

Darkpaper V1

Darkpaper V1 will focus on the tokenomics and implementation of Lilith Swap, LLTH token, Abyss parlor games, and NFT staking modules. Darkpaper V2 will be dedicated to our planned partnerships, integrations, and upcoming Crypto Demonz Sidescroller + Battle Royale P2E games.



Relevant Links:

CDZ Staking Whitepaper -

<https://github.com/Cryptodemonz-Github/cdz-staking/blob/dev/docs/Cdz-staking-paper.pdf>

CDZ Staking Github - <https://github.com/Cryptodemonz-Github/cdz-staking>

Lilith Token Github - <https://github.com/Cryptodemonz-Github/lilith-token>

Slots Github - <https://github.com/Cryptodemonz-Github/lilith-slots>

Wheel Github - <https://github.com/Cryptodemonz-Github/lilith-wheel>

Blackjack Github - <https://github.com/Cryptodemonz-Github/lilith-blackjack>

Lilith Swap Introduction:

The main purpose of Lilith Swap is to provide the foundation for a fully scalable, decentralized P2E gaming platform available for tiered use to any owner of LLTH (both players and developers). LLTH incentivizes and controls interaction with the

ecosystem at every level: almost all actions within the ecosystem have reward/penalty functions that include LLTH disbursements/burns.

LLTH token is a straightforward ERC20 with zero shitcoin functions like auto-burning or redistribution or passive income baked in. LLTH token's main purpose is to provide utility exclusively within the LLTH ecosystem. Within the LLTH ecosystem, LLTH provides reward incentivisation for games and staking, game access functions, merchandise discounts & redeemables, NFT discounts & redeemables, Airdrops of NFTs and tokens, and community membership tiers. A separate LLTH "ghost token" will be created in Q2 2022 for governance of the entire ecosystem.

Spawn1 holders will be responsible for the creation of the large part of the LLTH tokens in existence over time based on most logical projections with their weighted staking APR versus other Spawn collections or external collections. A great reward, and a great responsibility lies upon the shoulders of Spawn1 OG's. We have specifically designed the staking contract to mint rather than yield from a reserve to deter hackers from targeting our pool. More on the actual staking vault itself will be written below.

CDZ Staking Vault:

The CDZ.Staking smart contracts will be used to provide a passive APR to any NFT project that is willing to provide Liquidity to LLTH token, and is vetted through the Lilith Swap team.

Below, our NFT Staking whitepaper is available via PDF:

<https://github.com/Cryptodemonz-Github/cdz-staking/blob/dev/docs/Cdz-staking-paper.pdf>

Crypto Demonz + Lilith Swap

Crypto Demonz (CDZ) is the main P2E & NFT series launching on top of Lilith Swap. Over time other projects will be vetted to build on top of and integrate with the Lilith Swap ecosystem, partner projects will institute their own tokens with unique use-cases within Lilith Swap, partnership tokens will be available for swaps with LLTH token.

The base layer of governance and utility for Lilith Swap is cooked into the CDZ Spawn collections. These collections will act as exclusive membership access tokens with weighted rewards and incentivisation within the ecosystem.

- Staking APR is based on a Collection multiplier, a rarity multiplier (within each collection), days staked, and divided across the number of total stakers in each collection. It is a fully dynamic formula that should be able to adjust for many variables that could change overtime.

- While Spawn1 stakers enjoy the highest rate of passive rewards, Spawn2-3 holders have higher rewards & utility in-game, receive heavier discounts on merch, and pay less in fees across the entire Lilith Swap ecosystem where applicable as shown below:

Spawn Collection	In-Game Reward/Payout Multiplier
Spawn1	1.1x (example)
Spawn2	2x (example)
Spawn3	3x (example)

- In-game rewards multiplier will vary per arcade game. Rewards will be heavier relative to the treasury size in the PvP Multiplayers like the upcoming Spawn2 themed Battle Royale compared to the initial Solo-player Side Scroller.

Spawn Collection	Fee Reductions & Ecosystem Discounts
Spawn1	25% fee reduction
Spawn2	35% fee reduction
Spawn3	50% fee reduction

These are the core differences between the separate Spawn collections within the LLTH ecosystem.

In the future, we plan to offer NFT staking modules to other projects hosted on top of our contracts, bringing significant liquidity and additional volume to the LLTH ecosystem.

LLTH Token Overview

LLTH is the primary token which participants will use to interact with the LLTH ecosystem.

The goal of introducing LLTH is to provide a convenient and secure mode of settlement between participants who interact within the ecosystem, and it is not, and not intended to be, a medium of exchange accepted by the public (or a section of the public) as payment for goods or services or for the discharge of a debt; nor is it designed or intended to be used by any person as payment for any goods or services whatsoever that are not exclusively provided by the issuer.

LLTH does not in any way represent any shareholding, participation, right, title, or interest in the Company, the Distributor, their respective affiliates, or any other company, enterprise or undertaking, nor will LLTH entitle token holders to any promise of fees, dividends, revenue, profits or investment returns, and are not intended to constitute securities in Singapore or any relevant jurisdiction. \$LLTH may only be utilized on the LLTH.Treasury ecosystem, and

ownership of LLTH carries no rights, express or implied, other than the right to use LLTH as a means to enable usage of and interaction within the LLTH ecosystem.

LLTH Ecosystem Details

The **LLTH** ecosystem revolves around the LLTH.Treasury, which is an open and transparent rewards treasury smart contract, which will sponsor all games thereon. This would require a sufficient buffer of rewards in order to cater for mathematical variance in the odds and multipliers offered by the games, this buffer is ensured during minting genesis described further down below. All fees collected from players will be pooled in this treasury (in LLTH and ETH), and it would also disburse players' winnings.

LLTH Ecosystem Structure

To start, the LLTH Ecosystem is comprised of the following elements:

- **LLTH.Treasury** - Treasury contract that pools rewards (LLTH / wETH / other tokens*) from the Abyss & Arcade for use across the ecosystem
- Games contracts will include:
 - LLTH.BlackJack
 - LLTH.WheelofDestiny
 - LLTH.Slots
 - CDZ.SideScroller
 - CDZ.BattleRoyale
 - CDZ.Fighter
- **LLTH.Reward** - Gameplay rewards contract that distributes LLTH to players.
- **CDZ.Staking** - NFT staking contract that allows stakers to earn LLTH & other tokens*
- **LLTH.Staking** - LLTH Staking contract that allows stakers to earn a percentage of rewards from The Abyss.
- **LLTH.Governance** – Governance contract that requires CDZ NFTs or LLTH to be staked to participate in voting on various proposals for ecosystem improvements in order to control and receive LLTH incentives.

LLTH Distribution & Farming Power %

10 million LLTH will be birthed and locked at Genesis on Halloween, October 31st, 2021. Genesis LLTH will be released on a vesting schedule of 10% monthly over 10 months post-launch.

- 75% [7,500,000 LLTH] to LLTH.Treasury.
- 20% [2,000,000 LLTH] to the Team.
- 5% [500,000 LLTH] to Spawn1 holders from the screenshot taken on September 28th before the Spawn2 sacrifice.

Community

35% Farming Power to CDZ.Staking: LLTH rewards through staking NFTs will account for the majority of LLTH minted into existence. Staking NFTs for LLTH Governance token will end when 2 Billion LLTH are minted in total.

25% Farming Power to LLTH.Reward: Players mine LLTH through competitions and playing games with LLTH or ETH. The play-to-mine rate is based on the amount bet in-game via the Abyss. Play-to-earn rate is based on multiple factors depending on which Arcade game is being played.

20% to Ecosystem Support. Ecosystem support tokens will be allocated to aid development of new games and incentivize strategic partners that will help the LLTH ecosystem grow.

5% Farming Power to Lilith Swap Community: Airdrop tokens will be allocated to active community members to incentivize purchase of CDZ NFTs, participation in testing games, and activity in LLTH.Treasury community forums.

Team

15% Farming Power to Team: LLTH ecosystem development team and future employees will be rewarded from this pool.

Abyss Parlor Games

Abyss Parlor Games will be a series of P2E games centered around classic betting sequences, verified through an oracle like Chainlink to ensure true, fair randomization. Players within the Abyss will make back a percentage of each bet regardless of whether they win or lose. Eventually, LLTH will be available for staking as an ERC20, in exchange for Governance and a share in fees of the Abyss series.

$\text{reward}(\text{AMOUNT_BET_LLTH}) = (\text{AMOUNT_BET_LLTH} \times 1_LLTH) / (2,000^*)$

- **Blackjack / Wheel Of Destiny / Satan's Slots play-to-mine** function – equation that determines \$LLTH mined based on amount wagered in any parlor game.
- **NFT holding bonus** – CDZ NFT holders will have a weighted benefit/discounts in rewards/fees, based on which collections of Spawn they have in their wallet.

*example depending on # of total LLTH holders / number of players / LLTH treasury liquidity.

The Abyss will run on Polygon as a layer 2 solution, in order to cut down massively on in-game fees. Both wETH & wLLTH will be required to play games in the Abyss. Instructions

& tutorials on bridging will be provided in Discord and on the new, upcoming Lilith Swap website.

The flow for bridging in and out of the Abyss is described below:

L1 -> L2

STEP 1: User sends LLTH/ETH with a unique transactionID to our L1 bridge smart contract.

STEP 2: When a transaction is received, L1 bridge smart contract emits an event with the unique transactionID, msg.sender and the amount of LLTH that needs to be bridged.

- If LLTH was sent, after emitting the event it burns the received LLTH.
- If ETH was sent, it just keeps the ETH that can be withdrawn by the admin wallet.

STEP 3: Node.js server catches the emitted event identified by the unique transactionID and msg.sender, then it calls the mint function of L2 LLTH smart contract. This mint function mints and sends the corresponding amount of L2 LLTH to the user's address.

L2 -> L1

STEP 1: User sends L2 LLTH with a unique transactionID to the L2 bridge smart contract.

STEP 2: When a transaction is received, L2 bridge smart contract emits an event with the unique transactionID, msg.sender and the amount of L2 LLTH that needs to be bridged.

STEP 3: Node.js server catches the emitted event identified by the unique transactionID and msg.sender, then it calls the mint function of L1 LLTH smart contract. This mint function mints and sends the corresponding amount of L1 LLTH to the user's wallet.

NOTE 1: In this plan, L2 LLTH is an ingame stable coin that has the same value of L1 LLTH, it can't be traded at all, it has a whitelist of addresses so it's restricted to make any transactions out of our games smart contracts. If the user wants to make money out of it, they have to bridge it back to L1. That's why we don't have to pay for burning transactions of L2 LLTH.

NOTE 2: In L1 -> L2 we burn L1 LLTH, this definitely makes the L1 LLTH deflationary, and by the nature of the abyss games games, we'll burn more than mint. We might burn too much, so that part should be considered, perhaps we don't have to burn all that was sent by the user.

LLTH.Blackjack (written by 0xCODE)

1. Description

In Blackjack, also known to some as twenty-one, the standard 52-card pack is used, and there are two roles in the game, Dealer and Player and Player will play versus Dealer.

The game's object is to beat the Dealer. It can be accomplished by Blackjack without dealer blackjack, having your final card count be higher than the dealers without exceeding 21, or by not exceeding 21 and Dealer busting by exceeding their card count of 21.

Once the Blackjack hand is played out, three outcomes can occur. First, you can win (as previously described), secondly, you can lose (bust hand or have less than Dealer's hand), or you can push (have exact hand-number count or Blackjack - as Dealer). If you win, you get your bet money back PLUS that same amount from the Dealer, YAY! If you win with Blackjack, you get your original bet back PLUS you win 1.5 times your bet from the Dealer, WOOHOO! If you lose, the Dealer takes your bet money. If you push, you keep your bet money but do not win anything additional.

2. Game Play

There are three main actions: "Deal", "Hit", and "Stand".

The Player will bet their \$LLTH before the deal from their wallet.

After the Player deal, the Dealer will draw cards based on randomness(get from the Chainlink to provide fair play), two showing cards to the Player, one show, and one hiding card to Dealer.

Once the Player calls Hit, Dealer will draw a new card from the deck and give it to the Player.

Once the Player calls Stand, Dealer will draw new cards until he wins or is busted.

3. Game Rewards

When a Player bets on a game, he needs to pay a fee based on the betting amount, maybe 1~2%.

The Gaming contract will transfer the fee to owner's wallet.

The Player will pay different fees based on the NFT that he is holding, like the table below.

Let's assume that the Player is betting X \$LLTH on a bet.

NFT holder	Betting Fee	The total Player Betting amount
Spawn1 holder	2%	$X * 1.02$
Spawn2 holder	1.5%	$X * 1.015$
Spawn3 holder	1%	$X * 1.01$

If the Player wins the game, he will receive a reward of \$LLTH from the Dealer.

Rewards by Winning Type

Winning Type	Reward	Players balance change(\$LLTH)
BlackJack	$X * 1.5$	$+(X * 1.5 - \text{Fee})$
Normal Win & Bust	X	$+(X - \text{Fee})$
Push	0	$-(\text{Fee})$
Lose	$-X$	$-(X + \text{Fee})$

Statistical Data about the blackjack game for individual players shows like below:

4. Structure

We will have three parts to implement the game, they are;

- a. Main Game Engine with Smart Contract
- b. Node.js Server for logging game result
- c. Gaming Front-end with React

Main Game Engine will be developed with Solidity, and it will manage all card draw based on random numbers aggregated from Oracle like Chainlink.

It will have three main functions for "Deal", "Hit", and "Stand".

Node.js Server will log all game result logs to show other player's game results in the front-end.

Node.js will save the game result in MongoDB, and Front-end can show Game logs from it to save gas fees for retrieving log data from On-Chain.

LLTH.Slots (written by Leeevi)

1. Description:

This game has 3 circular, independently operated reels. A series of 6 different symbols (1, 2, 3, 4, 5, 6) is put on each reel. The player places a certain amount of bet and starts the round. During the game, reels are spinning & spinning then they stop at a random symbol.

There are a series of rules on which results payout and how much. Different combinations offer different payouts. Normally, these machines payout between 80-99% of the amount that goes in (RTP, Return to Player).

2. Gameplay:

By choosing various winning lines, reels and many symbols, defining a ruleset can be quite complex. I chose 3 reels to be simple in the beginning of the development. So this will be a solid foundation of the game which we will extend by adding more reels & rules.

3. Game Rewards:

In my approach, each reel contains 6 different symbols which means we have totally $6 \times 6 \times 6 = 216$ combinations or ways. Each round has 1 winning line and the player can bet only a certain amount. This example uses 1 \$LLTH as the fixed bet amount which we can adjust later by a multiplier that reflects the exchange rate.

PAY TABLE		LINE COMBINATIONS		
Winning Combination	Pays	Ways to Win	Total Payout	
6-6-6	20 to 1	1	20	
1-1-1, 2-2-2, 3-3-3, 4-4-4, 5-5-5	5 to 1	5	25	
6-6-x, 6-x-6, x-6-6	4 to 1	15	60	
6-x-x, x-6-x, x-x-6	1 to 1	75	75	
	Total Ways to Win:	96	180	Total Payout
	Total Ways:	216		
	Hit Frequency:	44.44%	83.33%	RTP (Return to Player)
	Avg. Spins until Win:	2.27		

Pay Table: it lists each of the 3-symbol combinations, ways and its associated payout value. In case of 6-6-6, the player will get 20 \$LLTH for that 1 \$LLTH spent on this round.

Hit Frequency: it represents how often a player will win something from a play of the game.

$$(\text{Total Ways to Win}) / (\text{Total Ways}) = 96 / 216 = 44.44\%$$

Avg. Spins until Win: from Hit Frequency we can easily calculate on average how many spins it takes for the player to win something: $1 / (\text{Hit Frequency}) = 1 / 0.44 = 2.27$.

Return to Player (RTP): the amount that a player can expect to win on any given spin.

$$(\text{Total Payout}) / (\text{Total Ways}) = 180 / 216 = 83.33\%$$

In other words: if the player places 1 \$LLTH bet, they will get back on average 0.8333 \$LLTH.

NFT holder	Betting Fee	The total Player Betting amount
Spawn1 holder	2%	$X * 1.02$
Spawn2 holder	1.5%	$X * 1.015$
Spawn3 holder	1%	$X * 1.01$

4. Structure:

The core of this smart contract is 2 main functions.

One of them is an external function which makes the player available for placing bets. This function triggers another function which gets the 3 random numbers between 1 and 6.

The other main function is an internal function that investigates the rules & the 3 random numbers. If any of the winning lines equals the result, the prize that's matched with the winning combination will be transferred to the player's account and notifies the player by emitting an event.

There are smaller functions such as a withdraw function that withdraws the \$LLTH balance for the owner's wallet, view functions for the front-end and set functions for changing basic variables. This game can be solved without defining any states but for security reasons we can define timed transitioned states dedicated for each player.

This requires storing and changing more data which generally results in higher gas. We will be using MATIC for in-game L2 solution, so this becomes a viable security measure.

LLTH.WheelOfDestiny (written by Leeevi)

1. Description:

It's a wheel with 13 segments, each segment defines a multiplier like 2x, 3x, ..., 12x, 13x, and it has a wild segment which gives a free round. The player can place a bet and has to figure out which multiplier will be the result when the wheel is stopped. After betting, the wheel starts spinning and spinning, then it stops. Anyone who successfully figured out the winning multiplier where the wheel's stopped, gets the prize: bet amount x winning multiplier. Otherwise, the player loses their bet. With this ruleset players have 7.69% chance to win or at least get a new round where they can try again.

2. Structure

The player can place their bet either in ETH or \$LLTH which is received by the game's smart contract. This is implemented by calling a function where the user passes the bet amount, multiplier value. The smart contract stores the player's address, bet amount, user's multiplier, plus the generated random number as mapping. After the random number between 1 and 13 is received from Chainlink, the game's smart contract emits that as an event. If the generated random multiplier equals the player's multiplier value, the game's smart contract transfers the prize for the player. In case the bet was placed \$LLTH the player receives the prize with an extra 1.5x multiplier, otherwise if the bet was placed in ETH the player receives a normal 1x prize without any extra.