DIODE: A Web3 Game Distribution Platform

Whitepaper

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October 30, 2025

Abstract

DIODE is a Web3-powered PC game distribution platform that leverages blockchain and NFTs to grant true ownership of digital games. By representing game licenses as non-fungible tokens (NFTs), DIODE enables gamers to buy, sell, and trade their digital games freely, much like physical discs. This whitepaper outlines the value proposition, technical architecture, blockchain integration, smart contract design, user workflows, and roadmap for DIODE. The platform aims to align the interests of players and developers: gamers regain the ability to resell or gift their games, and developers earn revenue not just on initial sales but also from peer-to-peer resales via enforced royalties. We discuss how DIODE's NFT-based digital rights management (DRM) works, how the marketplace splits revenues, and why blockchain is an ideal backbone for this ecosystem. Finally, we present a development roadmap and go-to-market strategy, positioning DIODE as a next-generation "Steam on blockchain" that empowers users and content creators alike in the evolving landscape of digital ownership.

1 Introduction

In today's gaming industry, buying a digital game typically grants a limited, non-transferable license locked to one account. Platforms like Steam, Xbox Live, or PlayStation Network do not allow players to resell or even share the digital titles they purchase – the concept of "used games" has effectively vanished in the digital era. Gamers are left with libraries of titles they can't monetize or gift, and developers have no stake in any secondary market that might exist. This is a sharp departure from the days of physical game media, where a game could be loaned to a friend or sold second-hand.

Vision: DIODE's vision is to restore true ownership to gamers by using blockchain technology. Every game purchased on DIODE is minted as a unique NFT license to the user's crypto wallet, giving them actual ownership of a digital asset. This NFT can later be transferred, resold, or even used as collateral – whatever the owner wishes – without platform interference. In essence, DIODE brings the economics of physical game ownership to the convenience of digital distribution, creating a "Steam meets blockchain" ecosystem.

Value Proposition: By enabling game license resale, DIODE provides value on both sides of the market:

- *For gamers:* the ability to recoup value from finished games by selling them, or to acquire titles second-hand at a discount. Instead of accumulating "digital dust" in accounts, players have liquidity and true property rights in their game collection.
- *For developers/publishers:* new revenue streams via resale royalties. On DIODE, when a game NFT is resold peer-to-peer, a percentage of that sale goes back to the developer automatically.

This was impossible on traditional platforms where publishers earned nothing from used game sales. Additionally, DIODE's primary market fees are significantly lower than the industry standard, meaning developers keep more from initial sales as well.

This paper will detail DIODE's business model and how it achieves these benefits, then dive into the technical architecture underpinning the platform, and finally outline the development roadmap to turn this concept into reality.

2 Business Model and Ownership Economics

2.1 True Ownership via NFTs

When a user purchases a game on DIODE, they receive an NFT in their wallet that represents the license for that game. This token acts as a digital ownership certificate, verifiable on the blockchain. Unlike the status quo where a user's "purchase" is just a contractual right tied to a platform account, DIODE's NFT license is actually owned by the user. Ownership means the user can transfer or sell the game license at will, peer-to-peer. Transferring the NFT effectively transfers the game license and all rights to play that game via the DIODE platform to the new owner.

This model closely emulates the physical market: just as one could sell a used game disc, DIODE users can sell their game NFTs. The original owner loses access once they sell (the NFT leaves their wallet), and the new owner gains full play access. Gamers thus avoid the trap of sunk cost in games they no longer play – they can resell a finished game and monetize their playtime investment. In traditional platforms, publishers like to say "you are buying a game, not renting it," yet you cannot do anything with it after purchase; DIODE corrects that imbalance by turning a purchase into a true asset.

Importantly, while users gain these ownership rights, publishers retain control over the intellectual property. The NFT license does not convey copyright or duplicative distribution rights – it simply allows the holder to download and play the game. DIODE's terms will clarify that NFTs are licenses governed by publisher-specified conditions (for example, no commercial use, etc.), much like today's EULAs but with transfer rights baked in.

2.2 Revenue Streams for Developers and the Platform

Initial Sales (Primary Market): Developers will earn the lion's share of each initial game sale on DIODE. Our platform fee for new purchases is targeted around 10–15%, meaning 85–90% of the sale price goes to the game's creator. This is a far better revenue split for developers than the 30% cut on Steam or console stores. For example, on a $40 game sale, a developer might keep $34 (85%) while DIODE takes $6. This developer-friendly fee structure is designed to attract game studios to list their titles on DIODE. (By comparison, Steam's 30% fee has long been industry standard; even emerging competitors undercut this – for instance, Epic Games Store takes 12%, and Robot Cache only takes 5%, letting developers keep up to 95% of the proceeds.)

Secondary Sales (Resale Market): Every time a player-to-player resale occurs, DIODE's smart contracts enforce a royalty fee on the transaction. A typical model would be a 5% royalty in total, which is then split between the developer and the platform. For instance, DIODE might take 2% and the developer gets 3% of each resale. These percentages can be adjusted per title or globally, but the key point is that the original creator continues to earn revenue each time their game changes hands. This is a revolutionary shift: previously, used game sales (physical or otherwise) yielded zero to the developers. Now it becomes a perpetual revenue stream and an incentive to enable resales. Platforms like *Ultra* (a blockchain game store) have implemented similar resale

fees – Ultra's marketplace charges a very low base fee (4% total, split as 2% protocol fee and 2% marketplace fee) and allows creators to set their own additional royalty percentages on NFT resales. DIODE will implement a straightforward, on-chain royalty mechanism to ensure fairness and transparency.

Player Incentives: From the gamer's perspective, the resale royalty is usually factored into the resale price. For example, if they sell a game for $30 and there's a 5% fee, they receive $28.50 net. This is still value back in their pocket that would be impossible on a traditional platform. In Robot Cache's model, sellers get 25% of the resale price while the developer gets 70% and platform 5%. DIODE's approach will be more generous to the seller than physical retail (where often digital sellers got 0% because resale was completely forbidden). Our aim is that gamers typically recoup a meaningful portion (e.g. 50% or more) of a game's price on resale, depending on demand and publisher settings. This effectively lowers the cost of gaming for users – for instance, a gamer might buy a $60 title and later sell it for $30, making their net cost $30.

2.3 Competitive Pricing & Resale Controls

One concern with enabling resale is the potential for it to cannibalize new sales (if everyone just waits for cheap second-hand copies). DIODE addresses this with smart but flexible controls:

- **No-Resale Period:** Developers can specify an initial period (e.g. 90 days from launch) during which the NFT cannot be resold. This mimics a window where only new copies are available, so that early sales aren't undercut. Such a restriction can be coded into the smart contract or enforced at the marketplace level.

- **Floor Price:** Developers/publishers may set a minimum resale price for their game (for example, not less than 50% of the full price) during a certain timeframe. This prevents a "race to the bottom" where users might drastically undercut the new price immediately. It ensures the title retains value and the studio's revenue from ongoing sales isn't overly diminished. On DIODE, this would be implemented as a check in the marketplace contract that refuses listings below the allowed floor.

- **Resale Fee Configuration:** Publishers can choose their royalty cut (within reason). If a developer believes their game should yield them 10% on each resale, they can configure that, though we will advise optimal ranges. Notably, if the developer sets a very high resale cut, the seller's incentive drops, which could reduce the number of resales. Balancing this is a question for each developer to find a sweet spot where players still find resale worthwhile. DIODE will offer guidance and default settings (likely around a 5% total fee) to keep the ecosystem healthy.

By giving content creators these levers, DIODE makes publishers more comfortable with the resale concept. They opt in under their terms, rather than having it forced upon them. Many publishers will likely see the upside: even with, say, a 5% royalty, that's additional revenue from users who might have otherwise waited for a deep discount sale or never bought the game at all. Early data suggests allowing resales can increase primary market activity too – gamers feel safer purchasing a game at full price if they know they can sell it later, which can lead to more total sales. For example, Ultra reported that after introducing resellable NFT licenses for an indie title, the game saw more initial purchases than before, as resales increased its exposure and gave players confidence they could recoup value. Enabling resales can thus become a win-win that drives engagement (buyers try more games knowing they aren't "stuck" with them).

2.4 Comparison to Existing Models

The concept of a blockchain-based game store isn't purely theoretical – projects like *Robot Cache* and *Ultra* have pioneered similar ideas, validating the model:

Robot Cache: Launched by industry veteran Brian Fargo, Robot Cache lets users resell digital games for a cut of the price. Robot Cache's platform fee is only 5% on both new sales and resales, dramatically undercutting Steam's 30%.. In their system, a resale yields 70% of the price to the publisher, 25% back to the player, and 5% to the platform. They introduced their own cryptocurrency (IRON) for transactions and even allow users to mine IRON via the client to earn store credit. Robot Cache's philosophy is that "developers can keep more of their hard-earned profit" while gamers get something back for their purchases. In fact, Fargo noted that earning *any* money on the used game market was previously unheard of for publishers, and getting up to 70% on resales is equivalent to the best margins developers receive on new sales today. DIODE shares this philosophy and improves on it by using widely adopted tokens (like stablecoins or mainchain currency) instead of requiring a new coin, for ease of use.

Ultra: Ultra is another "Web3 Steam" platform that has built a custom blockchain (UOS, a fork of EOSIO) to support its game store. Ultra allows NFT-based game licenses and enforces royalties at the protocol level. Ultra's marketplace fees are very low (roughly 2% for the protocol and 2% for the marketplace), and the content creator sets the resale royalty percentage. Ultra opened its PC game store in 2023, and by December 2023 it launched the first digital PC game that can be resold via NFT license. All games on Ultra's store are now tokenized on its blockchain, meaning that – with publisher permission – users can freely transfer and trade those game licenses. Ultra reportedly had over 150 publishers and developers signed up prior to full launch (even big names like Ubisoft participated in Ultra's testnet) due to interest in this model. This strong interest from developers shows that the industry is warming up to the idea of NFT-based distribution, especially when presented as an opt-in model that can be lucrative and controlled by the publisher. DIODE will differentiate itself by focusing on an EVM-compatible chain initially (for broader wallet support and interoperability) and by emphasizing ease-of-use for mainstream gamers, but Ultra's progress confirms that our core concept is not only viable but likely represents the future of digital distribution.

In summary, DIODE's business model is a win-win: gamers gain freedom and value through true ownership, and developers gain higher margins plus ongoing revenue from a secondary market. The platform's own revenue comes from modest fees that scale with usage, aligning our incentives with the ecosystem's success. Next, we delve into how this is technically achieved.

3 Platform Architecture and Technology Stack

DIODE's architecture blends traditional elements (a PC client, cloud services) with blockchain components to deliver a seamless user experience. The high-level design includes:

1. **PC Client Application** – the user interface for browsing games, initiating purchases/resales, and launching games (analogous to Steam or Epic Games Launcher).

2. **Crypto Wallet Integration** – the mechanism for user identity and ownership tracking, using blockchain wallets instead of traditional accounts.

3. **Smart Contracts on Blockchain** – handling NFT minting, transfers, and marketplace transactions with royalty enforcement.

4. **Backend Services** – supporting infrastructure for content delivery (game file storage/distribution), user analytics, and off-chain data caching.

3.1 Client Application and Wallet Login

The DIODE client will be a desktop application (Windows initially, with plans for Mac/Linux later) through which users interact with the platform. Upon installation, instead of creating a username/password account, users will log in with a crypto wallet. The wallet address becomes the user's identity on DIODE. This approach leverages the security of blockchain keys – if you own the wallet, you own the account.

At launch, DIODE will integrate existing popular wallets:

- *Browser wallets (e.g. MetaMask):* The client can embed a web view or use deep linking to prompt MetaMask for a signature. MetaMask (and similar Ethereum-compatible wallets) will work seamlessly if we choose an EVM blockchain for DIODE.

- *WalletConnect support:* This allows users to connect mobile wallets by scanning a QR code in the DIODE client. Users who prefer mobile wallets like Trust Wallet or Rainbow can use this method to log in.

- *Future options:* As we target mainstream gamers (many of whom may not have crypto wallets), we will explore user-friendly wallet solutions. Possibilities include integrating a social login wallet (where an email or Google account can create a non-custodial wallet behind the scenes), or offering a simple custodial wallet for beginners. Projects like Immutable Passport or Magic.Link provide near-frictionless onboarding where a wallet is created with minimal user effort. While initial power users can use MetaMask, lowering the barrier for newcomers will be key in later stages.

Account Security: To authenticate, the DIODE client will request a signature of a random nonce from the user's wallet. This signed message proves ownership of the address without exposing any private keys. No sensitive data is stored by DIODE – losing access to the wallet means losing access to the games, so users will be advised to secure their wallet (just as they would their Steam account credentials, but here recovery is decentralized). In the future, we may introduce an optional account recovery service or smart-contract-based social recovery if users desire a safety net, but the baseline model treats the user's wallet as the source of truth.

3.2 Blockchain Backend Selection

Choosing the right blockchain is critical for DIODE's user experience. Key requirements include low transaction fees, fast confirmation times, smart contract capability, and broad wallet support. We evaluated several options:

- **Ethereum Layer-1:** Ethereum is the most battle-tested smart contract platform and widely supported by wallets. However, its gas fees and limited throughput make it impractical for frequent transactions like game purchases (users won't pay a $10 gas fee on a $40 game). Ethereum L1 is thus not suitable for our main transactions, though we might use it for certain high-value collectibles or interoperability in the future.

- **Ethereum Layer-2 / Sidechains:** This is a strong starting point. Networks like Polygon (PoS chain) offer EVM compatibility with fees on the order of fractions of a cent and high throughput. Polygon is already used by many NFT and gaming projects, meaning many users will have it configured in their MetaMask. Other Ethereum scaling solutions like Immutable X (which targets

gas-free NFT trades) or Arbitrum Nova (optimized for social/gaming) are also contenders. Using an Ethereum L2 means we benefit from Ethereum's security while achieving the needed performance and cost profile. Polygon in particular is attractive for launch due to its mature ecosystem and widespread wallet support.

- **Alternate L1 Blockchains:** Purpose-built chains like WAX or Flow were considered. WAX (Worldwide Asset eXchange) is an NFT-centric chain known for high throughput and no gas fees (it uses a staking model for resources). It's also carbon-neutral and already hosts many game dApps.*(https://www.wax.io/)*. Flow (from Dapper Labs) has proven scalability in projects like NBA Top Shot. However, these come with the downside of requiring integration with their unique tech (Flow's Cadence language, WAX's custom wallets, etc.), which could limit interoperability. Binance Smart Chain (BSC) offers low fees and a large user base, but is more centralized and can still have dollar-scale fees at times. Solana provides high speed and low cost, but it uses a different wallet ecosystem and has had some stability issues historically.

- **Custom App Chain:** In the long run, DIODE could develop its own blockchain (similar to Ultra's approach using an EOSIO-based chain). A custom chain could be optimized for our use case: e.g. free transactions by the platform staking resources for users, on-chain account recovery, and native NFT logic. Ultra built their own blockchain for these reasons – to ensure transactions in their ecosystem are feeless and instant for users, funded by the platform's staked pool of UOS tokens. While appealing, this path requires significant effort in securing and maintaining a new network, and in bootstrapping node infrastructure and validators. As a startup, leveraging an existing chain with robust security is wiser for speed-to-market.

Decision: DIODE will initially deploy on an EVM-compatible, low-fee network (Polygon) for the NFT contracts and marketplace. Polygon strikes a good balance of cost (¡$0.01 typical tx fee), speed (around 2s blocks), and user/developer familiarity. This means we can use Solidity smart contracts and existing tooling (OpenZeppelin libraries, MetaMask, etc.) out of the box. If Polygon's performance meets our needs, we stick with it. Should we encounter scaling issues at extreme volume, we can migrate to a dedicated solution or Layer-2 that offers greater throughput. The architecture will be modular enough that the specific chain can be swapped if needed (we'll design contracts to allow migration or bridging of NFTs if we ever move chains).

Transaction Currency: To reduce volatility and make pricing straightforward, we plan to use a stablecoin (e.g. USDC) or the chain's native token for purchases. Listing games in USD-equivalent terms is important for both users and developers to have predictable pricing. Many NFT marketplaces use stablecoins or their own token for pricing (e.g. OpenSea supports USDC, Axie Infinity's marketplace uses AXS/SLP). On Polygon, for example, we could accept USDC or MATIC. Using USDC has the advantage that 1 USDC = $1, avoiding confusion. The smart contracts can be written to accept a specific token as payment (with the flexibility to add support for multiple currencies later if needed).

Native Platform Token: In the initial version, DIODE will *not* introduce its own cryptocurrency. The focus is on functionality using existing currencies. However, we envision a future DIODE token that could power a loyalty and reward system. Such a token (akin to Robot Cache's IRON or Ultra's UOS) might be earned through community participation or staking for benefits like fee discounts. We acknowledge the potential but will only pursue a native token at a later stage, once the platform is established. Any mention of a DIODE token in this paper is purely a future possibility – it is not part of the current implementation plan, keeping things straightforward for now.

3.3 Smart Contracts: NFT Licenses and Marketplace

At the core of DIODE's system are smart contracts governing game NFTs and the marketplace. We outline the key contracts and their functionality:

Game License NFT Contracts: For each game listed on DIODE, a corresponding NFT contract (ERC-721 standard) will be deployed. Every time a user buys that game, the contract mints a new token (license) to the user's wallet. This token ID can have metadata pointing to the game's details (name, edition, cover art or manual if applicable). We chose ERC-721 (non-fungible tokens) because each license is unique to a user and we need robust ownership tracking. (In cases where a game might have multiple identical copies, ERC-1155 could be considered, but we prefer the simplicity and broad support of ERC-721.)

Each game's NFT contract will be owned or controlled by the DIODE platform (at least in terms of who can mint new tokens). This ensures that only an authorized sale can create a new license token. We can also embed the royalty info in the contract. Specifically, we will implement the EIP-2981 royalty standard on these NFTs, which allows the contract to declare a royalty percentage and payout address(es) for secondary sales. For example, the "*CyberBlade 2077*" game NFT contract might specify a 5% royalty, paid 50% to the developer's address and 50% to DIODE's address. Marketplaces that honor EIP-2981 will then automatically send those portions to the right parties on each sale.

Marketplace Contract: DIODE's marketplace is a set of smart contract functions that facilitate listing and selling of game NFTs. The typical workflow:

(a) A user who wants to sell an NFT calls `approve()` on the game's NFT contract to allow the marketplace contract to transfer it (standard for NFT marketplaces).

(b) Then they call `createListing(tokenId, price)` on the marketplace contract. This stores a listing for that NFT (we can choose to let the user retain the NFT until sale, or escrow it in the contract; retaining it but marking it as "listed" is user-friendly, while escrow is simpler to manage—our implementation will ensure the NFT cannot be transferred elsewhere while listed).

(c) Another user calls `buy(listingId)` with the specified price, which triggers the contract to transfer the NFT from seller to buyer and transfer the payment from buyer to seller.

During the buy execution, the contract will automatically deduct the royalty and fees. For example, suppose price = 100 USDC and royalty = 5%. The contract will take 5 USDC out of the 100; the remaining 95 goes to the seller. From that 5 USDC fee, it might split (say) 2.5 to the developer and 2.5 to DIODE (per the configured splits). All of this happens atomically on-chain. The transaction event will record the sale and price, providing transparency and a record of ownership transfer.

For initial purchases (buying a new game from the store), we have a couple of design options: - We can *mint on demand*: i.e., a user clicks buy, the payment goes to a store contract function which mints the NFT to them and splits the payment to the developer and DIODE. - Or we *pre-mint* a supply of NFTs to a DIODE treasury address which are then transferred on sale (this is less appealing since games are not limited-run assets; on-demand minting is more logical for unlimited digital goods).

We will likely integrate the initial sale into the marketplace contract as well (so there is a unified purchase function that either mints a new NFT if it's a first-party sale, or transfers an existing NFT if it's a resale). This unified approach is how factories work, where a token factory contract handles both primary issuance and secondary transfers under certain rules.

Security and Upgradability: All contracts will be audited and based on well-known templates (OpenZeppelin libraries for ERC-721, etc.). We will exercise caution in allowing upgrad-

ability. The NFT contracts for games ideally should be immutable (once deployed, the rules of ownership shouldn't change). The marketplace contract could be upgradable via a proxy, since marketplace logic might need to evolve (for new features like auctions, rentals, or to patch any discovered bugs). If we do upgrade the marketplace, it will be done transparently and likely governed by the platform's multi-sig or a community DAO in the future. Users will always own their NFTs regardless of marketplace changes – in a worst case, if an old marketplace is deprecated, the NFTs can still be traded elsewhere or migrated to a new contract, since the tokens adhere to open standards.

Off-Chain Data and Indexing: While ownership is tracked on-chain, things like game metadata (title, description, cover image) and library indexing will be cached off-chain for performance. DIODE's backend will run an indexer node that listens to NFT contract events. When a new NFT is minted or transferred, our database updates who owns what. This allows the client to quickly answer "what games does address X own?" without scanning the blockchain every time. However, the blockchain remains the source of truth – any discrepancy can be resolved by re-syncing events. We also plan to store the actual game files or download URLs off-chain (due to their large size), with cryptographic hashes on-chain or in metadata to verify integrity.

3.4 Content Delivery and DRM Integration

Owning the NFT license grants the user the right to download and play the game via DIODE. However, the actual game binaries (often tens of gigabytes) will be delivered via a content distribution network (CDN) or cloud storage rather than directly from the blockchain (which is infeasible for large files). Our approach:

- Game files are hosted on DIODE's servers or a cloud provider, possibly leveraging peer-to-peer distribution for efficiency (similar to how Blizzard's launcher or Steam use peer networks for patches). We might also integrate decentralized storage (like IPFS/Filecoin) for redundancy or for storing smaller game assets or updates.

- When the user clicks "Download" on a game in the DIODE client, the client first verifies that the user's wallet still owns the corresponding NFT. This check can be done by querying our backend indexer or directly via a blockchain API.

- If ownership is confirmed, the client requests the game installer or package from the CDN. This request includes an authorization token tied to the user's session/wallet (to prevent sharing of download links). The game data downloads through standard channels (HTTP or P2P), just as it would on a traditional platform.

- The game is then installed on the user's machine. To enforce DRM, the DIODE client (or a lightweight runtime stub) will verify NFT ownership on game launch. Essentially, the DIODE client must be running (and logged in) to launch any game, acting as the DRM layer. The client will refuse to launch a game if the user doesn't have the NFT in their wallet at that moment.

We will support both online and offline play modes, similar to existing launchers: - *Online Mode:* The client continuously ensures the wallet holds the NFT. On game start, it does a quick check (via our API or a direct blockchain call) to verify `ownerOf(tokenId) == userAddress`. If yes, it permits the game to run (possibly by injecting a transient token or simply by not blocking execution). If no, it aborts launch. - *Offline Mode:* We understand players may want to play offline for some time. DIODE can allow a grace period where the client caches a proof of ownership. For

example, when last online, the client can store an encrypted confirmation that allows play for up to X days offline. After X days without an online check (e.g. 7 days), the game will require reconnection to verify ownership. This behaves like Steam's offline mode (which requires periodic online verification). Publishers may be allowed to set this offline allowance window for their titles if desired.

License Token Mechanism: One implementation detail is to issue a temporary license token or ticket on the user's PC when they launch a game. This could be a file or memory token containing: - The user's wallet address - The NFT ID (game license) - An expiry timestamp for offline allowance - A signature from DIODE's servers or a keyed HMAC that the game or client can verify

The game (or a DIODE DRM module that wraps the game) would read this token to confirm it's valid. If the user sells the NFT, any cached license token would be invalidated upon the next online check (or expire naturally after the offline window). We will ensure that once an NFT is sold, the seller cannot continue playing: the next license verification will fail, and even in offline mode, once the grace period ends they'll be locked out. The new owner, of course, can immediately download and play the game.

This approach ensures no static keys or license codes are given out that could be reused illicitly. The NFT itself is the key, and it's non-duplicable and revocable by transfer. Even if someone copied the game files, without the NFT the DIODE client will not authorize it to run (short of illegal cracks, which we address below).

Preventing Unauthorized Copies: Blockchain provides a strong record of ownership but cannot stop someone from copying bits on a hard drive. DIODE's defense against piracy is at the software level:

- *Client-side authentication:* Games will be integrated (via an SDK or API) with DIODE's authentication. Many games already use external DRM SDKs (Steamworks API, Denuvo, etc.); similarly, DIODE will offer a lightweight API for developers to call at game startup to check license status. We can also enforce that games are launched via the DIODE client so that an authenticated environment is always present.

- *Encryption:* We may encrypt certain critical game files and only decrypt them on the fly when the user is authenticated. However, heavy-handed encryption can impact performance, so this will be used judiciously (for instance, encrypting an executable or a crucial asset and decrypting in memory at launch).

- *Online features:* Games that have online components inherently require server checks; those servers will query DIODE's API to ensure the connecting player's wallet owns the NFT. For purely offline single-player games, we rely on the above DRM mechanisms. We acknowledge that determined hackers might crack a single-player game by stripping out our checks (just as they do with other DRM schemes). No DRM is 100% unbreakable. However, our model offers incentives to use the legitimate platform (resale value, community features, automatic updates). We will update our DRM over time and potentially include subtle watermarking or community reporting to deter widespread sharing of cracked copies.

Our stance is similar to other platforms: make piracy difficult enough that most users won't bother. By offering a fair deal (e.g., the ability to resell and recoup value), we further reduce the incentive to pirate. If a user knows they can resell a game after playing, they may be less inclined to seek an unauthorized free copy with no resale value or support.

Game Patches and Sunsets: When a user owns the NFT, they are entitled to all patches/updates the developer releases, just like any rightful owner. If a developer ever delists a game or stops supporting it, the NFT remains as proof of entitlement. DIODE could employ decentralized storage or community mirrors to preserve the last available version of the game, ensuring owners can still download it even if the game is pulled from sale. This ties into a broader movement in some jurisdictions (e.g., the EU) to require that games remain playable even if official servers shut down. In fact, a recent European initiative calls for publishers to provide means for gamers to continue playing discontinued games (such as enabling private servers or issuing patches to remove online checks). DIODE's architecture – with NFTs representing ownership and potentially community-hosted game files – is well-positioned for game preservation. If needed, we could transfer NFTs to a different chain or issue a final update to remove online requirements, to ensure lifelong access for buyers.

Revocation and Fraud: A delicate area is fraud: for example, if a fraudulent payment is made (stolen credit card used to buy crypto, then a game NFT is purchased). Can the NFT be "revoked"? On a decentralized blockchain, we cannot delete a token from a user without consent. Our policy will lean towards not revoking NFTs except under extreme circumstances. Instead, we'd address fraud by disabling the associated account in our client (preventing further downloads) and working with authorities off-chain, or by compensating the affected parties through other means. Consistency and trust demand that if you own an NFT, it's yours. We won't arbitrarily seize licenses. In rare cases of critical bugs or exploits, we might issue a new NFT and deprecate the old one via a contract upgrade (with community communication), but such measures would only be as a last resort. Essentially, user ownership is treated as sacrosanct – that's the promise of Web3, and DIODE will uphold it.

4 User Flow: Buying, Selling, and Playing Games

To illustrate how a user interacts with DIODE, let's walk through common scenarios step-by-step, highlighting the on-chain and off-chain actions involved.

4.1 Buying a New Game (Primary Purchase)

1. **Browse & Select:** The user opens the DIODE client, which displays a store catalog of games. Game listings show a price (e.g. 50 USDC or equivalent), game details, and perhaps the resale royalty info so users know the fee on resales.

2. **Initiate Purchase:** The user clicks "Buy". The client prepares a blockchain transaction. If using MetaMask, for example, a popup will appear showing the transaction details (a contract call to DIODE's store/marketplace contract, plus the payment amount). The user confirms the transaction in their wallet.

3. **On-Chain Minting:** The transaction is sent to the blockchain. The DIODE smart contract receives the payment and mints a new NFT from the game's NFT contract to the buyer's wallet address. Simultaneously, the payment is split according to the predefined revenue share: the contract directs the appropriate percentage to the developer's address and the rest to DIODE's treasury. For example, the contract might be set such that Developer X gets 90% for this game, so it transfers 45 USDC to Developer X and 5 USDC to DIODE on a 50 USDC sale.

4. **Confirmation & UI Update:** Within a short time (a few seconds, depending on block time), the transaction is confirmed. The client, listening for events or via polling, sees that the purchase succeeded. The game now appears in the user's Library section of the DIODE client.

5. **Download Available:** The "Buy" button changes to "Download" since the user now owns the game. The presence of the NFT in their wallet is the proof of ownership. (The user could even view their newly acquired game NFT in an external wallet or block explorer if they wished.) The client stores a mapping of the token ID and game for quick reference.

6. **Revenue Distribution:** The developer immediately and automatically receives their revenue share (in crypto). Because the sale and split happened on-chain, the developer got paid instantly; there is no 30-60 day payout delay as is common on traditional app stores. This trustless, transparent payment builds confidence with developers, who can independently verify every sale on the blockchain.

From the user's perspective, aside from the crypto wallet step, this feels similar to any digital purchase – except there was no platform account to log into beyond connecting a wallet, and the user has tangible ownership of a token afterwards.

4.2 Downloading and Playing

1. **Download:** After purchase, the user clicks "Download" in the DIODE client. The client contacts the DIODE backend (or a content server) with the user's auth token and requested game. The backend verifies that the user's wallet still owns the NFT (checking our database or directly querying the blockchain). If all checks out, it grants a secure download URL or begins the download stream.

2. **Installation:** The game's files download and install on the user's machine. This may include installing DIODE's runtime or an API library if the game uses it for license checks. The game is now ready to play.

3. **Launch:** The user hits "Play" in the DIODE client (or double-clicks the game, which routes through DIODE's launcher). The client (or game) performs a license check:

    - If online: the client quickly checks that the NFT is still in the user's wallet (via our service or a direct on-chain call). Alternatively, the game might call our SDK which queries the client for validation. If valid, the game launches. If not, it aborts with an error.
    - If offline: the client refers to its last known ownership cache. If the user's offline period is still within the allowed window, it permits launch. If the user has been offline too long or if the NFT was sold (which the client would detect once it reconnects), it will require an online check before launching.

4. **In-Game:** Once running, the game behaves normally. If the game has online multiplayer or features, the game's own servers can double-check NFT ownership by requesting the user to sign a challenge with their wallet or by querying DIODE's API for that user's license status. For single-player games, typically no further checks occur during gameplay unless the developer chooses periodic verifications.

5. **Periodic Verification:** If the user remains online while playing, the DIODE client might periodically verify the NFT (for example, every few hours) and cache the result. This is to catch edge cases, e.g. if the user sells the NFT mid-game. In such a rare case, we might gracefully warn the user or prevent saving further progress once they no longer own the game. However, generally a player wouldn't sell a game while actively playing it.

6. **Updates:** When game patches are released, the user is notified in the DIODE client and can download the update – again, requiring valid ownership. If a user somehow skipped an update and then sold the NFT, the new owner will still be able to download the latest version, since entitlement to updates follows the NFT (license), not the original download.

The gameplay experience is intended to be identical to current platforms, with the addition of wallet-based login which we strive to make as seamless as possible. Performance and latency of license checks are critical, so we will optimize these by using local caching and instantaneous responses (our backend can confirm an NFT ownership in milliseconds using an indexed database, while still being backed by the tamper-proof blockchain data). The heavy cryptography (signature verification for login) happens only at login, which is manageable. After that, the experience is like any other game launcher.

4.3 Selling a Game (Secondary Market)

1. **Initiate Resale:** After finishing a game, the user may decide to sell it. In their DIODE library, next to the game, they click "Sell" (or "List for Sale"). A dialog prompts for a listing price. The platform might suggest a price based on recent used sales or publisher rules (e.g. a minimum price). The user sets, say, $30. Upon confirmation, the client begins the listing process.

2. **Blockchain Listing:** The DIODE client triggers the necessary blockchain transactions:

   - If not already done, it asks the user to approve the marketplace contract for transferring that game NFT (a one-time approval per game contract).
   - It then calls the marketplace's `createListing` function with the token ID and price. The NFT can remain in the user's wallet but marked as listed (the contract will reject any transfer of that token outside the marketplace while it's listed, effectively locking it for sale). Alternatively, we may escrow the NFT in the contract until sale completes. In either case, the user's intent to sell is now recorded on-chain.

3. **Listing Live:** The game now appears on DIODE's marketplace for others to see. The listing includes the game title, the specific token (license) on sale, the asking price, and the seller's address (or a masked ID). If multiple users list the same game, multiple listings will be shown (we may sort by lowest price or highlight the best offer). For example, other users browsing that game's page will see an option "Buy Used for $30" alongside the standard new price.

4. **Buyer Purchases Used Copy:** Another user (call them Bob) decides to buy Alice's listed copy for $30 (perhaps because it's cheaper than the new price). Bob clicks "Buy Used". His client will execute the `buy(listingId)` transaction, paying 30 USDC to the marketplace contract. Bob confirms this in his wallet.

5. **On-Chain Transfer:** The marketplace contract performs the atomic swap: it transfers Alice's NFT to Bob's address, and transfers the payment to Alice, minus the fee. Continuing the example, price = 30 USDC, royalty = 5%. The contract thus distributes:

- 5% of $30 is $1.50 as fees. According to our assumed split, perhaps $0.90 goes to the developer (3%) and $0.60 to DIODE (2%).
- The remaining $28.50 goes to Alice (seller), sent directly to her wallet.

This all happens in one blockchain transaction, guaranteeing that either both the payment and NFT transfer occur, or neither does (no risk of one side defaulting).

6. **Post-Sale Updates:**
   - Alice's DIODE client, if online, gets notified that her sale completed. The game is removed from her library (since she no longer owns the NFT). If her client was offline, it will discover the sale next time she logs in by seeing the NFT is gone from her wallet.
   - Bob's client sees the NFT license arrive in his wallet (we can have the UI polling for the transaction confirmation). The game then appears in Bob's library as owned, with a "Download" button now available for him.
   - Alice receives 28.5 USDC in her wallet automatically. If she opens her crypto wallet app, she'll see a transaction crediting her that amount from the marketplace contract. There's no withdrawal or further action needed – it's her crypto to keep or convert as she wishes.
   - The game's developer can see on-chain that a resale occurred for $30 and that they earned, say, $0.90 from it. These individual micropayments may be small, but over many resales they can accumulate. The developers effectively have a new passive revenue stream from what used to be a zero-revenue activity (used sales).
7. **Access Control Enforcement:** The moment the sale is finalized on-chain, Alice's wallet no longer holds the NFT. If Alice still had the game installed, she will no longer be able to launch it. The next time her DIODE client checks ownership (which could be at game launch or during an online ping), it will see she isn't the owner and will prevent the game from running. If Alice were in the middle of playing when she sold it (an unlikely scenario), the game would eventually detect the lost license and prompt her accordingly. In practice, selling a game implies she's done playing it.
8. **External Marketplace Note:** It's worth noting that, because these NFTs are standard tokens, such a sale could even occur outside of DIODE (for example, on a third-party NFT marketplace). If Alice transferred her game NFT to someone via an external platform, DIODE's backend would still register that transfer, and Bob (the new owner) could use the game on DIODE. We intend to capture royalties via standards like EIP-2981, which most NFT marketplaces can honor, meaning even off-platform sales would ideally still pay the developer cut. If a marketplace did not honor these (or if a transfer was done privately), the sale might circumvent our fee. However, the new owner would still only get the one license (and the seller would lose access), so the system's integrity holds. We will encourage using DIODE's built-in marketplace by keeping fees low and providing a seamless experience (and possibly offering rewards for using our marketplace).

This user flow demonstrates how blockchain technology automates trust. Neither party had to trust the other or a centralized entity to "allow" the sale; the smart contract ensured a fair swap of value for the license, or the transaction would not execute. Everything is auditable on-chain, addressing concerns about scams or chargebacks that often plague digital item trading. Once a sale is confirmed on the blockchain, it is final and transparent.

5 Regulatory and Market Considerations

While DIODE's technology opens up a new paradigm, we must navigate the existing legal and market environment for digital goods:

Digital Ownership Rights in Law: There is active discussion, especially in Europe, about consumers' rights to their digital purchases. A notable case occurred in France, where in 2019 a court ruled that Steam should allow resale of digital games based on EU principles of exhaustion of rights. However, that ruling was overturned on appeal in 2022, maintaining the status quo that EULAs can forbid resale of downloaded games. The final blow came in October 2024, when France's Supreme Court (*Cour de cassation*) upheld the ban on reselling digital video games, concluding that the doctrine of exhaustion does not apply to digital copies of games (viewing them as software licenses governed by copyright law) *(https://www.jonesday.com/en/insights/2024/12/french-supreme-court-rules-on-resale-of-digital-video-games)*. In short, under current EU law, platforms are legally allowed to block resale of purely digital games.

Yet, the initial 2019 decision and surrounding debate signaled a shift in attitudes. The fact that a court at first sided with consumers indicates momentum toward recognizing digital resale rights. The European Parliament has also shown interest in digital fair use for games: for example, a resolution adopted on 18 January 2023 called for stronger consumer protection in online gaming, which implied that practices like forbidding resales or shutting down online games without offering preservation options should be re-examined. Furthermore, a European Citizens' Initiative (ECI) titled "Stop Destroying Videogames" was launched in mid-2024, aiming to require that games remain playable (via official or third-party servers) even after publishers end support, and to solidify consumers' rights to their digital games. This initiative gathered over 1.4 million signatures by late 2025 (*https://www.gamesradar.com/games/despite-fears-that-stop-killing-games-1-4-million-signatures-were-plagued-by-fakes-organizers-are-are-confident-we-have-surpassed-the-required-thresholds/*), surpassing the threshold for the EU Commission to consider it. The campaign (also known as "Stop Killing Games") is moving into the legislative phase, reflecting a strong consumer demand that digital purchases should behave more like owned property. Such developments suggest that DIODE's model could soon align with, or even get ahead of, regulatory expectations. If laws evolve to mandate that digital purchases be transferable or continuously accessible, platforms like DIODE will already be compliant and well-positioned as leaders in consumer-friendly practices.

Global Market Strategy: Attitudes towards secondary game markets vary globally. In the U.S. and many parts of Asia, there's significant demand for player ownership (consider the robust gray markets for game item trading, or the popularity of player-to-player sales in markets where allowed). Asia, in particular, is ripe for Web3 gaming solutions – countries like South Korea and Japan have avid gaming communities and are gradually embracing blockchain tech (with some regulatory hurdles around crypto, which are slowly easing). DIODE plans to launch globally, but initial marketing will focus on North America, Europe, and Asia-Pacific, where digital distribution is dominant and gamers are receptive to new models that offer tangible benefits. Europe's evolving legal stance could actually become a tailwind: if the EU eventually enshrines some right of resale or game preservation, DIODE can position itself as a compliant, consumer-friendly alternative at the forefront of this change, whereas incumbents might scramble to adjust. We will closely monitor regional regulations – for example, if some countries ban transfer of game licenses, we might geo-restrict the NFT transfer feature there or work with policymakers to clarify that an NFT license transfer is permissible. Our overall stance is to be proactive in advocacy: we can show that giving users more rights doesn't destroy the industry but can expand it, a case we will make to both gamers and authorities.

Competitive Landscape: Our competition ranges from traditional stores (Steam, Epic Games

Store, GOG, console stores) to emerging blockchain platforms (Ultra, Robot Cache, and others). Against *Steam/Epic:* DIODE's unique selling point is true ownership and monetization of games, which they do not offer. We will pitch to users: "Don't just buy games – *invest* in them. Own them and trade them." To developers: "Earn more per sale and even on resales, instead of 0% from used games today." We anticipate skepticism from large publishers initially (due to fear of resale cannibalization), but by offering them control and royalties, we make it a potentially attractive proposition. Against *Ultra/Robot Cache:* we aim to differentiate on openness and ease-of-use. For example, DIODE will use established wallet standards and tokens to lower friction (Ultra requires its custom wallet and token; Robot Cache requires IRON or an account on their platform). DIODE will also be chain-agnostic long-term (we could potentially support multiple chains or migrate to better tech as it arises). Another factor is content: neither Ultra nor Robot Cache has yet secured any "killer app" exclusive or mass adoption. We have the opportunity to learn from their trials. Ultra, for instance, has built a whole ecosystem (with tournament platform, NFT marketplace, etc.), which is powerful but also complex; our strategy is to nail the core functionality of distribution and resale first, achieving a smooth user experience, then iterate on community features. Additionally, our revenue model for developers (taking around 10–15% on primary sales) is extremely competitive – better than Steam's 30%, on par with or better than Epic's 12%, and close to Robot Cache's 5% (we might not match 5% initially because we need to sustain operations, but even at 10–15% we're offering a great deal). In summary, we'll emphasize that DIODE is *for the gamers and developers*, not just another marketplace with heavy fees and restrictions.

Licensing and Partnerships: To build a strong catalog, we need to partner with content providers. We will start by targeting independent game developers and mid-size publishers, who are often more open to new distribution channels, especially ones that offer better revenue shares. Early adopters might include indie studios who already sell DRM-free or on itch.io, and are willing to experiment with NFT licenses if it means extra revenue. We plan to reach out through developer forums, blockchain gaming communities, and events (like GDC, Gamescom, NFT/blockchain conferences). We could offer incentives such as reduced platform fees for early partners or technical support to integrate our SDK. For larger publishers, we will pitch pilot programs: e.g. try launching one older title on DIODE or allow resale on a certain franchise's back-catalog, with the promise of data sharing and a revenue comparison to see the effect. If we can demonstrate, say, that allowing resales increases engagement and even primary sales (as Ultra's early tests indicated), more publishers will come on board. Having even one or two recognizable AA or AAA titles as a proof-of-concept could be game-changing for perception. We'll also explore partnerships with platform-agnostic IP holders – for example, publishers who have left the market (abandonware) or public domain-like scenarios – to populate some content. Another avenue is to partner with NFT-savvy game developers (those already making blockchain games) to list their titles on DIODE, since they'll conceptually align with us and bring an existing audience of Web3 gamers.

Funding Strategy: Building DIODE is ambitious and will require capital for development, infrastructure, and marketing. Our funding approach will be multi-pronged:

- *Equity and VC Investment:* We will seek angel and venture capital, particularly from investors who understand both gaming and blockchain. The pitch is that DIODE taps into the $200+ billion digital games market with a disruptive model that can unlock new revenue. We highlight that our revenue scales with every transaction (primary or resale) and that we have the potential for a token economy in the future. Early interest might come from crypto-focused funds, but also from traditional gaming investors looking for the next distribution innovation.

- *Community and Crowdfunding:* Because gamers are our audience, we are considering an

early community funding round (akin to a Kickstarter or Republic campaign). This could involve selling a limited "Founders NFT" or lifetime membership that gives perks (like fee discounts, early access, or governance votes) to supporters. Not only would this raise funds, but it would bootstrap a community of evangelists. Of course, any token issuance would be carefully weighed against regulatory compliance; initially, a simple crowdfunding for equity or for a membership NFT (without promise of profit) might be done.

- *Grants and Partnerships:* We will explore grants from blockchain foundations (many L1/L2 ecosystems have grants for projects that drive usage) or strategic partnerships (for example, with a hardware manufacturer or a game engine company) which could provide funding or in-kind support (like marketing exposure).

As the platform grows, if we introduce a DIODE token later, there could be a token sale (subject to market conditions and legal considerations) to further fund expansion. But in the early phases, we'll focus on equity and community funding to avoid overcomplicating our launch with a token.

Legal Entity and Compliance: We will incorporate DIODE in a jurisdiction that is friendly to both cryptocurrency and digital commerce. Options include certain U.S. states (for example, Delaware corporation with proper guidance on token issues) or jurisdictions like Switzerland or Singapore which have clearer frameworks for crypto projects. We will ensure to comply with relevant regulations: - If we enable fiat-to-crypto on-ramps or custody user funds, we may need money transmitter licenses or to partner with licensed payment processors. - We will have to handle taxes on game sales (e.g., VAT in Europe). Potentially the smart contract can be configured to include a tax component based on buyer location, or we handle it off-chain by pricing with tax included and remitting via our business entity. - Because NFTs could technically be seen as transferable licenses, we will craft our Terms of Service carefully to clarify that users are obtaining a license represented by an NFT and what rights they have. Publishers will also have agreements with us that allow this NFT licensing of their content. - We'll be vigilant about not positioning NFTs as "securities" or any sort of investment scheme. They are simply digital game licenses. This distinction is important in the U.S. and other jurisdictions with strict securities laws. - Age ratings and regional content restrictions: We will incorporate existing frameworks (like verifying age for mature games, or region-locking a title if we have to due to licensing of that game). Overall, we will have legal counsel from both the gaming and blockchain domains to guide our policies.

6 Development Roadmap

Delivering DIODE's vision will happen in stages. Below is our proposed roadmap with major milestones and phases:

6.1 Q1 2026 – Prototype and Alpha Launch

- **Core Smart Contracts:** Develop initial smart contracts for NFT licensing and the marketplace on a testnet (e.g., Polygon Mumbai). These include basic minting, transferring, and resale with royalty logic. Perform internal tests covering purchase flows and edge cases.

- **Launcher Prototype:** Build a bare-bones PC client that can connect to a wallet (e.g., via MetaMask integration) and display a sample game library. Implement a test purchase flow using testnet contracts and a dummy game entry, and a simple DRM check that consults the testnet.

- **Indie Pilot Games:** Partner with a handful of indie developers to onboard 3–5 games for the alpha. These could be DRM-free titles or new indie releases willing to try Web3 distribution. The goal is to test the full pipeline with actual game files and get real content in users' hands. We might target games that are not on Steam or have small communities, to start without heavy pressure.

- **Closed Alpha Testing:** Run a closed alpha with a small group of tech-savvy users (perhaps 100–500, drawn from our community or blockchain gaming enthusiasts). Gather feedback on the user experience: wallet login flow, purchase and resale process, and game launching. Iterate quickly on UX improvements and fix any major bugs or security issues.

6.2 Q2–Q3 2026 – Beta 1 (Closed Beta, 10k users)

- **Mainnet Deployment:** Deploy the platform on a production blockchain network (likely Polygon mainnet). The core contracts should be audited by this point. Migrate any testnet data if needed (or simply restart fresh on mainnet).

- **Expanded Game Catalog:** Onboard more games – aim for 20–50 titles in the catalog. This will include more indie games and ideally a couple of mid-tier publishers' titles. We'll use the success stories from alpha to convince more developers. The platform fee advantage and resale royalties will be key selling points.

- **User Onboarding Enhancements:** Implement features to make onboarding easier for non-crypto users. This could include integrating WalletConnect for mobile wallets, offering an embedded wallet creation (perhaps using a service like Magic to allow email login that secretly creates a wallet), and guiding users through acquiring their first USDC/MATIC (potentially integrating a fiat on-ramp service so they can use credit cards to fund a purchase).

- **Marketplace Functionality:** Enable the resale marketplace UI in the client for users to list and browse used games. By Beta 1, users should be able to actually resell their games to each other on mainnet. Monitor on-chain activity and ensure the royalty distributions are occurring correctly for each sale. Also enforce the developer-configured rules like no-resale periods or floor prices on new releases.

- **DRM Robustness:** Strengthen the DRM integration in collaboration with pilot developers. Ideally, integrate our license-check SDK into those pilot games and release updated builds on DIODE. We want to ensure that the license verification is secure but not overly intrusive or performance-hitting. Also implement the offline mode functionality and test it.

- **Scalability and Infrastructure:** Set up scalable backend infrastructure: high-availability nodes or blockchain API services for checking ownership, scalable storage/CDN for game files, and analytics pipelines to track usage. Although the user count is limited in closed beta, we prepare for larger numbers.

- **Closed Beta Rollout:** Expand the user base to around 10,000 in a controlled beta. This might be invite-based or queue-based signups. We will target both crypto-savvy gamers and traditional gamers open to trying something new. The goal here is to stress test with more variety of systems and network conditions, and to start building community enthusiasm. Provide active customer support to beta users to resolve any friction points.

6.3 Q4 2026 – Beta 2 (Open Beta, Feature Expansion)

- **Feature Expansion:** Implement additional features to bring DIODE on par with other game launchers. For example: cloud saves/backups for games (possibly via an integration with a cloud storage service or blockchain storage for save files), a user review system for games, a basic friends list and social profile (maybe tied to wallet addresses or ENS names, etc.), and community forums or chat channels for game discussions.

- **Rentals and Gifting:** Explore advanced features like game rentals (temporary transfer of an NFT with automatic return, which could use an ERC-4907 "rentable NFT" standard) and game gifting (transferring an unused redemption code or NFT to a friend with zero cost). If feasible, implement one of these in beta form to test the concept.

- **Mobile and Web:** Begin development of companion apps: perhaps a mobile app that at least allows library viewing, store browsing, and initiating downloads on your PC remotely. Also, a web interface for the marketplace and library (even if playing still requires the PC client). Accessibility across platforms will broaden our reach.

- **Tokenomics Planning:** If we intend to introduce a DIODE platform token or reward points, beta 2 is a time to finalize that plan. We may run a simulated rewards program in Beta 2 (e.g., give users "points" for using the marketplace, which could later convert to tokens or perks). However, any token rollout would be cautious and likely after legal vetting.

- **Security Audits:** By now, an additional round of professional security audits should be done on the entire system (smart contracts, client application, backend). This is crucial before a full launch. We will also run a bug bounty program to crowdsource security testing from the community.

- **Open Beta Launch:** Transition from closed beta to open beta—meaning anyone can sign up (or simply download the client and connect a wallet) without an invite. At this stage, we aim to have a solid library of at least 100+ games, covering various genres. We will ramp up marketing: press releases, developer testimonials about their experience on DIODE, perhaps an event or contest (for example, a promotion where we subsidize some resales or drop some free limited-edition NFTs to early users).

6.4 2027 – Full Launch and Growth Phase

- **Official Version 1.0:** Remove the "beta" tag and launch DIODE Version 1.0 to the general public. This would coincide with a major marketing push and possibly a flagship partnership—such as an exclusive game launch on DIODE or a major publisher announcing support. Achieving a headline like "Indie Hit *XYZ* Launches on DIODE" or "Major Publisher allows resales on DIODE for Popular Franchise" would be ideal for this moment.

- **Geographic Expansion:** By now we should have infrastructure and compliance for multiple regions. We'll do region-specific marketing. For example, in Asia we might partner with local crypto exchanges or gaming communities; in Europe, we will highlight how we preemptively offer what regulators are asking for (resale rights, preservation); in Latin America, we might stress the economic benefit (where games are expensive relative to income, resales can make gaming more affordable).

- **Partnerships and Integrations:** Form deeper partnerships. For example, integrate DIODE with streaming platforms or influencer programs – such as allowing Twitch streamers to have an affiliate link to games on DIODE (we could even use smart contracts to automatically give them a cut of sales they drive). Another idea is a partnership with a hardware vendor (like a PC accessory brand or even a GPU manufacturer) to bundle promotional credits or NFTs for DIODE with their products, raising our profile among PC gamers.

- **Governance and Community:** If a DIODE token has been launched, we could begin transitioning certain decisions to a community governance model. This could involve creating a DIODE DAO or similar body where token holders (including game developers, perhaps weighted by their sales, and gamers by their token holdings or NFT holdings) vote on proposals – such as changes to fee structure, new features, or community fund allocations. Even without a token, we will have channels (like a community council or discord voting) to involve users in the roadmap prioritization to strengthen user loyalty.

- **Continuous Improvement:** Use analytics and user feedback to iterate. Optimize the platform's performance – for example, speed up load times, reduce memory usage of the client, etc. Also iterate on features like recommendations (use machine learning to suggest games, taking into account ownership since users can sell games they don't like, we might recommend games that have good resale retention value). We'll also keep an eye on emerging tech – e.g., if VR or cloud gaming integration makes sense, or if other blockchains gain traction that we should support (interoperability).

- **Revenue Growth and Sustainability:** By 2027 we project meaningful revenue from transaction fees. We'll reinvest in growth (more developer outreach, perhaps funding some game exclusives or timed exclusives). We'll also evaluate the competitive landscape: it's possible by now that even Steam or Epic might be exploring NFT licenses (especially if regulations push them). If that happens, we need to stay ahead by offering an even more developer-friendly and user-empowering ecosystem (perhaps we lower our fees further, or emphasize decentralization and community governance as something a corporate player can't match).

Beyond 2027 – Future Vision: In the longer term, DIODE aims to be not just a store, but a cornerstone of a new digital ownership economy in gaming. We could explore:

- *Decentralized Infrastructure:* Migrating more of our backend to decentralized solutions – e.g., a fully decentralized storage for game files distribution (using protocols like Filecoin or BitTorrent-like swarms incentivized by tokens), and perhaps even a rollup or app-specific blockchain to handle our transactions at scale. Ultra's approach of free transactions via an app-chain is instructive; we might similarly run our own chain or layer-2 once we have millions of users, to ensure costs are negligible and performance is consistent.

- *Metaverse and Interoperability:* We could allow our game NFTs to interact with emerging metaverse platforms. For example, a metaverse game room might detect your DIODE library and let you launch games from within a virtual space or display your owned game collection as part of your online identity. Also, consider integration with other NFT ecosystems – e.g., if a game NFT could double as a token to unlock community forums or cross-game rewards.

- *Empowering Creators and Mods:* We can extend the marketplace concept to user-generated content. If allowed by game developers, we could enable a mod marketplace where mods (which could themselves be NFTs) are sold, with mod creators and original devs splitting revenue. This aligns with the ethos of ownership and could drive further engagement.

- *Evolving the Business Model:* Eventually, if DIODE becomes successful, we may face the same questions as current platforms: how to curate the store (discovery problem), how to handle an influx of low-quality submissions, etc. We envision possibly a more community-driven curation (users could stake tokens on games they think are good, etc., to surface them). The specifics are beyond the scope of this paper, but we are aware that solving digital ownership is one piece of the puzzle; the ultimate goal is a healthy ecosystem for game distribution and discovery.

The roadmap above is ambitious but we believe it's achievable with the right team and support. We prioritize delivering a working product early – even with limited content – to prove the concept, and then we will scale both the content library and user base in tandem, guided by feedback and an adaptive strategy.

7 Conclusion

DIODE represents a transformative shift in digital game distribution – one that harnesses blockchain to realign value between users and creators. By minting game licenses as NFTs, we turn what has traditionally been a mere usage license into a true, tradeable asset, empowering gamers with rights akin to physical ownership. This rekindles the spirit of game ownership, eliminates the "buyer's remorse" of accumulating unplayable digital titles, and fosters a circular game economy where nothing goes to waste.

For developers and publishers, DIODE offers a novel, sustainable revenue model: beyond earning a higher cut on initial sales (up to 85–90% to them, far above industry norms, they also tap into the secondary market via royalties on every resale *(https://www.prnewswire.com/news-releases/a-massive-paradigm-shift-coming-to-pc-video-game-distribution-using-the-blockchain-300582737.html)*. Instead of viewing used-game sales as lost revenue, they become a continuous source of income and player engagement. Our platform's smart contracts ensure these splits are automated and fair, building trust with content creators who might initially be wary of resales. Early successes by platforms like Ultra and Robot Cache have shown that when given control and incentives, developers will embrace blockchain distribution – for instance, Ultra has demonstrated that even optional resale features can be attractive to studios, and Robot Cache highlighted how extraordinary it is for publishers to earn money on resold games. DIODE takes these pioneering ideas to the next level by emphasizing cross-platform openness and ease of use, positioning itself as a leading contender in this next generation of game marketplaces.

Technically, we have outlined a robust architecture: using a scalable blockchain (Polygon or similar) for transactions, implementing secure NFT-based DRM that respects offline play while preventing abuse, and integrating user-friendly wallet solutions to onboard gamers from all backgrounds (not just crypto enthusiasts). We acknowledge potential challenges – from DRM circumvention attempts to varying legal landscapes – and have incorporated solutions or mitigation plans for each. The platform remains flexible: if laws change or if a superior blockchain solution emerges, DIODE can adapt, always with the goal of maximizing user ownership and minimizing friction.

Our roadmap charts a clear path from prototype to full platform, emphasizing incremental learning and community feedback. We will start with a controlled alpha to prove out the concept with real games and users, then scale up content and features as we approach a public launch. A key part of our strategy is bridging the gap between Web2 and Web3: we communicate the benefits (resale value, higher dev revenue, etc.) in terms that any gamer or developer can appreciate, while using Web3 technology under the hood to deliver those promises. We want users to enjoy

the advantages (like selling a game when done) even if they don't deeply understand NFTs or blockchain – in fact, we aim to abstract those complexities away in the user experience.

In conclusion, DIODE aims to revolutionize the digital games marketplace much like digital distribution once revolutionized physical media. We believe the next evolution is to bring true ownership into the digital realm. Our platform turns a purchase from a one-time transaction into an ongoing asset for the player. It aligns the industry toward more fairness: players invest confidently knowing their purchases have residual value, and developers design games knowing that greater player satisfaction and demand can translate into multiple sales (initial and resale) of the same copy. With DIODE, the interests of gamers and game makers converge in a mutually beneficial ecosystem built on transparency and respect for ownership.

We invite gamers, developers, and stakeholders to join us on this journey. Together, we can build a future where digital entertainment is not a dead-end consumption but a vibrant economy – one where everyone wins by empowering the rightful owners: the players.

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