# XAUE Protocol Information

XAUE is an RWA share token protocol backed by Tether Gold. It is deployed on **Ethereum Mainnet** and **BNB Smart Chain (BSC)**. The three core contracts use **the same addresses on both chains**.

*Version 2 — updated 2026-10-29 to add the BNB Smart Chain deployment.*

## 1. Overview

The XAUE protocol consists of three core contracts:

- `FundToken` : the XAUE share token contract, responsible for share issuance, redemption requests, and related access control
- `Oracle` : the contract that manages NAV-related parameters and APR settings
- `Vault` : the custody contract for the underlying asset, responsible for controlled outflows

Underlying asset:

- Ethereum: `XAUt` (Tether Gold)
- BNB Smart Chain: `XAUt0` (the omnichain version of Tether Gold)

## 2. Network Information

| Item | Ethereum | BNB Smart Chain |
|---|---|---|
| Network | Ethereum Mainnet | BNB Smart Chain Mainnet |
| Chain ID | 1 | 56 |
| Chain Type | EVM | EVM |
| Underlying Asset | Tether Gold (XAUt) | Tether Gold (XAUt0) |

## 3. Contract Addresses

### 3.1 Core Contracts (identical on both chains)

| Module | Address |
|---|---|
| XAUE / FundToken | `0xd5D6840ed95F58FAf537865DcA15D5f99195F87a` |
| Oracle | `0x0618BD112C396060d2b37B537b3d92e757644169` |
| Vault | `0xC86Daf84C01c891B21dEA66f4cA41CD3799f9E6B` |

The core contracts run the same code on both chains.

### 3.2 Underlying Asset

| Item | Ethereum | BNB Smart Chain |
|---|---|---|
| Underlying | XAUt `0x68749665FF8D2d112Fa859AA293F07A622782F38` | XAUt0 `0x21cAef8A43163Eea865baeE23b9C2E327696A3bf` |

## 4. Token Information

### 4.1 XAUE (both chains)

| Item | Value |
|---|---|
| Name | `XAU Reward Token` |
| Symbol | `XAUE` |
| Decimals | `18` |

### 4.2 Underlying Asset

| Item | Ethereum (XAUt) | BNB Smart Chain (XAUt0) |
|---|---|---|
| Name (on-chain) | `Tether Gold` | `Tether Gold` |
| Symbol (on-chain) | `XAUt` | `XAUt` |
| Decimals | `6` | `6` |

## 5. Core Deployment Parameters

### 5.1 Oracle Parameters (both chains)

| Parameter | On-chain Value | Human-readable Meaning |
|---|---|---|
| `maxAPR` | 100000000000000000 | Maximum APR is `10%` |
| `maxAprDelta` | 50000000000000000 | Maximum single APR change is `5%` |
| `minUpdateInterval` | 86400 | Minimum update interval is `1 day` |

Initial `baseNetValue`:

- Ethereum: `1e15` at initial deployment
- BNB Smart Chain: set to the Ethereum NAV at the time of the BSC deployment (2026-10-26)

### 5.2 FundToken Parameters (both chains)

These values may be updated through governance or operational decisions.

| Parameter | On-chain Value | Human-readable Meaning |
|---|---|---|
| `minDepositAmount` | 1000 | Minimum subscription amount is `0.001 XAUt` |
| `minRedeemShares` | 500000000000000000 | Minimum redemption amount is `0.5 XAUE` |

## 6. Decimal Conventions

| Item | Precision |
|---|---|
| XAUt / XAUt0 | `6 decimals` |
| XAUE | `18 decimals` |
| NAV / APR parameters | `1e18 precision` |

## 7. Initial Pricing Reference

At initial deployment on Ethereum, `baseNetValue = 1e15`:

- `1 XAUt = 1000 XAUE`

The live price is always `Oracle.getLatestPrice()`.

## 8. Oracle Calculation Model

The Oracle calculates the latest NAV using a linear interpolation model based on APR.

### 8.1 Core Variables

| Variable | Meaning |
| --- | --- |
| `baseNetValue` | NAV at the start of the current period, with `1e18` precision |
| `currentAPR` | Current annual percentage rate, with `1e18` precision |
| `lastUpdateTimestamp` | Timestamp marking the beginning of the current period |
| `maxAPR` | Maximum allowed APR |
| `maxAprDelta` | Maximum allowed APR change per update |
| `minUpdateInterval` | Minimum time interval between updates |

### 8.2 Formula

```
NAV(t) = baseNetValue + baseNetValue × currentAPR × (t − lastUpdateTimestamp) / (365 days × 1e18)
```

Where:

- `t` is the current block timestamp
- `baseNetValue` is the NAV at the start of the current period
- `currentAPR` is the APR effective during the current period

Under this model, NAV grows linearly within each period.

### 8.3 Update Logic

When a new APR is submitted, the Oracle first crystallizes the current interpolated NAV into a new `baseNetValue`, and then updates:

- `lastUpdateTimestamp`
- `currentAPR`

This ensures that accrued value from the previous period is preserved before the new APR takes effect.

### 8.4 Constraints

APR updates must satisfy the following constraints:

- the new APR must not exceed `maxAPR`
- the difference between the new APR and the current APR must not exceed `maxAprDelta`
- the time interval between two updates must not be shorter than `minUpdateInterval`

# 9. Oracle Read Interfaces

### 9.1 `getLatestPrice()`

Returns the latest NAV at the current point in time.

- Return type: `uint256`
- Precision: `1e18`

This value is the primary on-chain pricing reference for XAUE shares.

### 9.2 Other Common Read Parameters

| Interface | Description |
| --- | --- |
| `baseNetValue()` | Returns the NAV at the start of the current period |
| `currentAPR()` | Returns the current APR |
| `lastUpdateTimestamp()` | Returns the timestamp of the latest period start |
| `maxAPR()` | Returns the maximum allowed APR |
| `maxAprDelta()` | Returns the maximum single APR change |
| `minUpdateInterval()` | Returns the minimum update interval |

# 10. System Architecture

### FundToken

FundToken is responsible for:

- managing the XAUE share token
- controlling the user whitelist and blacklist
- processing redemption requests and approval states
- coordinating with the Oracle and Vault for subscriptions and redemptions

### Oracle

Oracle is responsible for:

- maintaining NAV-related parameters
- enforcing APR update constraints
- controlling the update frequency of pricing inputs
- serving as the pricing parameter source for the protocol

### Vault

Vault is responsible for:

- custody of the underlying asset (XAUt on Ethereum, XAUt0 on BNB Smart Chain)
- controlled asset transfers to whitelisted destination addresses
- serving as the source of funds for redemption settlement

## 11. Access Control and Governance

The protocol uses role-based access control. Primary roles include:

- `DEFAULT_ADMIN_ROLE`
- `UPGRADER_ROLE`
- `MANAGER_ROLE`
- `REDEMPTION_APPROVER_ROLE`
- `EMERGENCY_GUARDIAN_ROLE`
- `NAV_UPDATER_ROLE`
- `SETTLEMENT_OPERATOR_ROLE`

Operational constraints include:

- subscriptions and redemptions are restricted to whitelisted users
- XAUE transfers are not whitelist-gated; blacklisted addresses cannot transfer XAUE
- all token operations stop while the contract is paused
- Oracle parameter updates are constrained by frequency and delta limits
- Vault outflows require both role authorization and destination whitelist checks

## 12. Notes

This document provides a public overview of protocol configuration and deployment parameters on Ethereum Mainnet and BNB Smart Chain. In the event of future upgrades, governance changes, or parameter updates, the latest on-chain state and official disclosures should prevail.