**ARSX Protocol Whitepaper**

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# Introduction

ARSX is a decentralized stablecoin protocol designed to create a low-volatility crypto asset pegged to the Argentine peso (ARS). The system integrates an exogenous collateral model, custom price oracle, decentralized stability mechanisms, and an optional Peg Stability Module (PSM) for robust peg maintenance.

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# System Components

## 1️⃣ARSUSDTOracle

### Overview

The ARSUSDTOracle is a custom price oracle contract, manually updated by an authorized owner or multisig. It provides the ARS/USDT price used by the protocol to enforce solvency and maintain peg stability.

### Key Features

- **Manual Update**: Prices are pushed on-chain by the owner, using reliable off-chain data sources.
- **Freshness Checks**: Consumers can verify price freshness using `maxAge` checks.
- **Events**: Emits updates for transparency.

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## 2️⃣ARSXStableCoin

### Overview

The ARSXStableCoin is a standard ERC20 token designed to represent the stablecoin pegged to ARS. It is mintable and burnable exclusively by the ARSXEngine.

### Key Features

- **ERC20 with Burn/Mint**: Implements `ERC20Burnable` and `Ownable` restrictions.
- **Ownership**: Controlled by ARSXEngine to ensure only the protocol can mint or burn supply.

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## 3️⃣ARSXEngine

### Overview

The ARSXEngine is the core of the system. It manages collateral deposits, minting and burning ARSX, and enforcing collateralization and health factors to maintain stability and solvency.

**Key Features**

- **Collateral Management**: Supports multiple collateral types (ETH, USDC, USDT, DAI), each with price feeds and risk parameters.
- **Overcollateralization**: Ensures ARSX is always backed with a higher value of collateral than ARSX in circulation.
- **Liquidation**: Automated mechanisms to liquidate undercollateralized positions.
- **Health Factor Checks**: Enforces minimum collateral ratios to prevent insolvency.
- **Governance Parameters**: Adjustable liquidation thresholds, bonuses, and oracle freshness.

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### 4️⃣ Peg Stability Module (PSM)

**Overview**

The PSM enables 1:1 swaps between ARSX and external stablecoins (e.g., USDC, USDT, DAI) to directly manage the peg during times of volatility or external shocks.

**Key Features**

- **Swap Mechanism**: Allows users to swap ARSX ↔ USDC/USDT at fixed rates with minimal slippage.
- **Liquidity Pool**: Separate pool, not connected to Engine collateral, seeded with reserves from governance or treasury.
- **Peg Defense**: Acts as a pressure valve to absorb supply/demand shocks without requiring large-scale collateral adjustments.

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## How Components Work Together

### 1️⃣ Oracle feeds the Engine

The ARSUSDTOracle provides an accurate, manually maintained ARS/USDT price. The Engine uses this price to calculate each user's collateral health factor and determine if they can mint ARSX.

### 2️⃣ Engine manages collateral and minting

Users deposit collateral (ETH, stablecoins) into the Engine. Based on collateral value and the ARS/USDT oracle price, they can mint ARSX, respecting overcollateralization requirements.

### 3️⃣ ARSXStableCoin represents the peg

ARSX tokens circulate as a stable representation of the Argentine peso. Users can redeem or burn them to reclaim collateral or exit positions.

### 4️⃣ PSM ensures strong peg

If ARSX deviates from its peg, the PSM enables direct swaps to correct market price, reducing reliance on liquidations or collateral adjustments.

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## Security and Risk Considerations

- **Oracle centralization**: The ARSUSDTOracle is manually updated and relies on multisig or off-chain processes.
- **Collateral volatility**: ETH and other crypto assets are volatile; stablecoins mitigate this risk.
- **PSM exposure**: Using centralized stablecoins (e.g., USDC) introduces counterparty risk.
- **Governance**: Parameter adjustments must be carefully controlled to avoid governance attacks or misconfigurations.

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## Future Enhancements

- Support for additional decentralized collateral types.
- Automatic oracle aggregation with multiple data sources.
- Dynamic collateral ratios and real-time risk monitoring.
- Expanding PSM to include other stable assets or synthetic ARS products.

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## Conclusion

The ARSX Protocol combines algorithmic stability mechanisms, robust collateral management, a manually maintained custom oracle, and an optional Peg Stability Module to create a flexible, resilient stablecoin system tailored for the Argentine peso. This design balances decentralization and practical peg maintenance, enabling a scalable, secure, and transparent stablecoin infrastructure.

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