SOLV JOURNAL 01

EASY GUIDE TO ERC-3525

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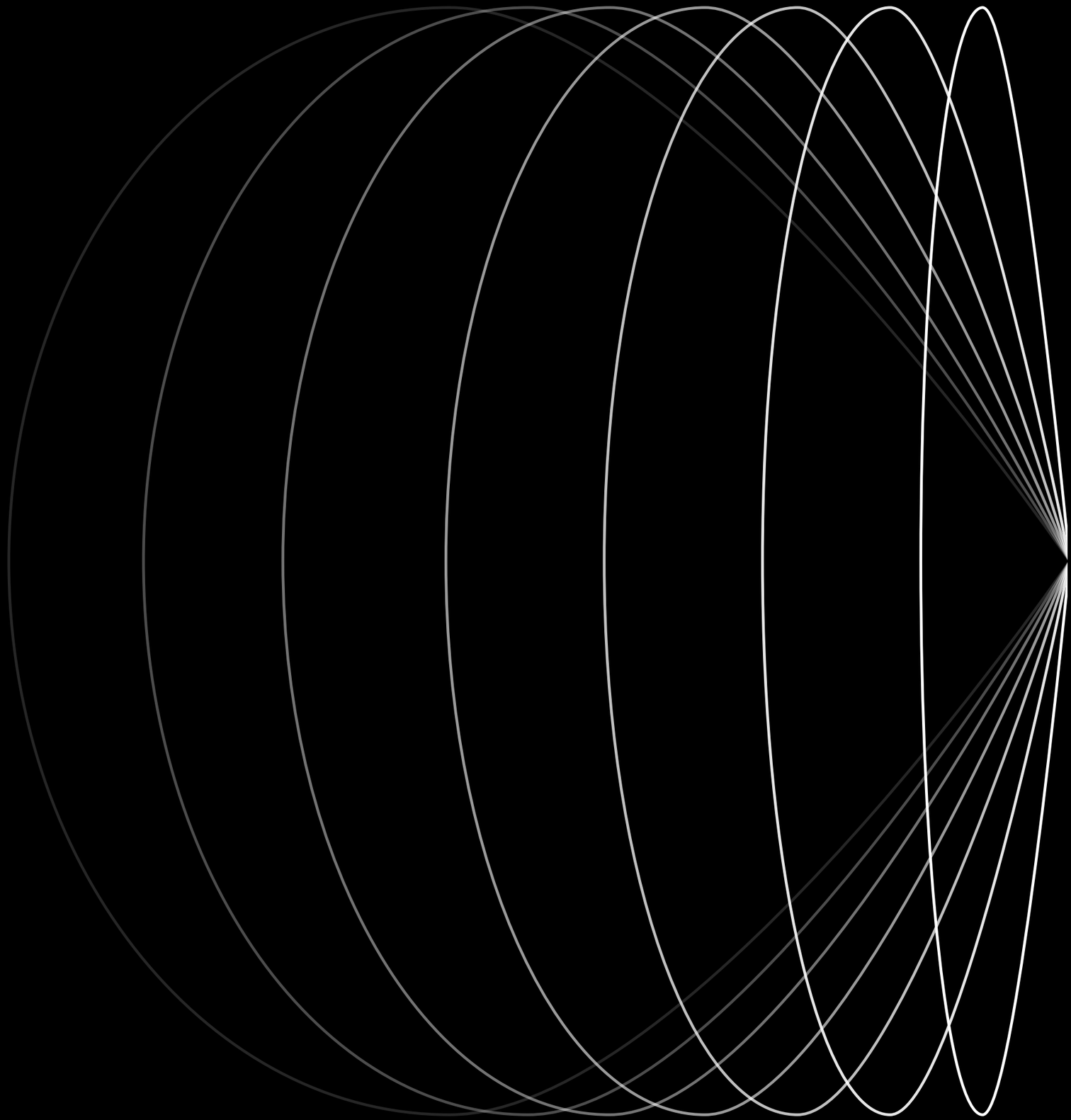
CHAPTER 1

ERC 3525 IS IN TOWN!



ERC 3525 IS IN TOWN!

On September 5, 2022, ERC-3525, an Ethereum token standard developed by Solv Protocol, was accepted as a final ERC for semi-fungible tokens. This makes ERC-3525 the 35th ERC that is officially approved by the Ethereum community.

ERC-3525 was first proposed in the winter of 2020 and has been rigorously polished over the past 20 months. Today, ERC-3525 is finally here and ready to open the floodgates for a new asset class that will disrupt Web3 and metaverse: Semi-Fungible Token, or SFT. This booklet provides an overview of ERC-3525 and its magical skills.

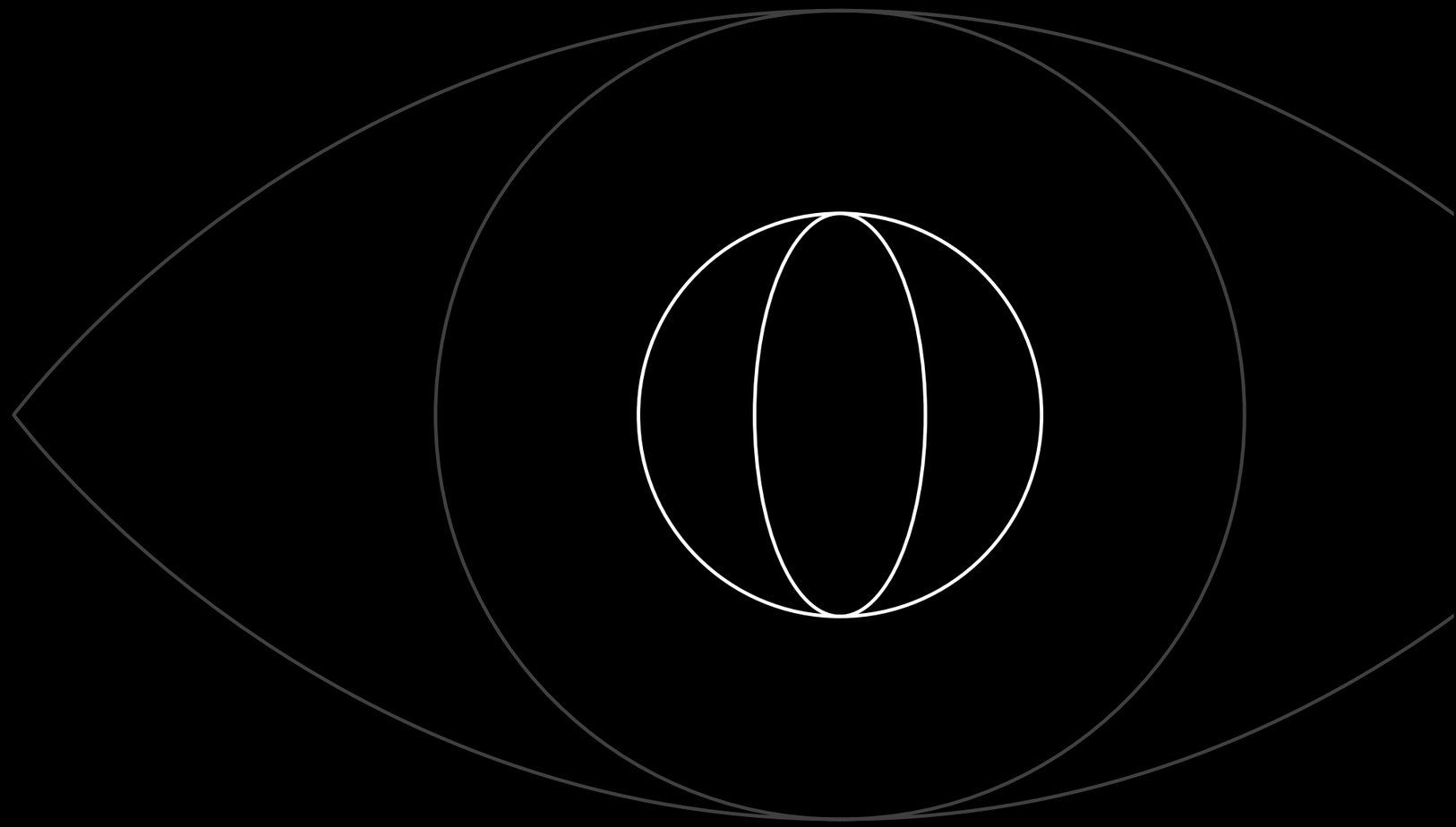
Let's start with a brief history.

Timeline	Stage	Status	Important Updates
2020-10 -01	Idea conceived	-	-
2020-12-01	EIP-3525 created	-	First proposal
2021-04-22	Pull Request (PR)	PR	PR submission
2021-10-20	EIP repository	Draft	Merged into the EIP repository
2021-12-01	Changed title to "Semi-Fungible Token"	Draft	Title change Abandoned "Split" and "Merge"
2022-06-29	Final major changes	Draft	Aligned all aspects of the specification with foundational protocols such as ERC-721, ERC-20
2022-07-30	Requested for Peer Review	Review	Submitted the Reference Implementation
2022-08-22	Submitted for the Last Call	Last Call	Addressed the final suggestions from the Ethereum community
2022-09-05	Approved	Final	The 35th token standard for Ethereum

EIP-3525 in Retrospect

CHAPTER 2

WHAT IS ERC-3525



WHAT IS ERC-3525?

ERC-3525 Semi-fungible Token (SFT) defines a standard specification where EIP-721 compatible tokens with the same SLOT and different IDs are fungible.

Okay, if you're not a coder, that probably made no sense to you whatsoever. Let's try again.

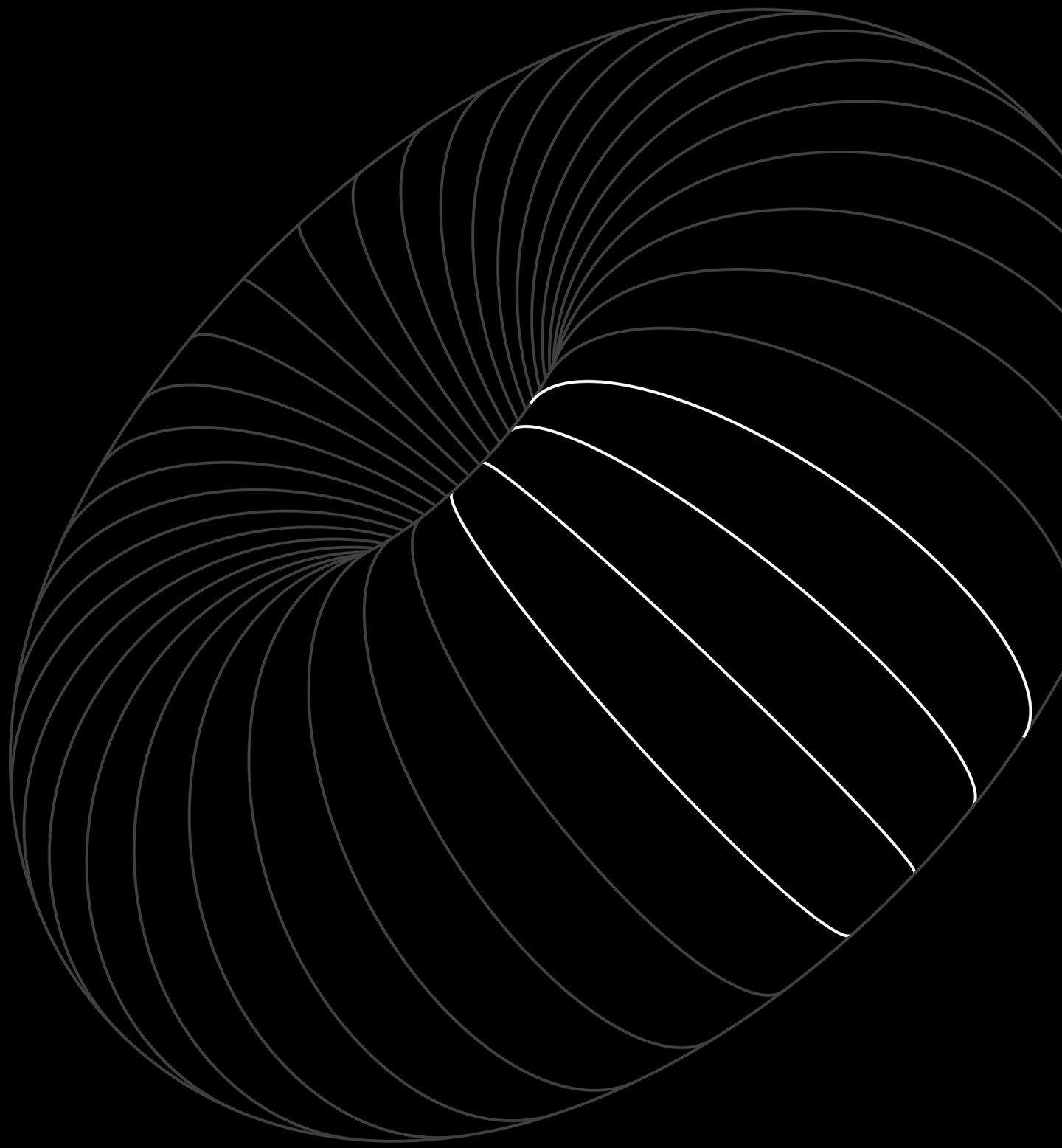
ERC-3525 is a general-purpose and omni-asset standard that combines the quantitative attributes of an ERC-20 token and the descriptive features of an ERC-721 token (NFT). It is the most advanced digital representation of ownership, value, rights, status, and identity.

ERC-3525 rewrites the generation and trading of assets, creating efficiencies and enhancing market integrity. With it, traditionally illiquid assets can become divisible, represented digitally, and traded in an open market. These assets could be simple instruments like gift cards, loyalty cards, checks, or vouchers, to more regulated assets like bonds, futures and options contracts, ABS, and even real estate and renewable energy.

```
interface IERC3525 is IERC721 {

    event TransferValue(uint256 indexed fromTokenId, uint256 indexed toTokenId, uint256 value);

    event ApprovalValue(uint256 indexed tokenId, address indexed operator, uint256 value);

    event SlotChanged(uint256 indexed tokenId, uint256 indexed oldSlot, uint256 indexed newSlot);

    function valueDecimals() external view returns (uint8);

    function balanceOf(uint256 tokenId) external view returns (uint256);

    function slotOf(uint256 tokenId) external view returns (uint256);

    function approve(uint256 tokenId, address operator, uint256 value) external payable;

    function allowance(uint256 tokenId, address operator) external view returns (uint256);

    function transferFrom(uint256 fromTokenId, uint256 toTokenId, uint256 value) external payable;

    function transferFrom(uint256 fromTokenId, address to, uint256 value) external payable returns (uint256);

}
```

CHAPTER 3

SKILLS OF ERC-3525



SKILLS OF ERC-3525

Do you know that not only can you embed anything – texts, images, links, or files – into an SFT, you could split it into infinitely many pieces, too? Further, the SFT disrupts the ordinary token-to-address transfer model with the token-to-token transfer model, unlocking the wealth of use cases beyond our imagination! Here are the top four skills of ERC-3525 that make tokens great again.

SLOT

SLOT is the flagship feature of ERC-3525, which allows tokens with the same SLOT to be fungible even if they have different IDs. It establishes the common ground, so to speak, for every two SFTs and excludes the value by which an SFT is computable. For a bond SFT, a SLOT may be the combination of the borrower's ID, maturity date, and interest rate, but not the price since it is the only value by which the bond could be divvied up or merged into another.

Token-to-token Transfer

SFTs are digital containers allowing users to easily send, receive or store digital assets or goods. A borrower could simply pay to a single bond SFT (mother SFT), and lenders' tokens (daughter SFTs) would then automatically receive their payments on a pro-rata basis. ERC-3525s are practically tokenized bank accounts!

Expressivity

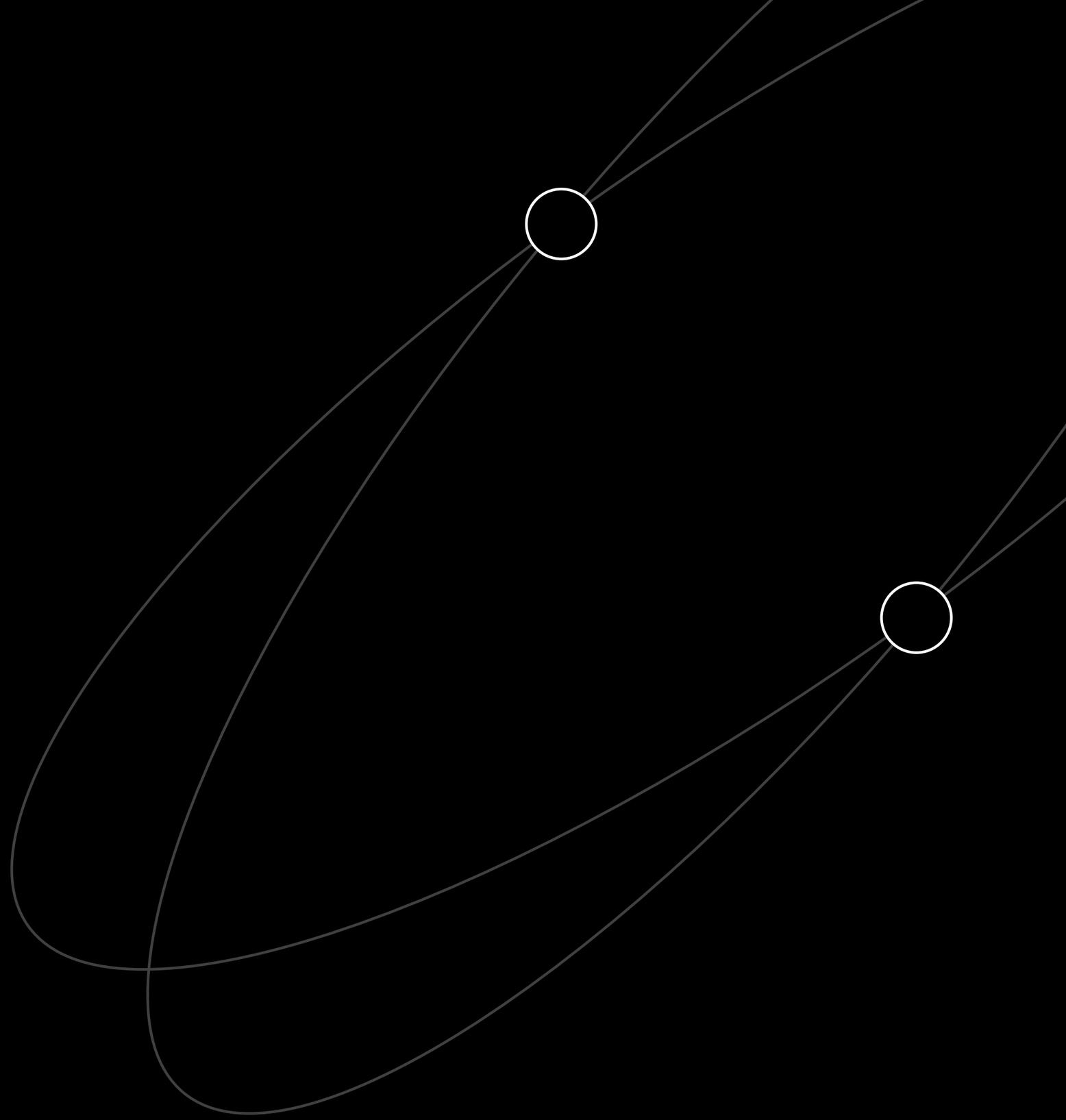
To accommodate assets in all shapes and sizes, ERC-3525 inherits the NFT's vital visual attributes plus support for text descriptions, attachments, on-chain SVGs, and real-time data feeds.

Computability

You can nest any digital assets inside an SFT, but that's not all. An SFT's underlying asset is fully liquid like an ERC-20, so you could easily divvy it up quantitatively into a new SFT that still follows the same rules governing the underlying asset (like the maturity date for a bond SFT).

CHAPTER 4

HOW ERC-3525 DIFFERS FROM OTHER TOKEN STANDARDS?

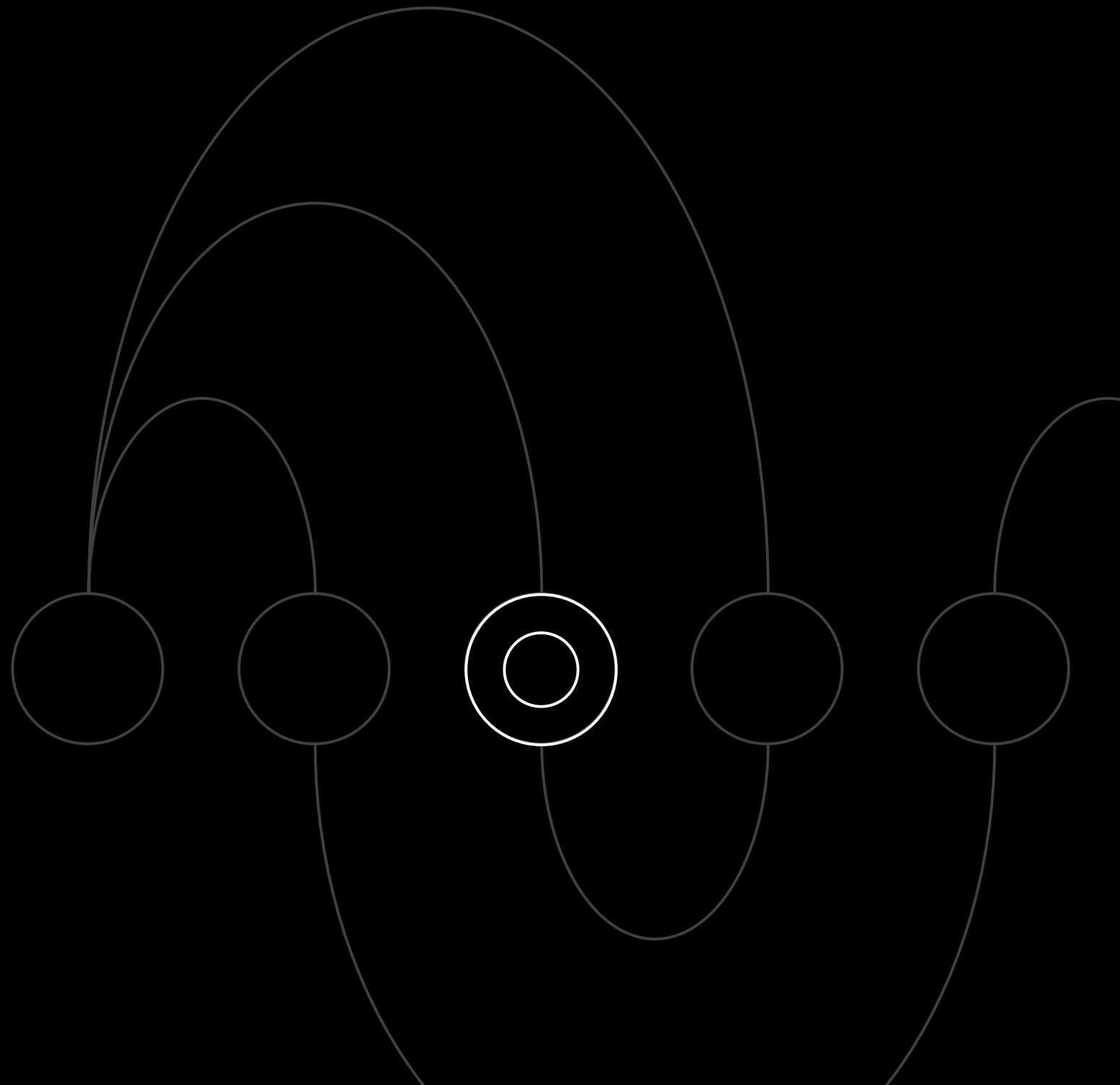


HOW ERC-3525 DIFFERS FROM OTHER TOKEN STANDARDS?

	Fungibility	What does it mean?	Data structure	Real-world examples	Use cases
ERC-20	Fungible	All tokens are interchangeable.	· _value (balanceOf())	Address A has 50 ETH. Address B has 100 ETH. Send 100 ETH from Address B to Address A. Now the balance in Address A is 150 ETH.	· Cryptocurrencies
ERC-721	Non-fungible	Each NFT is unique.	· _tokenID · metadata	Send one BAYC from Address A to Address B.	· Arts · Collectibles
ERC-1155	Non-fungible (multiple instances)	Each NFT can have multiple identical instances.	· _id · _value · metadata	Send 5 copies of the same potion NFT from Address A to Address B.	· In-game items
ERC-3525	Semi-fungible	SFTs with different IDs but the same SLOT can be divided, combined, can send assets to each other.	· _tokenID · _value · _slot · metadata	A smart contract sends a $100 bond with one-year maturity to address A (call it Bond #1). A user can then divide this bond into two $50 bonds, Bond #2 and #3, and send them to address B and C respectively, leaving Bond #1 with zero remaining value. The user can even go on to transfer $20 from Bond #2 to Bond #3, leaving Bond #2 now with $30 and Bond #3 with $70	· Financial instruments · Contracts · Advanced financial assets · Real-world assets (RWA) tokenization

CHAPTER 5

USE CASES OF ERC-3525

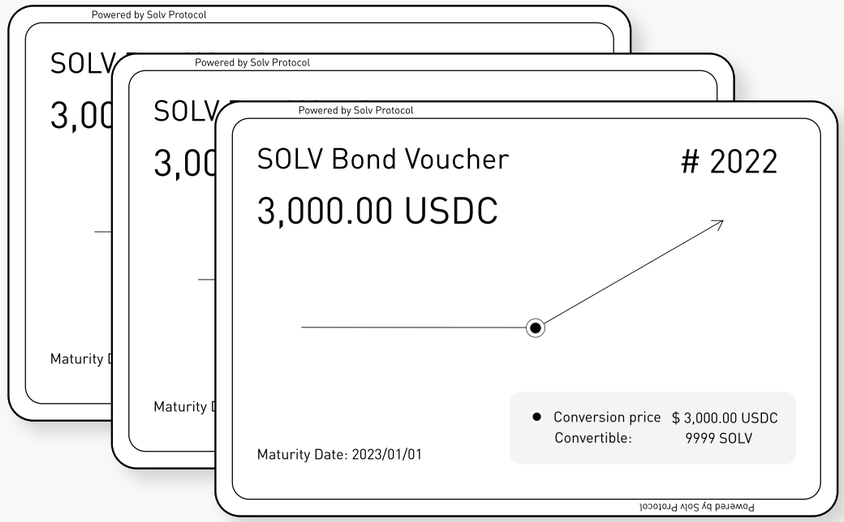


USE CASES OF ERC-3525
LENDING

The Bond Voucher is the world's first on-chain bond to bridge TradFi with DeFi and Solv's debt NFT tailor-made for crypto market makers, VCs, or crypto projects seeking to bootstrap liquidity or fund operational expenses. It provides a zero-coupon bond with credit enhancement optionality, including collateral, insurance, and custody services.

The ERC-3525 powered Bond Voucher leverages the descriptive features of ERC-721 tokens, providing visualized and customizable financial terms such as the face value and maturity date in a no-code front end. For crypto projects, there's an option to embed a Euro-style call option into the bond that will give the lenders exposure to the native token's upside.

At maturity, the borrower pays directly to the Bond SFT, which distributes the corresponding payments to all the lenders' tokens in a secure and automated way.

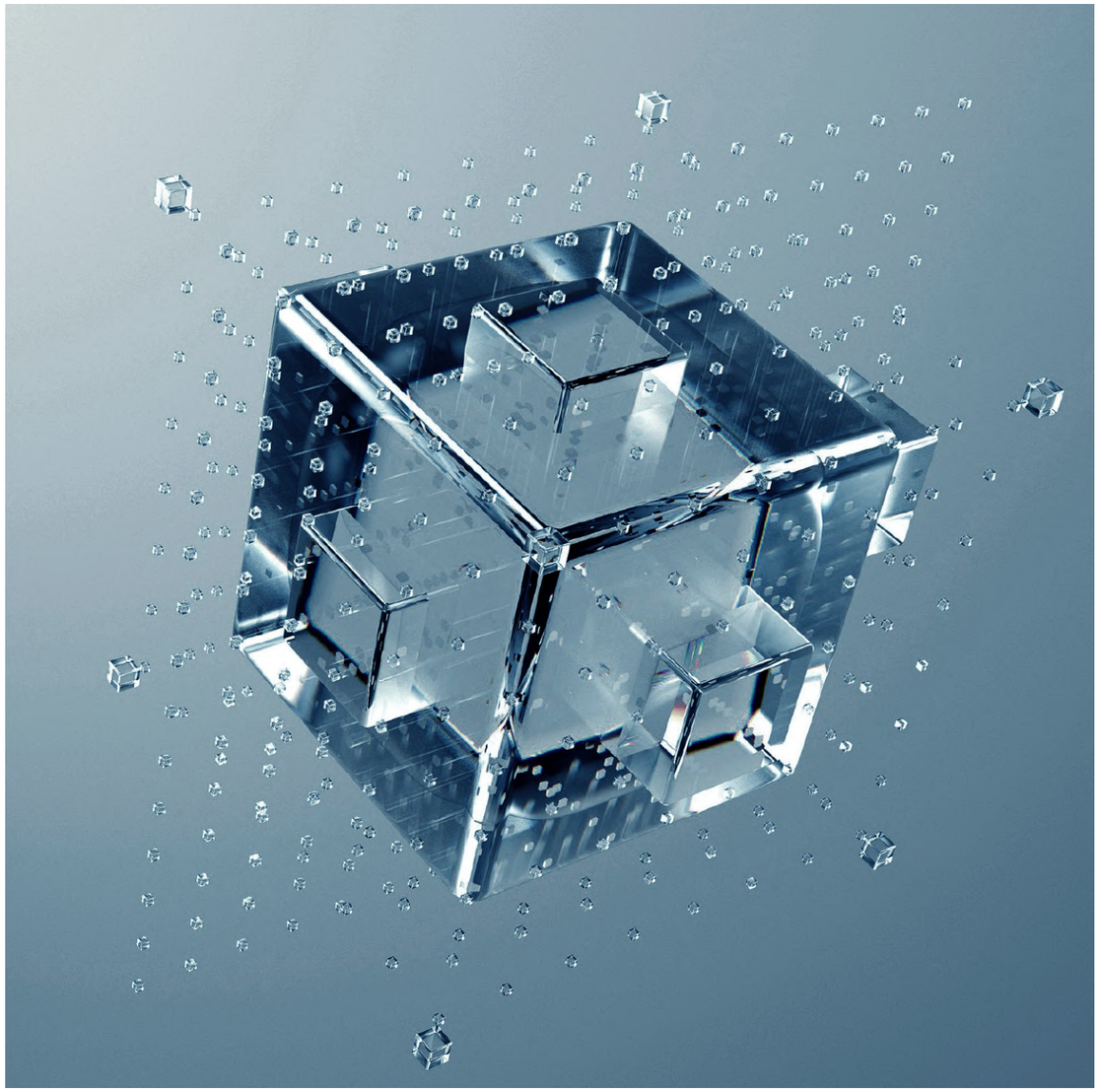


Solv Bond Voucher

USE CASES OF ERC-3525
ASSET PACKAGING

The Package SFT is an upcoming ERC-3525 powered asset packaging solution that will enable various assets to be packaged into a single SFT, resembling a traditional investment portfolio. The Package SFT provides the look-through and fund-in-fund transparency for any underlying assets, and it is divisible for liquidity management.

Furthermore, the immutability of data held in the digital ledger (the blockchain) and the excellent visualization of ERC-3525 will enhance what regulators desire to achieve - clarity and protection for investors.



The Package SFT provides the look-through and fund-in-fund transparency for any underlying assets

USE CASES OF ERC-3525
GAMING

As blockchain games evolve, so do our needs to operate advanced in-game items. With ERC-3525, game items represented by multiple token types can be transferred in just one transaction, just as they are with ERC-1155.

Not only so, ERC-3525's unique grouping mechanism, SLOT metadata, allows game items that are like-kind but uniquely identifiable to be easily created and transferred.

Before ERC-3525, a player could transfer multiple identical copies of an NFT gear to another under a smart contract at best. Now, the player can socket unique add-ons into these identical items, making them uniquely identifiable, and still be able to transfer them in a single transaction.

With ERC-3525, managing complex in-game items have never been easier and more fun!

On-chain game items that are like-kind but uniquely identifiable can be easily batch-processed with ERC-3525.

USE CASES OF ERC-3525
REAL-WORLD ASSETS (RWA)

Bringing real-world assets (RWAs) on-chain has always been a significant focus of the blockchain sector. Tokenization diversifies investors' asset universe and increases transparency like never before.

In the past decade, RWA tokenization has been stagnant because a powerful and versatile digital representation for RWAs was missing.

ERC-3525 allows existing illiquid assets such as equities, real estate, and renewable energy to become divisible, represented digitally, and traded freely.

In the renewable energy industry, solar panels can be tokenized using ERC-3525 tokens, with ties to a panel's serial number, daily output, surface area, and location. A "solar token" provides investors with accurate data feeds through oracles so that the financial profile of a solar panel could be monitored in real-time.

Since tokenized solar panels are fractionalized assets, investors could conduct P2P (peer-to-peer) trading on a regulated marketplace to increase liquidity or use the tokens as security for a loan.

Tokenized renewable energy

YOU MADE IT!

Congratulations on being one of the first to learn about the most exciting Web3 asset yet! As the creator and the first adopter of ERC-3525, Solv Protocol welcomes everyone to join in and become the early builders of the SFT ecosystem. Explore with us at **sftlabs.io**

Once again, thank you for reading this guidebook, and welcome to the future of finance!

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