet, all while maintaining end-to-end encryption. Even Empyreal cannot decipher the activities within the Enclave.



The technical framework of the Enclave establishes a secure and hidden transactional environment where asset control, transfer, and management occur privately, without compromising operational efficiency. Users can generate private keys for encryption, and the flexibility of a second private key helps minimize risks associated with potential loss or security breaches. EmpyrealSDK strives to merge security with user-friendly transactional experiences. The Enclave ensures that transactions from deposit to withdrawal are executed with a comprehensive veil of confidentiality, keeping financial activities concealed within the Enclave and introducing a new dynamic to the conventional blockchain transaction environment.

With the Enclave, our goal is to create a scenario where DeFi aligns not only with transparency but also with the benefits of privacy. This methodology not only facilitates private token transactions but also establishes a robust layer above the existing DeFi ecosystem that is resistant to Maximal Extractable Value (MEV). By ensuring user transaction privacy, interactions with protocols can occur without the inherent risk of frontrunning or being identified by copytraders.

d. Automation & Bots

The versatility of EmpyrealSDK extends beyond specific use-cases like bots and applies to any blockchain application that requires automation. While existing frameworks may not offer comprehensive solutions for certain tasks, such as setting limit orders, EmpyrealSDK aims to provide a robust framework that allows users to develop trading strategies or automate any blockchain interaction. The ultimate goal is to create a framework that is comparable to Apache Airflow in Web 2.0 development, capable of managing automation for users and facilitating the creation of complex, potentially interconnected pipelines. These pipelines can trigger actions within a Web3 environment, empowering developers to build larger scale applications.



4. Technical Overview

EmpyrealSDK is fundamentally based on a data model built upon an Object-Relational Mapping (ORM), mapping entities to database tables and linked to a REST API, constructed using an asynchronous Python 3 framework with FastAPI. This selection of Python architecture and libraries aligns with current Python REST API tooling.

In addition, there's a specialized Web3 framework aimed at simplifying interactions with various Web3 concepts through an object-oriented design. This framework offers generalized methodologies for developing abstractions on Web3 protocols like Orbiter, Layer0, Uniswap, AAVE, GMX, and more. For example, the bridging module standardizes the interaction with different blockchain bridges by offering a uniform interface, mitigating challenges caused by diverse interfaces across different bridges, and facilitating developers in building multi-chain pipelines. In doing this, a developer can simply provide an invocation to bridge funds from one chain to another using the bridge with the lowest current fees, and if they have additional concerns or want to analyze more data on the current bridging solutions, we enable them to do so.

The SDK serves as an abstraction layer, not merely working on a REST API but also providing models like the token model, both at the back-end and within the SDK, each exposing functionalities for respective use cases. For instance, DEX-related functionalities (such as performing a swap on Uniswap on Ethereum) are abstracted in a manner that simplifies interaction through the SDK. In the same regard, users can easily query price, volume, and get individual trades for DEXs, or query transfer and holders for a specific ERC20 token. This is built on top of a custom indexer and decreases reliance on highly limiting APIs like Arbiscan or DEX Screener.



5. Use Cases

a. Automation

We envision numerous use cases that highlight the potential of the EmpyrealSDK in facilitating innovative DeFi solutions. Essentially, a dApp is a self-functioning entity that operates through on-chain invocations. Our primary focus with dApps is to empower users to automate their strategies.

Our indexer module is designed to provide accurate reporting to protocols, focusing on specific changes rather than raw data. Often, dApp developers lack sufficient monitoring for their protocol's security. There are numerous instances where a protocol was exploited without the developers being aware until being informed via a tweet. This module can enhance the efficiency of dApp developers, empowering them to construct more sophisticated alert systems.

With the Enclave, we can create abstractions on wallets that allow for increased security. This allows us to invoke specific functions on behalf of a wallet should certain conditions be met. For instance, should there be a potentially exploitable change in a particular protocol parameter, we can automate the execution of the wallet's 'pause' function. Immediately following this, we send a message to alert the protocol team. This automation and monitoring not only optimize protocol security but also help teams react swiftly and effectively to potential threats.

EmpyrealSDK also aims to enable developers to effortlessly monitor 24-hour yields on various pairs (e.g. on Uniswap v3), optimize liquidity allocation ranges, and automatically adjust strategies based on real-time conditions - all without the complexities of Web3 development. Our goal is to allow developers to concentrate on their specific business logic rather than grappling with technological intricacies.



One particularly compelling scenario involves developing trading systems for cross-margin activities, where users leverage their assets to mitigate risk exposure and promptly rebalance their collateral when transactions arrive to the mempool. This process significantly reduces liquidation risk and ensures users can adapt effectively and safely to rapid market fluctuations.

Furthermore, we are exploring possibilities where developers, after creating a strategy, can automate fund management or establish a strategic fund in which others can allocate capital. This has the potential to democratize access to well-crafted trading strategies for non-technical end users.

We are not only laying a solid foundational framework with EmpyrealSDK but also working towards a future where complexities are minimized, allowing for a wide range of use cases to be explored and realized with reduced friction and enhanced efficiency in the DeFi space. This remains our unwavering focus and aspiration as we continue to develop and refine EmpyrealSDK.

b. dApps

In addition to the featureset discussed in Automation, we have made significant progress in developing onchain applications that facilitate functionalities of the SDK. One such development is the Enclave, a secure compute environment. It seamlessly connects to logical operations on any supported blockchain chain, increasing the scope of potential features for the SDK.

Our wallet abstraction module is another example, which we submitted in October 2023 for the Oasis Privacy4Web3 Hackathon, and which went on to win the top prize in the “Best use of Sapphire for scalable privacy” category. This module allows a user to delegate specific contract-related tasks to an external wallet with precision. It opens up a possibility for users to automate their portfolio according to a multichain trading strategy.



At the same time, it establishes strong safeguards to prevent us from taking certain actions on their behalf. These privileges can be revoked at any moment.

We're also in the process of deploying our custom DEX router contracts, which will improve our trading automation and fee retrieval process. Our philosophy of simplifying Web3 development is centered around building efficient tooling onchain.

Building on Arbitrum brings several unique benefits to our project. Its robust bridging infrastructure, lower fees, and quicker finality give application developers an edge. Similarly, users may not need to understand the chain they are interacting with if they use a well-designed application with wallet abstraction. As we grow our managed liquidity, bridging this liquidity to Arbitrum appears increasingly advantageous.

For instance, a token doesn't necessarily need to support a multichain strategy officially. If we notice a large number of users trading a particular token, we can consolidate their positions, tokenize it on Arbitrum, and offer fully custodial trading of that token at significantly lower gas costs.

c. Bots

EmpyrealSDK plays a crucial role in the world of blockchain automation, providing bot developers with significant advantages. The main challenge in blockchain development lies in the isolation of knowledge and the presence of redundant development cycles. This leads to inefficiencies as multiple engineers independently tackle the same problems, harming the ecosystem. To address this challenge, EmpyrealSDK offers a simplified yet powerful framework for creating Telegram integrations with the SDK.



Its mission is to democratize development capabilities and potentially establish a gold standard for streamlined functionalities that can be shared and leveraged by others, resulting in a more efficient development process. To address this challenge, EmpyrealSDK offers a simplified yet powerful framework for creating Telegram integrations with the SDK. Its mission is to democratize development capabilities and potentially establish a gold standard for streamlined functionalities that can be shared and leveraged by others, resulting in a more efficient development process. We have created a custom tailored framework for bot development that abstracts significant complexity in integrating a trading strategy with a multi-level Telegram menu. By doing this, we are enabling developers to focus on business logic and not have to spend extensive time learning the complexities of Telegram and Web3 APIs.

What sets EmpyrealSDK apart in this competitive space is its focus on simplicity and efficiency in the development process. It achieves this by abstracting user-related queries, such as executing swaps, retrieving swap history, obtaining token prices, and calculating Profit and Loss (PNL). By doing so, the SDK significantly simplifies developers' tasks and contributes to the efficient capture and distribution of knowledge. It consolidates insights from various development efforts into a user-friendly, streamlined platform.

We envision a scenario where EmpyrealSDK, with its low friction and high utility, becomes the preferred choice for bot developers. They can use it for prototyping, data analysis, strategy development, and ultimately deliver these strategies to users on platforms like Telegram. Simplifying the process of building innovative tools is central to our mission. The simplicity is likely to inspire more developers to participate, leading to a net positive impact as adoption spreads. Additionally, the SDK will encourage the exploration and implementation of new primitives not only within the broader blockchain space but also specifically within DeFi.



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6. Market Analysis

We believe there is a clear demand for EmpyrealSDK due to existing gaps and inefficiencies in blockchain and Web3 development tools. Current tools, often deemed suboptimal by developers, predominantly focus on Solidity testing, while neglecting other crucial aspects of Web3 development. EmpyrealSDK stands out by focusing on DeFi tooling, an area that has received limited attention so far.

Although there are similar tools in the market, they often cater to different needs, such as dashboard creation, alerting, or data provision, and may not align with the actual trading and diverse developer requirements in the DeFi space.

Existing solutions, like APIs from DEXTools or DEX Screener, have strict rate limitations. Others, like The Graph, prioritize data aggregation from event data and decentralization, which might not be direct competitors but could be potential partners. On the other hand, Alchemy, while offering some convenient services, often falls short of developers' requirements, with certain features, such as its alerting API, being notably limiting.

EmpyrealSDK is being developed with a focus on providing a simple API that facilitates tasks like retrieving the past 24 hours of trading data for a token through a straightforward RPC or REST call, among other functions. It aims to be a developer-friendly tool, designed with the practical needs and desires of developers (like the team themselves) in mind, offering functionalities that are currently either non-existent or significantly limited in the blockchain development space.



The team also recognizes a demand not only for innovative modules but also for a platform similar to Hiroku or a hosted Airflow, where users who are reluctant to set up traditional cloud accounts can simply use crypto to pay for API calls and application hosting. This aligns with the growing trend and desire for more decentralized payment processing, as well as improved overall usability and access to development tools.



7. Competitive Analysis

To date several platforms and tools have emerged with the goal of making blockchain development more accessible. However, very few have successfully addressed the gap between traditional software development and blockchain-centric programming.

1. Individual Bot Developers: EmpyrealSDK faces immediate competition from individual bot developers, primarily operating in the Telegram ecosystem. While these bots have gained popularity, they tend to cater to specific niche needs and often lack standardization. Their fragmented nature requires developers and users to place trust in multiple sources, without any guarantee of quality or security.
2. Traditional Web3 Toolkits: Several toolkits exist that simplify Solidity programming or enable blockchain integration. However, these predominantly assume a foundational understanding of blockchain concepts and are not designed for individuals who are only familiar with traditional programming languages.
3. Lack of Modular Solutions: Many platforms offer a one-size-fits-all solution, which does not necessarily meet the specific needs of diverse developers. EmpyrealSDK distinguishes itself by providing a unique modular approach, enabling developers to pick, choose, and customize their toolsets based on the specific requirements of each project.
4. Integration Challenges: While some platforms aim to bridge the Web2 and Web3 domains, their focus often lies solely on frontend or user interface development. EmpyrealSDK, on the other hand, emphasizes both frontend and backend aspects. This comprehensive approach simplifies the entire application creation process.



5. Adoption Barriers for Enterprises: Transitioning into the Web3 space can be particularly challenging for large corporations and businesses. The steep learning curve and lack of suitable tools often hinder their progress. Although some platforms attempt to address this segment, they ultimately fall short by failing to offer a comprehensive toolkit that eliminates the need for in-house blockchain development teams.

In the current tool landscape, we believe EmpyrealSDK stands out with its distinctive approach of bridging traditional programming with the intricacies of Web3. It caters not only to individual developers but also to enterprises, paving the way for widespread adoption and innovation in the blockchain space.



8. Tokenomics

Ticker: \$EMP

Chain: Arbitrum

a. Total Supply

Total supply as of the publication of this white paper is 300,000 \$EMP. All tokens are in circulation. We will leave open the possibility of a one-off supply increase of 11% to 333,333 no sooner than January 31st, 2024, if there is appropriate justification and community support for it. The increased supply (33,333 tokens) will have a 6-month cliff and will be linearly vested over no less than 24 months. These tokens will be allocated with 8% to the team (new and existing hires) and 3% to growth initiatives (marketing and partnerships). Since there was no team allocation during the TGE, this supply increase is left as an option in the case that the team wants to create additional supply to facilitate growth.

b. Revenue Share Model

The intention behind the business model is to ensure long-term sustainability of the project, providing meaningful upside to investors, and a solid foundation for EmperyalSDK's growth as the project matures.

- A fee of 0.35% will be applied to every transaction enabled via the EmperyalSDK modules.
- 50% of accrued revenues will be shared with \$EMP token stakers once daily revenue exceeds \$2,500 for at least 15 days in a 30-day period.
- In the intervening period (when daily revenue is <\$2,500), the proceeds will be gathered in a reward pool. Once the revenue threshold is reached, the accumulated amount in the pool will be distributed to stakers in proportion outlined above over a 3-month period.



c. Staking

Specific implementation will be defined and shared by the end of Q4 '23. However, we commit to the following underlying principles:

- There will be no minimum requirement of \$EMP tokens for staking eligibility.
- We wish to incentivize long-term project participation by introducing an APR reward mechanism for staking participants. It will be ONE of the following:
 - A reward mechanism with a lock-up period of up to 6 months. Participants are rewarded proportionally to the length of time they have staked (e.g. via a -ve token system), OR
 - A linearly increasing reward system, where multiplier points are accrued based on the period of time each wallet's tokens have been locked up. This is similar to GMX's approach and rewards users for supporting the protocol without creating a lockup for users.

d. Trading

No taxes beyond the standard trading fees that apply to platforms like Uniswap.



9. Roadmap

SDK modules developed as of October 2023

- User Interface and Experience (Best-in-class Telegram interface, View Customization)
- Trading Features (Easy Trading, Price Discovery, Trading History, Simulation)
- Trade Adjustments (Value Selection, Slippage and Priority, Anti-MEVI)
- Insights and Analytics (Tax & Honeypot Detection, PnL Analytics)
- Wallet Management (Wallet Overview, Balances)
- Vault (for representing Shared Stake)

Q4, '23

Note: Two operational advisors have joined the team in Oct '23 to drive business- and marketing/comms-related work streams (see more info below in the team section).

Product

- Beta testing & launch of Empyreal Trading Bot (SDK proof-of-concept)
- GambleFi module
- SocialFi module
- App-Specific Vaults module
- Orderly Multichain Perpetuals module
- OPL Wallet Privacy module
- API Management module
- Data Streaming module
- Identifying modules for 1st round of open-sourcing



Partnerships

- Develop formal partnership with Oasis through the Privacy4Web3 Hackathon. Empyreal's submission highlights our work on the Enclave and provides a reference implementation on how the Enclave can be extended for wallet abstraction.
- Co-marketing with Orderly to raise awareness about EmpyrealSDK's Orderly Multichain Perpetuals module.
- Arbitrum Foundation Grant submission.
- BloXroute partnership.
- Build a partnership pipeline of at least 5 high-profile partners for prospective integrations.

Marketing/Communications

- Formalize multi-channel content strategy.
- Accelerate content delivery across socials and community channels.
- Website refresh.
- Rebranding.

Q1, '24

- Token supply increase (referenced above).
- Staking launch after establishing a consistent revenue stream.
- Uniswap v4 module development.
- GMX perpetuals & leverage integrations.
- Integrate with at least 3 high-profile partners and build out further partnership pipeline.



10. Core Team & Advisors

Core Team:

- **Johnny (Founder & Lead Developer)** Johnny is a seasoned Systems Engineer with a wealth of experience in enterprise-level technology. Prior to starting Empyreal, he worked as a Software Engineer at a FAANG company. Johnny brings a strong passion for programming, particularly in Rust, Python, and Functional Programming.
- **Bill (Co-founder)** Active in the crypto space since 2017, Bill helps oversee non-dev related work-streams across community engagement, marketing, business development, and operations.
- **Greg Ivanov (Strategy & Operations)** Greg is a General Partner at [22/7](#). He previously spent 12 years at Google in various product strategy and business development roles focussing on enabling and growing developer ecosystems (Google Play, AR, VR, Android TV and Android Auto).
- **Iggy (Content Lead)** A storyteller with 15 years of marketing experience, Iggy has spearheaded customer-facing content experiences for diverse companies, ranging from SaaS start-ups to blue-chip tech giants.



Advisors:

- **fakeguru (Strategy & Branding)** Fakeguru has 20 years of international experience in creative production. He contributes insights to strategy, team operations, product, and branding rooted in his deep experience.
- **Effy (Business Development)** Effy is a partner at Sneaky Ventures, a pseudo-anon crypto and crypto-adjacent proprietary venture capital fund that has incubated numerous early stage projects. He has been active in the crypto space since the summer of 2020.



II. Conclusion

EmpyrealSDK represents a ground-breaking development toolkit that serves as a bridge between the rapidly expanding Web3 landscape and traditional developers. By offering an intuitive interface designed for developers less familiar with blockchain-centric languages like Solidity, EmpyrealSDK aims to spark widespread adoption and foster innovation within the crypto space. The inclusion of the Enclave further enhances EmpyrealSDK's mission of simplifying Web3 development, improving foundational privacy and security, reducing time constraints, and increasing cost-effectiveness.

