



# PYUSD on Solana

## White Paper



## Abstract/Summary

*PayPal USD (PYUSD) is an open stablecoin that addresses many of the challenges of current payments solutions. Combined with the power of the Solana blockchain, PYUSD offers near-instant global settlements, low cost transactions, and can be integrated into apps inside and outside of the PayPal ecosystem. Supported by PayPal, independently audited, and 100% reserved, PYUSD sets a high standard for U.S.-based stablecoins.*

## 1. Introduction

While e-commerce has matured dramatically in the decades since the introduction of the PayPal wallet in 1999, we now face a new world of payments involving blockchains and digital currencies that, much like the internet of the early 2000s, feels ripe with potential and opportunity.

These new solutions aim to address the legacy issues of traditional payments—slow settlement times, high transaction costs, and the exclusion of under-banked and unbanked individuals around the world.

**PayPal USD (PYUSD)** is a payments solution created with the goal of realizing the next generation of fintech innovation. PYUSD builds upon PayPal’s payments expertise and the power of the Solana blockchain to offer fast (near-instant settlement), cost-effective (near-zero network fees), highly secure, and truly global payments.

PYUSD is issued by Paxos Trust Company, LLC ([Paxos](#)), a fully-chartered, limited purpose trust company regulated by the New York State Department of Financial Services ([NYDFS](#)). PYUSD is 100% backed by high-quality liquid assets and is redeemable 1:1 via PayPal for U.S. dollars.

We believe PYUSD is a trusted foundation for the next generation of digital payments.

In this guide, we'll look at PYUSD on Solana, covering key concepts such as:

- Why stablecoins are needed
- How PYUSD unlocks new use cases for payment service providers, financial institutions, digital wallets, and both consumer and merchant developers
- The technical details of PYUSD on Solana

Let's start by looking at the current state of payments and why we believe PYUSD is the future of digital payments.

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## 2. The Current State of Payment Rails

Current payment rails and messaging protocols, such as ACH, SEPA, and SWIFT, form the backbone of global payments. They allow us to transact at scale and with sufficient trust that payments will happen the way we expect.

However, these technologies can force trade-offs between speed and cost-effectiveness, at a time when users often expect—and require—both. For example:

- **Payments accrue fees** as they move between parties and **require arrangements** such as infrastructure overhead and liquidity requirements.
- Batch-processing schedules and limited operating hours mean that payments can take **days to settle**.
- Net settlement arrangements make **small dollar-value transactions economically untenable to process**.

Innovations like digital currencies offer an opportunity to streamline this process and make payments more efficient, cost-effective, and accessible.

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## 3. PYUSD: Building the Next-Gen in Payments

**PYUSD, an open stablecoin supported by one of the world's most trusted digital payments company**, was built to solve these problems. PYUSD is fast, cost-effective, and inclusive.

### **Stablecoins Defined**

*Most cryptocurrencies fluctuate in price, often considerably, and are therefore ill-suited for payments. For example, the value of Bitcoin in USD can swing by large percentages in a single day. Because of this volatility, users typically don't settle invoices with a cryptocurrency such as Bitcoin. **Stablecoins** are cryptocurrencies designed to solve this problem by maintaining a stable value, often by pegging the value to a fiat currency (such as USD) 1:1. Stablecoins offer the best of both worlds: They keep a low rate of day-to-day volatility yet still provide the benefits of blockchain—fast, cost-effective, global payments.*

PYUSD is a stable store of value, built on [blockchain technology](#), that is redeemable 1:1 for USD. It was developed from the ground up to provide the technology suited for next-gen digital payments.

PYUSD can be **bought, sold, sent, received, and used for payments**. For example, eligible U.S. users can:

- Buy PYUSD on PayPal and Venmo
- Buy PYUSD using any compatible crypto wallet or exchange
- Pay for online transactions using PYUSD
- Send and receive PYUSD as payments, to and from eligible persons across the globe
- Send and receive PYUSD both inside and outside of the PayPal ecosystem

And with PYUSD on Solana, users also get:

- **Near-instant settlement:** Most PYUSD transactions settle within seconds.
- **Finality:** On-chain payments made with PYUSD offer near-instant finality. Merchants don't have to worry about canceled customer payments due to insufficient funds or other reasons.
- **24/7 availability:** PYUSD on Solana is designed to be available 24/7.
- **Interoperability:** PYUSD is also available for payments outside of PayPal, offering interoperability with other processors, networks, and wallets.
- **Programmability and composability:** PYUSD has been developed on the widely adopted SPL token standard. This means that any product that supports the standard automatically supports PYUSD. Developers can freely experiment and build on top of the digital currency both inside and outside of the PayPal ecosystem. Consumers, merchants, and institutions can enjoy a wide range of third-party developer experiences that leverage PYUSD for payments and financial use cases.
- **Low transaction costs:** For PYUSD on Solana, transfers between external wallets and applications typically cost [less than a cent](#) regardless of the transaction dollar amount. PYUSD transfers between PayPal or Venmo users are processed for free.
- **A prebuilt user base:** PYUSD is available to the existing base of eligible U.S. customers of PayPal.

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## 4. PayPal + PYUSD Creates a Better Stablecoin

In addition to the above benefits, PYUSD is designed to meet, what we believe, is the **highest standard for a U.S.-based stablecoin**. *PYUSD upgrades stablecoin transactions to stablecoin payments.*

PYUSD is issued by [Paxos](#), a fully-chartered, limited-purpose trust company regulated by the NYDFS. NYDFS has established a comprehensive framework for regulating virtual currency businesses, including stablecoin issuance and the required reserves.

PYUSD is **100% reserved with fully transparent attestations of cash and cash equivalents** held in:

- **Deposit accounts** with insured depository institutions, with each such account segregated from any proprietary assets of Paxos and PayPal and from any reserve assets that Paxos maintains on behalf of holders of other tokens issued by Paxos,
- **U.S. treasury bonds** with remaining maturities of less than 90 days held in custody accounts designed to be protected from bankruptcy at highly rated financial institutions, and
- **Overcollateralized overnight reverse repurchase agreements** with highly rated financial institution counterparties where cash is repo'ed out against U.S. treasuries.

PYUSD transactions are also subject to **regular audits, attestations, and reconciliations** including the [publication of monthly third-party attestation reports](#).

#### 4.1. High levels of distribution and a wide range of payments

Distribution of PYUSD can be achieved in a variety of ways, including:

- On **PayPal and Venmo**, PYUSD is available for purchase and can be transferred by eligible persons. It can be converted by PayPal's U.S. customers to checkout and pay at millions of PayPal merchants across the globe, allowing consumers to enjoy familiar PayPal payment features like returns and refunds.
- On **Xoom**, PYUSD can be used to fund cross-border P2P payments.
- **Outside of the PayPal ecosystem**, PYUSD can be transferred using exchanges such as [crypto.com](#) and wallets such as [Phantom](#).
- PYUSD can also be used for a variety of use cases that encourage distribution. For example, PYUSD can be used as a fast, low-cost funding instrument for venture investments such as the [investment made by PayPal Ventures](#) in Mesh.

PYUSD empowers stablecoin commerce with the nearly frictionless and trusted payments experience that mainstream consumers and merchants expect.

#### 4.2. Easy on and off ramps

Many stablecoins have costly and limited ways to redeem to fiat, negatively impacting their liquidity and risk. In addition to maintaining transparent, high-quality reserves, a safe, well-managed stablecoin should make it simple for its holders to acquire and redeem their stablecoins.

As some of the most widely used financial services applications in the U.S., the PayPal and Venmo apps provide easy and straightforward ways to move fiat to PYUSD and back. This simplified and education-oriented user experience allows eligible consumers to easily on and off ramp, without having to worry about asset custody, multichain switches, and key management. Additionally, token holders can redeem PYUSD directly with the issuer Paxos.

#### 4.3. Blockchain security and anti-fraud measures

PYUSD offers high levels of security, incorporating PayPal's anti-fraud mechanisms to help protect users and facilitate mainstream payments at scale.

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PayPal works with leading blockchain forensics firms Chainalysis, TRM Labs, and Elliptic Forensics, as well as created custom investigation teams to help identify and prevent fraudulent and illicit activity involving PYUSD. PayPal is also a member of the TRUST consortium, a group of leading cryptocurrency firms that jointly share information on customer crypto transfers as required under applicable law, such as the Financial Crimes Enforcement Network (FinCEN) of the U.S. Treasury Department.

#### 4.4. High level of customer protection

PayPal takes customer protection seriously and PYUSD's introduction to, and continued growth in, the stablecoin landscape catalyzes an enduring shift to increased consumer, merchant, and institutional confidence for this important payments technology.

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## 5. Building with PYUSD on Solana

Next, let's look at the technical details needed to start building with PYUSD.

PYUSD is available on [Solana](#), a high-performance blockchain network built for finance, payments, loyalty programs, and more. Solana is one of the most highly-adopted blockchains, with an average of [40.7 million daily user transactions](#) processed in Q4 2023 and an active base of [over 2,500 developers](#).

*PYUSD is also available as an [ERC-20 token](#) on the Ethereum blockchain.*

Solana brings speed and efficiency, offering significantly faster and cheaper transactions than many competing blockchains. Solana is:

- **Fast**, with target slot times of 400 milliseconds
- **Scalable**, with support of up to [thousands of transactions per second](#)
- **Cost-effective**, with [median network fees of U.S. \\$0.00064 per transaction](#)
- **Designed to be available** globally, 24/7

In practice, this means that PYUSD transfers on Solana **settle near-instantly**, with **very low fees** regardless of the transaction amount, can **scale to very large user bases** for apps, and are **available to eligible persons across the globe** with an internet connection.

#### **Exploring Solana**

*Solana was built to enable nearly frictionless, near-instant, near-zero cost payments. Learn more about Solana's [payments tooling](#), [developer resources](#), [blockchain basics](#), and [community](#).*



## 5.1. PYUSD Architecture

PYUSD is being implemented as a [fungible token](#) using [token extensions](#) (TEs) on Solana—a token standard and set of extensions that allow customization by token creators. Each TE is a program adhering to the SPL token standard, which provides [more than a dozen audited extensions](#), used to customize tokens.

Using TEs as part of the core architecture of PYUSD brings many benefits, including:

- **Reduced Risk:** TEs are audited and well-tested extensions are an industry standard. By using TE, PYUSD inherits its enterprise-grade security and reliability.
- **Reduced Development and Testing:** Because TEs are reusable standards, the time required to develop and test apps (and the chances of those apps having defects) is significantly reduced.
- **Enterprise Ready:** TEs are plug-and-play ready. They offer a fast, reliable, and proven path to adding blockchain and PYUSD to apps.
- **Flexibility:** TEs are an open standard, which allows PYUSD to be integrated and used not only in the PayPal ecosystem, but outside of PayPal with any compatible wallet, exchange, or library.

Following the rules of the Token Program, PYUSD tokens can only be minted by the “Mint Authority” (i.e., Paxos for PYUSD). However, compatible digital wallets, typically controlled by users, can own and transfer the PYUSD tokens.

While the details are outside of the scope of this paper, developers can access PYUSD token information (such as user balances, etc.) through various ways, including the [Solana CLI](#), [JavaScript](#), the [Solana RPC API](#), cURL, the [Rust SDK](#), and more.

Check out [the Solana docs](#) for more details. Request PYUSD from the devnet faucet via cURL with the code snippet below.

```
curl --data '{"address": "<address>", "network": "SOLANA", "token": "PYUSD"}'  
https://api.sandbox.paxos.com/v2/treasury/faucet/transfers
```

Because PYUSD was built on open-source code and open standards, developers can freely include PYUSD in their apps, experiment with PYUSD, and build on top of PYUSD as needed.

Test PYUSD can be acquired for building and testing apps on devnet [through the PYUSD faucet](#).

### **Solana Environments**

Solana has several different network environments. **Devnet** is the QA network meant for developers to deploy and test programs before moving to production. It replicates the production deployment of the Solana network but uses test SOL to pay for transactions.

**Testnet** is a testing network meant only for core Solana developers testing planned mainnet updates. **Mainnet** is the production, live Solana network.

## **5.2. PYUSD and Token Extensions**

Since it's nearly impossible to predict all features that developers will someday need, having the flexibility to evolve using TEs is important. By design on Solana, mint extensions **must be initialized** upon token creation. Extensions can be *configured by the token creator* after token creation, but new extensions cannot be added. Because of this requirement, several extensions have been initialized. However, just because a TE has been initialized does not suggest that it will necessarily be used.

### PayPal Mint Extensions

<b>Confidential Transfers:</b>	Allows merchants to keep transaction amounts confidential for their consumers while maintaining visibility for regulatory purposes. This is not dissimilar from today's commerce—for instance, you cannot see the financial statements of your neighborhood coffee shop just because you buy from the shop daily. ( <i>Note: This has not yet been enabled on Solana.</i> )
<b>Transfer Hook:</b>	Allows calling specific programs with each token transfer. As with transfer fees, this is initialized for potential future use but is currently initialized with a null program ID.
<b>Permanent Delegate:</b>	Allows specifying a permanent delegate for a mint. This delegate has unlimited delegate privileges over any account for that mint, which means that it can burn or transfer any amount of tokens. This extension is critical for regulatory purposes, as it allows for seizing funds as required by law enforcement.
<b>Metadata &amp; Pointer:</b>	Allows token creators to designate an address that describes the canonical (official) metadata for the token. This is used to store the name, ticker, and image in a standard manner.
<b>Mint Close Authority:</b>	Allows owners to close mint accounts and reclaim the <a href="#">lamports</a> on the mint account. Although this may never be needed, it has been initialized in case it is needed in the future.
<b>Transfer Fees:</b>	Allows transfer fees to be withheld on each transfer, that can be claimed by a defined account. This is included as a fail-safe and initialized to 0.



## 6. Use Cases for PYUSD on Solana

Now that we know the technical details, let's look at some of the use cases that can be built with PYUSD.

### 6.1. Cross-border peer-to-peer transfers

Sending payments across borders and currencies is a huge market; fiat payments to low and middle-income countries [reached \\$669 billion USD in 2023](#). But cross-border payments aren't always economical.

With PYUSD, token holders can send funds to eligible persons with a Solana wallet, and the transfer settles near-instantly and for minimal to no cost.

Even for recipients without Solana wallets, by settling with disbursement partners in PYUSD, cross-border P2P transfer service providers could reduce their processing and liquidity management costs, passing along the cost savings to the P2P senders.

Providers could also leverage local bank connections and cash networks to allow recipients to easily convert PYUSD to bank deposits or cash, unlocking the benefits of near-instant, low-cost global transfers while preserving the ability to off-ramp into local cash and bank accounts.

### 6.2. Business-to-business transfers

Due to the complex nature of cross-border payments, including multiple intermediaries and the complexities of correspondent banking networks across multiple countries, the majority of B2B payments can take several days to settle. And depending on the method used to transfer funds across borders, payments can be expensive.

By using the programmable nature of PYUSD, businesses could build their own services to create near-instant, cost-effective transfers seamlessly across borders, and with relatively light technological requirements. Teams could also create smart contracts (called [programs](#) on Solana) that govern the movement of PYUSD between accounts. This could increase the speed and accuracy of supplier payments (or any other B2B payment governed by a contractual agreement).

Additionally, the adoption of PYUSD transfers doesn't necessarily require businesses to own or even interact with PYUSD. Payment service providers could build B2B payments products that present fiat experiences to end users but convert and process the actual money transfers to PYUSD on the back end, passing along the time and cost advantages.

### **6.3. Global payouts**

PYUSD could significantly reduce complexity in global payouts. Rather than navigating a complex network of unique regional bank accounts, differing currencies, correspondent banking, and digital wallet rails, PYUSD could be paid out to any compatible wallet address.

In addition, programmable smart contracts using PYUSD could enable enterprise payers to automate payouts processes more efficiently, even [streaming payments](#) such as salary in real-time.

### **6.4. Microtransactions**

Because of high transaction fees, traditional payment processing systems struggle to support microtransactions. As a result, platforms that handle microtransactions typically batch process payments, which involves complex payments engineering, increased risk, and deters platforms from accepting microtransactions.

However, PYUSD on Solana will enable merchant platforms to easily process microtransactions in near real-time and at a low cost. Microtransactions enable a wide variety of use cases, such as tipping, in-game purchases, and paying content creators small amounts per read or view.

### **6.5. Web3 payments**

Many Web3 merchants, such as NFT marketplaces and blockchain-based gaming platforms, lack connectivity to traditional fiat bank accounts and need robust, non-volatile payment solutions, such as PYUSD.

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## **7. Conclusion**

PYUSD builds upon PayPal's legacy as a trusted payments platform by helping to usher in a new era of digitally native commerce.

When you build with PYUSD, you create a better payment experience that is efficient, inclusive, trusted, and ready for the new era of digital commerce.

Start integrating PYUSD into your apps today. Explore the PayPal developer ecosystem, learn about integrating with token extensions on Solana, and mint test tokens on Solana devnet.

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