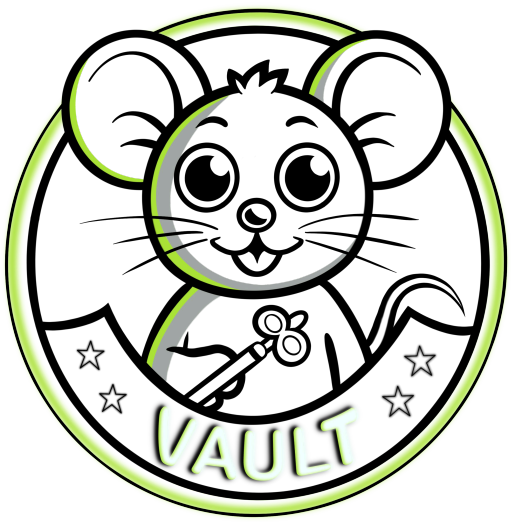

Transparent Network Vault

AI-Driven Lending & Risk Management Protocol for Multichain Assets

February 2025

Whitepaper Ver. 1.0

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Abstract

This document outlines the key principles of the TN Vault protocol, explaining its architecture, AI-driven risk management, and multi-chain infrastructure. It provides an overview of the platform’s implementation, ensuring transparency, security, and efficiency in decentralized finance.

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Introduction

Transparent Network Vault (TN Vault) is an **innovative decentralized platform** of the new generation for managing crypto assets, providing liquidity, and reducing risks. The platform operates across multiple blockchain networks (multi-chain) and combines the capabilities of smart contracts with artificial intelligence (AI) algorithms. The **goal of TN Vault** is to provide users with instant access to liquidity secured by crypto assets **without the need to sell their assets**, preserving their long-term growth while also ensuring high transparency and automated risk management.

Project vision — to combine the best features of DeFi (decentralized finance) and intelligent systems so that users can obtain loans, earn on liquidity provision, and manage their digital asset portfolio with minimal risks and maximum transparency. TN Vault allows users to receive liquidity **up to 50% of the current value of collateral instantly, without selling cryptocurrency.** This is especially important in volatile market conditions: users can weather a downturn or obtain funds for expenses without parting with their investments and without missing potential future price growth.

Operating on multiple leading blockchain networks (primarily **Solana, TON, BNB Chain, Ethereum**, etc.), TN Vault demonstrates flexibility and scalability within ecosystems. Initially, the platform supports the most in-demand networks and plans to **expand the list** as new blockchains emerge, striving for a truly universal multi-chain solution. This approach allows TN Vault to adapt to market changes and provide users with access to a wide range of digital assets **regardless of the network used**. TN Vault users can interact with different blockchains through a **single interface**, simplifying the DeFi experience for a broad audience.

02

Key Problems of DeFi and the TN Vault Solution

The modern decentralized finance (DeFi) market faces a number of **fundamental problems** that hinder its development and reduce efficiency for users. TN Vault is designed to solve these problems by combining a multi-chain architecture, intelligent management, and advanced technologies:

Liquidity deficit for cryptocurrency holders:

Many investors do not want to sell their coins to obtain fiat funds or stablecoins, as this leads to lost profit in the event of price growth and potential tax burdens. As a result, during periods of market instability, investors may not have access to sufficient cash. **TN Vault solves this problem** by allowing users to **instantly receive loans in USDT secured by cryptocurrency.** Users deposit their tokens (e.g., TON, SOL, BNB, ETH, etc.) into the TN Vault smart contract and immediately receive liquidity (credit) of up to **50% of their current value**. At the same time, the asset remains the property of the user, and they retain the ability to profit from the future price increase of the collateralized cryptocurrency without selling it at an unfavorable moment.

Limited tools for asset and risk management:

: Despite the growth of the DeFi sector, many users still face a lack of **reliable and convenient platforms** for storing assets, obtaining liquidity, and managing risks. Complex interfaces deter newcomers, while frequent smart contract hacks undermine trust in existing solutions. **TN Vault ensures secure multi-chain storage and asset management** in a single application. All operations are carried out through **audited smart contracts**, minimizing the risks of technical vulnerabilities. A simple and intuitive interface (including a **mobile wallet**, see section 4.1) makes advanced DeFi tools accessible even to beginner users without sacrificing functionality.

Difficulties in attracting and retaining users amid competition:

The number of DeFi platforms is growing, with many offering similar services. Investors easily switch from one platform to another in pursuit of better conditions (higher income, bonuses, etc.). **TN Vault implements innovative motivation mechanisms for long-term user retention.** The ecosystem provides **rewards in $TVLT tokens** for active participation: liquidity providers, stakers, long-term token holders, and active community members receive bonuses. Moreover, **the size and conditions of rewards automatically adjust** to the system's state (e.g., liquidity shortage in the pool, see section 6), maintaining a balance between platform attractiveness and sustainability

Thus, TN Vault offers a **comprehensive solution** to these problems: its multi-chain structure ensures **flexibility and diversification**; AI modules continuously monitor the market and risks, automatically **optimizing** system parameters; and **user-oriented transparency fosters trust and loyalty** from a broad audience.

03

Key Features and Advantages of TN Vault

After identifying the problems, let's examine the main features of TN Vault, which distinguish it from traditional DeFi protocols:

Multi-chain ecosystem:

TN Vault was initially integrated with multiple blockchains (**TON, Solana, BNB Chain, Ethereum,** etc.) and will continue to expand. Users can **distribute assets across different networks**, reducing risks associated with volatility or network congestion. The platform provides a **unified interface** for working with multiple networks simultaneously, eliminating the need for manual token swaps. This universality means that regardless of the user's preferences or market conditions, TN Vault grants access to the most popular blockchains. When new promising networks emerge, TN Vault's architecture allows **quick integration** of their support, keeping the ecosystem up to date.

Access to liquidity without selling assets:

TN Vault allows users to obtain an **instant loan in USDT stable coin** secured by their crypto assets without selling them. This is particularly beneficial for investors following the **HODL** strategy (long-term holding): they can obtain the necessary funds **while retaining rights to the collateralized coins** and avoiding realized losses during temporary market downturns. Additionally, this helps **avoid taxable events** related to cryptocurrency sales. For example, an investor holding **100 SOL** can deposit them into TN Vault and instantly receive liquidity ~50% of their **value** in USDT to cover current expenses or new investments while maintaining the potential profit from SOL price growth in the future.

AI-driven risk and liquidity management:

At the core of TN Vault are artificial intelligence algorithms that **analyze market conditions in real-time** (price volatility, trading volumes, on-chain activity, etc.) and automatically adjust protocol parameters. This ensures **optimal conditions for all participants:**

- **Dynamic parameter management:**

Under stable conditions, **the maximum loan-to-value (LTV) ratio** is set at **50%**. However, if AI detects increased volatility or negative trends, it **can lower the allowable LTV** (e.g., to **40%**), reducing liquidation risks. Similarly, **interest rates on loans (or fees, see section 6.3) can automatically increase** in response to rising market risks, maintaining platform stability.

- **Liquidity balancing:**

The AI module monitors liquidity pools across different networks. If **a liquidity deficit** arises in a particular pool (e.g., low USDT in Solana), the system increases rewards for liquidity providers in that pool to attract new deposits. If, on the contrary, **there is an excess of unused funds**, reward amounts automatically decrease to base levels to avoid inefficient token distribution. This mechanism **helps maintain sufficient liquidity across all supported blockchains** and improves resource efficiency.

Prediction and Risk Prevention:

Using machine learning methods, TN Vault analyzes historical data and **signals from external sources (news, social media)** to predict sharp market changes. If the algorithms anticipate, for example, **a volatility spike or a mass price drop of a specific asset**, the platform can proactively adjust conditions **(reduce LTV, increase collateral requirements, temporarily raise fees for new loans)** to **minimize losses for users and the system** in case of an adverse event. This level of **proactive risk management** gives TN Vault a significant advantage over traditional protocols, where parameters are often fixed or manually adjusted with delays.

Transparency and Security:

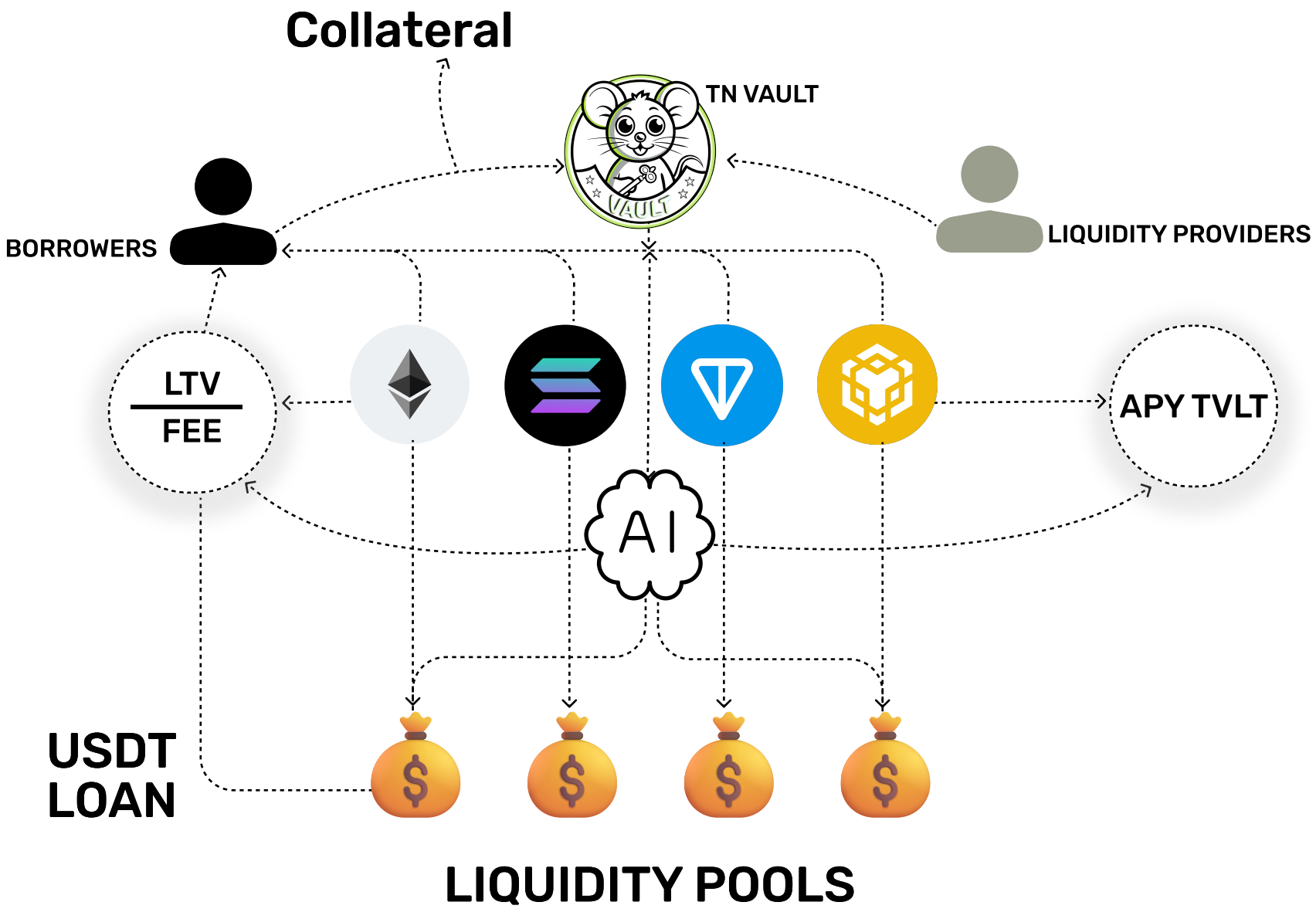
TN Vault is built on principles of **full trust and decentralization.** All operations **(deposits, loans, rewards)** are recorded on the blockchain and publicly verifiable, ensuring **transparency and auditability** of every action. User asset security is guaranteed by **smart contracts that have undergone independent audits**, as well as an **architecture with no single point of failure.** Additionally, the platform follows strict user protection policies, including compliance with **KYC/AML regulations (for fiat gateways)** and mechanisms to counter suspicious activity. This combination of measures provides users with a **high level of trust**: they can check the status of their assets and obligations at any time and verify the reliability of the protocol.

In summary, these features make TN Vault not just another DeFi tool, but **a comprehensive and innovative solution** for long-term crypto asset management. The platform is designed for both **tech-savvy users and business-oriented investors**, offering them **a transparent, secure, and efficient** way to interact with digital assets across multiple blockchains simultaneously.

04

Platform Architecture

The TN Vault architecture is designed with the requirements of decentralization, security, and performance in mind, allowing for efficient management of multi-chain assets and system scalability as load increases. The platform has a modular structure, including separate components for the wallet, lending, and liquidity management, which are closely integrated with each other:



Non-custodial Multi-Chain Wallet:

TN Vault provides its own wallet for storing and managing crypto assets, which **does not store users' private keys** on its servers. This is a non-custodial solution: full control over funds remains entirely with the user. The wallet supports all blockchains integrated into the platform (**TON, Solana, BNB, Ethereum**, etc.), allowing the user to keep various tokens in a single application. The main functions of the wallet include **secure storage, sending, and receiving** cryptocurrencies, as well as direct access to DeFi platform functions (**taking a loan, depositing collateral, adding liquidity**) directly from the interface.

In the first phase, a **mobile wallet application** will be launched in the **App Store and Google Play**, allowing users to conveniently interact with TN Vault from their smartphones. This integration of a proprietary wallet simplifies working with the platform, especially for new users, eliminating the need to install browser extensions or hardware wallets. At the same time, the implementation of the **non-custodial** principle means that even in a hypothetical scenario where TN Vault's servers are compromised, **hackers will not be able to access users' private keys or funds.**

4.2 Lending Module:

The lending module is responsible for accepting collateral and issuing loans in TN Vault. It is implemented as **a set of smart contracts in each supported network**, which manage user deposits and issue **liquidity (USDT) against collateral**. When a user deposits an asset, the **smart contract locks the collateral** and, based on the **current LTV coefficient (loan-to-value ratio), automatically issues the corresponding amount of USDT**. The logic for calculating interest rates, fees, liquidation conditions, and collateral redemption is also embedded in these smart contracts.

The TN Vault lending module is designed as an **independent component**, increasing its reliability and security: **contracts undergo audits and are deployed without manual intervention**. Thanks to the multi-chain module, users can take loans for various assets within their native networks (for example, **collateralizing SOL in the Solana network for a USDT loan, collateralizing TON in the TON network,** etc.), eliminating the need for external bridges or wrapped tokens. In case of changing market conditions, the **AI module (see section 5)** will interact with the lending module, automatically adjusting lending parameters (**e.g., reducing available LTV or increasing the base fee**) to ensure system sustainability.

4.3 Liquidity Provision Module:

This component is responsible for attracting and managing capital used for loan issuance. Essentially, these are **USDT liquidity pools** across different blockchains, where **liquidity providers (investors)** can deposit their funds to earn income. When a borrower receives **USDT against collateral**, these USDT come from the corresponding pool. In return, the platform **rewards liquidity providers** in the form of interest income and **$TVLT token rewards**.

Liquidity pools are implemented through **smart contracts**, which accept USDT deposits, track the **total available funds and issued loans** (pool utilization ratio), and distribute payments to providers. Thanks to an **automated reward system, pool profitability is dynamically adjusted:** the higher the demand for loans and pool utilization, the higher the rewards, and vice versa (a more detailed description of this mechanism is in section **6.4**).

This approach ensures balance: the platform always has sufficient liquidity for issuing new loans, and investors are incentivized to provide funds while earning **competitive returns**. The liquidity provision module is also **tightly integrated with the AI system**: algorithms can signal the need to **temporarily increase bonuses** if a pool is close to running out of liquidity or **reduce them to baseline levels** when there is an excess of available funds.

4.4 Cross-Chain Interaction:

Although the current version of TN Vault does not require cross-chain transfers (each loan and pool exists within a single network), the architecture was originally designed for the integration of such functions.

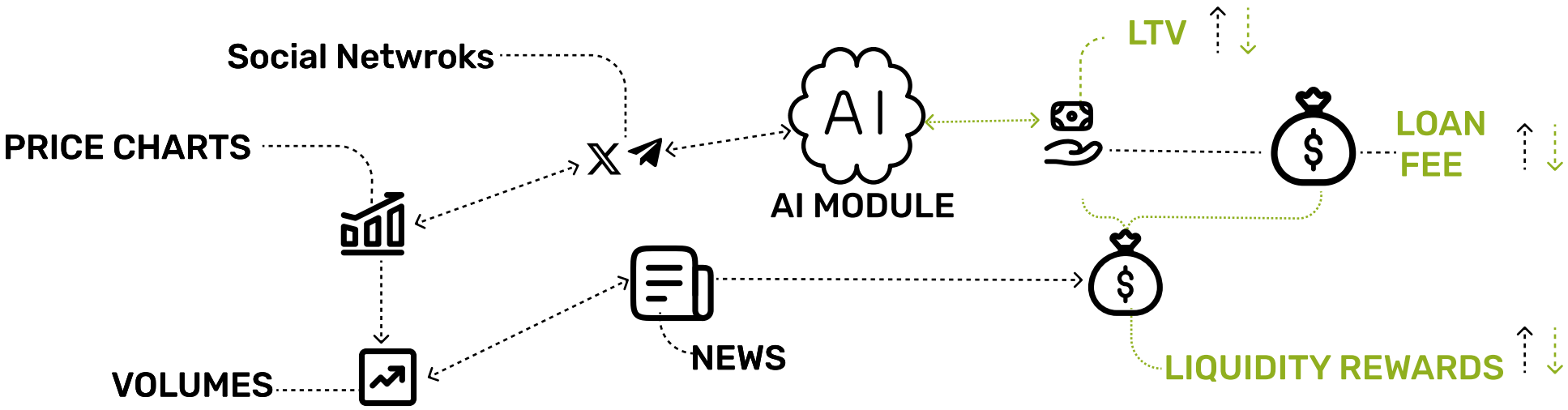
In the future, as the platform evolves and demand arises, **mechanisms for cross-chain asset exchange** or the use of **wrapped assets** may be added. This will allow, for example, borrowing in one network against collateral from another or **transferring liquidity between networks to balance returns**.

The **modular approach** (described above) simplifies the integration of such capabilities **without requiring a complete system redesign**. Thus, **TN Vault ensures scalability and architectural flexibility**: new blockchains, asset types, or additional DeFi functions (such as **staking or decentralized exchanges**) can be added as needed **without disrupting the core system.**

05

The Role of AI in TN Vault

One of the key distinctions of TN Vault is the use of artificial intelligence modules for risk and liquidity management. The AI subsystem constantly operates in the background, processing large volumes of data and making decisions aimed at maintaining platform stability and optimizing the user experience. Let's examine in more detail **how AI algorithms are used in TN Vault:**



Real-time market data analysis:

The AI module is connected to various cryptocurrency market data sources. It monitors **price indicators** (quotes of collateral tokens in different networks), **trading and transaction volumes, volatility** of each asset, as well as the **state of the DeFi sector** (for example, interest rate levels on other platforms, activity in related protocols).

Thanks to this, TN Vault always **"knows"** the current market conditions and can compare them with historical patterns. This operational analytics allows the system to identify emerging risks in advance—for example, **a sharp decline in the price of a collateralized token** or the beginning of a period of **surging demand for liquidity.**

Monitoring social networks and news sources:

In addition to on-chain data, AI tracks **external signals from the information space.** The algorithms analyze mentions in social networks (**Twitter, thematic forums, Telegram channels**), news, and announcements related to the main supported assets and blockchain platforms.

The goal of this analysis is to **recognize market trends and potential events** that have not yet affected prices but may influence them. For example, **negative news about a major protocol hack or regulatory restrictions** may trigger a market drop, while positive announcements or rumors may, on the contrary, drive growth.

By tracking such signals, TN Vault's AI can **proactively** adjust platform parameters: **reduce lending limits, increase fees for new loans, or strengthen incentives for liquidity providers even before the news impacts the market.**

This provides a competitive advantage in **reaction speed** compared to competitors, where changes occur post-factum.

Dynamic protocol parameter adjustment:

All key **TN Vault parameters (LTV, interest rates/fees, rewards, liquidation thresholds)** can be **automatically adjusted by the AI** within predefined safe ranges.

For example, in a stable market, AI may **set an initial borrowing fee at the minimum level (1%, see section 6.3)** and **LTV at the maximum level (50%)**. If market volatility increases, AI gradually tightens conditions: reducing the **available LTV** to a more conservative level, increasing **interest rate surcharges.** When the situation stabilizes, parameters are relaxed again to improve **service attractiveness.**

These changes occur **smoothly and transparently for users:** all rules are embedded in smart contracts, and AI decisions are based on **objective metrics** (for example, volatility index). Users can always check the **current parameters** applied at any given moment and be confident that the system operates according to their interests, maintaining a balance between **risk and profit.**

Liquidity Pool Balancing:

As previously mentioned, AI monitors the **utilization rate of liquidity (Utilization)** in each pool. If a significant imbalance is detected—for example, if **90% of available USDT** has been issued as loans in the **Solana pool (U = 0.90)**—the algorithm identifies this as a **liquidity shortage risk**. In response, the system **increases rewards** for new liquidity providers in that pool, which can attract additional capital and reduce **Utilization** to a more comfortable level.

On the other hand, if **a large portion of funds remains idle** in the **TON pool** (U is very low), AI may temporarily **reduce liquidity bonuses** to the baseline minimum to optimize the use of reward token reserves. All these adjustments occur **without human intervention**, following predefined formulas **(see section 6.4)**, ensuring the **automatic maintenance of a healthy TN Vault ecosystem.**

Data-Based Learning:

TN Vault's AI algorithms continuously **learn from new data.** Over time, AI gathers an increasing number of **market behavior patterns, user reactions, and the effectiveness of various strategies.** This enables **improvement in risk management models:** the software can **more accurately predict stress events**, optimally adjust parameters to **attract liquidity** or **prevent user outflows.**

For example, after analyzing several **crisis periods**, AI may identify which indicators **(such as spikes in Twitter discussions or abnormal "whale" transactions)** are the **strongest predictors of token price drops** and start reacting specifically to them. This approach makes **TN Vault a self-adapting system** that becomes **smarter and more reliable** as data volume and experience grow.

In conclusion, the **integration of artificial intelligence** allows TN Vault to achieve both **flexibility and stability**, which are difficult to combine in traditional finance. Users gain **advantages** in the form of **more stable lending conditions (fewer liquidations, more predictable fees)** and **attractive returns (due to timely bonuses)**, while investors and developers see TN Vault as a **reliable platform capable of self-regulation in response to market cycles.**

06

Financial Model and Calculations

This section presents the **key financial parameters and algorithms** of TN Vault, explaining the protocol's operation from a mathematical perspective. For developers and investors, it is important to understand how to calculate fundamental indicators: **maximum loan amount, interest accrual, liquidation conditions, and rewards**. Below, we will examine each of these components with an example calculation.

Loan-to-Value (LTV):

is a coefficient that determines the **maximum loan size** relative to the **value of the collateral.** In TN Vault, the **default maximum LTV is set at 50%**. This means that a user can receive a loan **equal to half of the market value of the deposited asset.**

For example, if a user **deposits tokens worth $2000** as collateral, the platform will issue **$1000 USDT as a loan**. However, **LTV is not a fixed value:**

AI algorithms can dynamically reduce the allowable LTV in conditions of increased market volatility. This proactive adjustment prevents situations where **a sudden price drop instantly makes loans undercollateralized.**

In **stable periods, LTV returns to its maximum values**, improving capital efficiency for users. The **dynamic LTV approach** is a significant advantage of TN Vault over competitors: in traditional protocols **(Aave, Compound)**, the **collateralization threshold** changes **only by community decision** and is often delayed, whereas in TN Vault, it is **automatically adjusted based on market indicators**.

Utilization Rate (U):

characterizes the **load on liquidity pools.** It is calculated as **the ratio of the total amount of issued loans to the total available funds in the pool:**

$$U = \frac{\text{Issued Loans}}{\text{Deposited Liquidity}}$$

This indicator is fundamental in regulating the **profitability for liquidity providers**.

The AI module in TN Vault continuously tracks U in each pool and strives to keep it within an optimal range.

- When **U is high** (close to 1, meaning almost all funds are loaned out), this signals **a liquidity shortage**. In this case, the protocol **increases the attractiveness** of the pool for investors by **raising rewards (e.g., an additional percentage in $TVLT).**
- If **U is too low (too much idle liquidity)**, the protocol **reduces bonuses to the baseline leve**l, as excess liquidity is not in use.

This mechanism ensures that the platform always has **sufficient liquidity**, but **not an excessive reserve that sits unused**. Lenders receive **fair returns based on demand.**

Note: In **classic DeFi protocols, Utilization also affects loan and deposit interest rates,** but it's adjustment is **formula-based (without AI)**. In contrast, **TN Vault makes more complex decisions based on U**, including **activating bonus programs**, improving **liquidity management efficiency.**

Health Factor (Hf) is an **integral risk indicator** for each specific loan, showing how “healthy” the loan remains given the **current value of the collateral**. TN Vault uses this indicator to **determine the moment of liquidation**.

Hf is calculated as the ratio of the current collateral value to the critical loan amount (which includes the **loan amount + accrued fees**). The simplified formula is:

$$Hf = \frac{\text{Current Collateral Value}}{\text{Loan Amount} + \text{Fees}}.$$

If Hf > 1, the loan is considered **secure**

If Hf falls to 1 or below, the loan becomes **subject to liquidation (collateral is sold to cover the debt).**

Unlike some protocols, **TN Vault does not preemptively liquidate a loan as soon as prices decline**. Instead, **liquidation occurs only when the threshold value is directly crossed**.

This mechanism **gives users time to restore their position (add collateral or repay part of the debt)**, making liquidation **a temporary, rather than an immediate, event.**

Below, we will examine **an example of Hf calculation and the liquidation process.**

- **The user deposited 10 SOL at a price of $200 per SOL, meaning the total collateral value is $2000.**

- **They received the maximum loan: $1000 USDT (50% LTV of $2000).**

- **At loan issuance, the algorithm set an initial fee equivalent to 1%** (for simplicity, we will assume **5.5% as the maximum possible fee**, see section **6.3**). Let's assume that at this moment, the maximum fee has accrued, meaning the **critical debt amount** is:

$$1000 + 5.5\% \;=\; \$1055\; USDT$$

This is the amount the collateral must cover for the position to remain healthy.

- **As long as the market value of 10 SOL ≥ $1055, liquidation does not occur (Hf ≥ 1)**. For example, if SOL drops to **$120, the collateral value is $1200**, then:

$$Hf = \frac{1200}{1055} \approx 1.14$$

The loan remains relatively safe.

If the SOL price drops, for example, to $105:

The collateral value is:

$$105 \times 10 = 1050.$$

Then:

$$Hf = \frac{1050}{1055} \approx 0.99.$$

The **Hf indicator falls below 1**, and TN Vault **detects that the position has become unsafe**. At this moment, the **liquidation mechanism is triggered:**

- The collateralized **SOL will be partially sold (or transferred to the lender) in an amount necessary to cover the debt of $1055.**
- After liquidation, **the user will receive the remaining collateral (if any remains).**

- **Thus, in our example, if SOL reaches ~$105, the loan will be forcibly closed**. The Hf at the moment of liquidation is **1 (or slightly lower)**, meaning the collateral precisely covers the debt.

This example illustrates the **TN Vault liquidation system**. Thanks to the **built-in Health Factor**, users and investors can easily monitor the position's status:

- The **wallet application will display Hf for each loan.**
- **If Hf approaches 1, the borrower is recommended to increase the collateral or partially repay the debt** to avoid liquidation.

In traditional protocols **(Aave, Compound)**, a similar indicator is used, but **TN Vault adds a predictive component:**

- **AI tracks factors affecting Hf (collateral price, potential news)** and can **warn the user in advance** about increased risk through notifications, providing additional time for reaction.

Dynamic Fee and Interest Model (Revenue Model)

In **TN Vault, there are no traditional floating interest rates** on loans. Instead, a **dynamic loan repayment fee** is implemented. This approach ensures **payment transparency for users** while also **providing a stable revenue model for the platform.**

- **At loan issuance, AI sets the initial commission rate (from 1% to 4% of the loan amount**, depending on market conditions). This fee can be compared to a **"fixed interest rate,"** charged when collateral is withdrawn.
- **The commission increases by 1% every 2 months,** until it reaches the **maximum value of 5.5%.**
- **If the user repays the loan (returns USDT and retrieves collateral),** they pay the accumulated commission, which **can be settled in USDT, $TVLT tokens, or by selling a small portion of the collateral.**
- **If the loan remains open and the commission reaches the maximum 5.5%, automatic loan renewal occurs:**

1. The platform **sells part of the collateral** equal to the **5.5% fee** so that the user does not have to manually pay.
2. After **12 months**, the user, in practice, will have paid **5.5% of the loan amount every ~12 months** (unless they **repay the loan earlier)**.

This mechanism **prevents infinite debt accumulation** through interest and **provides the platform with periodic revenue** while **avoiding liquidation** as long as the **collateral remains stable.**

Example of Commission Accrual:

For example, when issuing a loan, **AI sets an initial commission of 2%.** This is equivalent to saying that, under standard conditions, it would take **2 months** for the rate to increase from 1% to 2%. Therefore, the algorithm **freezes the commission increase for 2 months** (meaning the next increase to **3% will occur not in 2 months, but in 4 months)**. After that, the commission will continue increasing **by 1% every 2 months**. Eventually, after a year, it will **reach 5.5%.**

TIME SINCE LOAN ISSUANCE	TIME SINCE LOAN ISSUANCE
0-2 MONTHS	INITIAL RATE (1%-4%)
3-4 MONTHS	+1%
5-6 MONTHS	+1%
7-8 MONTHS	+1%
9-10 MONTHS	+1%
11 MONTHS	+0.5%
12 MONTHS	FIXED AT 5.5% (NEW CYCLE BEGINS)

- **If the loan is still open, 5.5% of the collateral will be deducted, and the cycle will restart from 1%.**
- The user can continue **using liquidity indefinitely** by simply **paying a small percentage of the collateral annually.**
- **The main loan amount remains unchanged,** meaning that no additional interest accrues on top of existing interest—this is a **linear interest model, not compound interest**, making it more transparent.

For the **platform**, this commission system ensures a **sustainable business model:**

- Revenue is **predictable** and depends on the **volume of issued loans**.
- **Investors can be confident** that TN Vault generates **reliable cash flow without** requiring **high loan interest rates** that might discourage borrowers.
- For users, the **clear advantage** is the absence of surprises—they **know that they will pay a maximum of 5.5% per year** on the loan amount **(plus the need to monitor collateral value).**

This is **unlike typical annual interest rates in many protocols**, where there is a **risk that the debt could spiral out of control due to compounding interest.**

Liquidity Provider Rewards ($TVLT)

TN Vault applies a **dynamic incentive system** for participants who provide their funds to **liquidity pools**.

- **Rewards consist of:**
- **1. Base yield (interest paid by borrowers or a fixed yield set by the protocol)**
- **2. Bonuses in $TVLT tokens**

The formula for calculating **total APR for liquidity providers** can be represented as follows:

$$Rtotal = Rbase + f(U) \times Rbonus$$

where:

- R_{base} – the **base interest rate** paid on the deposit (**e.g., from borrower fees**)
- R_{bonus} – the **maximum additional APR in $TVLT tokens**
- $f(U)$ – a coefficient that **adjusts based on the utilization rate U of the pool**

In a **simplified case**, the $f(U)$ **function** can be **linear**:

- **If the pool has zero utilization (U = 0)**, the **bonus is at its maximum** $(f(0) = 1, so\ Rtotal = Rbase + Rbonus).$
- **If liquidity is fully utilized (U = 1)**, the **bonus is minimal or zero** $(f(1) = 0, so\ Rtotal = Rbase).$

In reality, the algorithm is more flexible:

- **If the pool is not sufficiently filled with borrowers (low U)**, rewards for providers are kept **close to the maximum**. This incentivizes investors to **keep their funds in the pool**, even when they are not actively used, ensuring that the platform always has a **liquidity reserve**.

- **If the utilization rate is high** (many active loans, U → 1), the **algorithm further increases bonus rewards to attract new liquidity providers.**

1. At first glance, this may seem **illogical (since, with a high U, bonuses should decrease because providers are already earning interest from borrowers).**
2. **However, TN Vault's strategy** ensures **pool growth in response to increased demand: a higher total APR makes the pool attractive, new deposits will flow in, and U will return to the target range.**

- **This mechanism guarantees liquidity balance in the long term**, motivating participants to **add capital when the system needs it most**, while **avoiding excessive token distribution** during periods of **sufficient liquidity.**

In practice, the exact parameters Rbase,Rbouns, and the function F(U) are **determined by AI** based on **market conditions and platform policy.**

- For example, **in the first years of operation, a high** Rbouns may be **offered to accelerate TVL growth (total value locked)**, which will **later be adjusted.**
- All rewards are **distributed transparently through smart contracts.**
- **Bonus emissions decrease over time:**

1. The **algorithm can reduce Rbonus when the total allocated $TVLT supply for rewards (29% of emissions, according to tokenomics)** approaches depletion.
2. This ensures **a smooth transition from growth stimulation to long-term stability maintenance.**

07

Comparison of TN Vault with Competitors

The decentralized lending protocol market already includes major players such as **Aave** and **Compound**, as well as several other platforms on different blockchains. Below is a comparative analysis demonstrating the **key differences and advantages of TN Vault** compared to these solutions:

Feature	TN Vault (our platform)	Aave (benchmark DeFi lending)	Compound (algorithmic lender)
Multichain support	Supports **multiple blockchains** with a unified interface (**Solana, TON, BNB, ETH, etc.**). Ready to quickly add new networks as they gain popularity.	Deployed on multiple networks, but primarily within the **EVM ecosystem** (**Ethereum, Polygon, Avalanche, Arbitrum, etc.**) – each network operates separately, **without shared liquidity between them**.	Initially **only Ethereum** (**Compound v2**). **Compound III expands** to separate networks (**e.g., Polygon**) with a **limited set of assets**, but there is **no unified multichain platform**.
Integrated wallet	Has its own **non-custodial multichain wallet**, simplifying access for new users.	**No built-in wallet** – users connect external wallets (**MetaMask, etc.**), requiring experience and increasing the entry barrier for newcomers.	**No built-in wallet** – interaction is through **external wallets** (**Compound offers only a web interface for connection**).
Risk management	**AI algorithms dynamically adjust parameters** (**LTV, fees, rewards**) based on **market conditions**. Early risk detection, proactive **volatility protection**.	Parameters are set by the **community (Governance)** and change **slowly**. During sharp market movements, **Aave relies on predefined reserves and liquidation thresholds** but **cannot independently reduce LTV or interest rates without governance approval**.	Parameters are mainly **static** or manually changed through **governance proposals**. **No automatic adaptive risk factor adjustments** – the **interest rate depends only on Utilization or a fixed formula**.

Max. available liquidity	**Up to 50% of collateral value (moderated by AI; may temporarily decrease in case of risks)**. This is a **conservative approach**, reducing **the probability of undercollateralization**.	Depends on the asset: for **high-liquidity assets, often 75-85% (e.g., ETH ~80%)**. Allows for **larger loans**, but **liquidation occurs faster during volatility**.	**Around 75% for reliable assets (ETH, stablecoins). Compound offers slightly higher LTV for stablecoins**, but **the lack of AI adaptation makes it more vulnerable to sudden market movements.**

Feature	TN Vault (our platform)	Aave (benchmark DeFi lending)	Compound (algorithmic lender)
Interest model	**Fixed fee of 1-5.5% upon repayment**, with **automatic loan renewal** (partial payment every ~12 months). Interest does not accumulate beyond **5.5%** **without payment** – no risk of a **"debt spiral"**.	**Floating APR** on loans and deposits, depending on **supply/demand**. Interest accrues continuously, **debt can grow indefinitely** if unpaid. Requires monitoring of debt position.	Similar to Aave: **continuous interest accrual**. No auto-payment mechanism, **loan can last indefinitely**, but **interest continuously increases the debt**. Less flexible conditions – **fixed rate limits set by the protocol**.
Rewards and tokenomics	**Generous $TVLT rewards** for early users, liquidity providers, and community participants (**~29% of tokens allocated for rewards**). **Dynamic yield farming mechanism – rewards increase during liquidity shortages and decrease during surpluses (see section 6.4)**.	Governance token **AAVE**. In **Aave v2**, liquidity mining programs (**token rewards**) were active to attract capital, but **Aave v3 reduced incentives**, shifting focus to a **sustainable model without constant token distributions**.	Governance token **COMP**, which was used for **liquidity mining incentives**. However, these **rewards are fixed by the protocol and are gradually decreasing, without dynamic adaptation.**

Interface simplicity	**User-friendly approach:** mobile app, **unified interface for different networks, AI-based tips (e.g., risk warnings).** Suitable for **both beginners and experienced DeFi users.**	**Web interface designed for experienced users:** requires **understanding of Metamask, network switching.** Rich functionality but complex for beginners. **No official Aave mobile app (only third-party apps).**	**Compound's interface is minimalistic, but functionality is limited (fewer asset types, no multichain support). No mobile solution from the project.** Overall, **requires DeFi knowledge (otherwise, understanding risks is difficult).**
Transparency and community	**Full on-chain control, smart contract code is open-source. AI manages key parameters,** but platform **development and new feature additions** involve the **community through DAO voting (for $TVLT holders).**	Also **open-source code** and **managed via DAO (AAVE).** The **community actively** decides on **risk parameters, asset additions, and treasury allocation. Aave is a decentralization benchmark,** but **its development can be slow.**	**Compound was one of the first to introduce algorithmic interest rate management.** The protocol is **simple and open. Governance participation is through COMP,** but **updates are rare,** and the **platform develops more slowly compared to competitors.**

Conclusion from the Comparison

TN Vault offers a more integrated and intelligent solution, combining the functionality of multiple products into one. While Aave and Compound primarily focus on lending based on fixed algorithms, TN Vault expands its capabilities through AI modules and multichain infrastructure.

This allows it to achieve both flexibility (market adaptation) and reliability (conservative settings when necessary).

Moreover, TN Vault is aimed at a wider audience, including less technically experienced users, thanks to its user-friendly interface and built-in wallet—whereas existing solutions still remain a domain for crypto finance enthusiasts.

TN Vault, as a new platform, will strive to prove its reliability through:

- Smart contract audits
- Gradual feature rollout
- Transparent communication

However, TN Vault's unique advantages—AI-driven management, multichain ecosystem, innovative interest and reward model—can position it as a leader among the new generation of DeFi protocols, attracting both existing users of competitors and a new audience that has not yet engaged with decentralized finance.

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Conclusion

TN Vault represents the next step in the evolution of DeFi, combining proven mechanisms with cutting-edge technologies. For users, the platform provides:

- Flexibility: Access to liquidity without selling assets, enabling multi-chain portfolio management in one place.
- Managed risk: An AI module that continuously monitors the market and takes measures to protect user funds and ensure system stability.
- Transparency: All operations are visible on the blockchain, smart contracts are open, and operational rules are clear and predictable.
- Profitability: New earning opportunities—from earning interest on USDT deposits to participating in $TVLT token distribution and DAO governance—with rewards structured to incentivize long-term participation.

For investors, TN Vault offers a sustainable business model: revenue is generated from platform fees (loans, wallet services) based on real usage, rather than relying solely on speculative token price growth. At the same time, the $TVLT token has essential utility functions within the ecosystem (rewards, governance, fee discounts), creating demand and value as the user base expands.

The current development phase of TN Vault includes the implementation of its roadmap, which covers:

- The launch of the multichain wallet
- Listing of the $TVLT token on exchanges
- Gradual integration of new DeFi functionalities

The platform will undergo security audits and actively seek community feedback to drive continuous improvement. The TN Vault team is committed to transparency and open engagement: all updates and parameter changes will be communicated to the community, and critical decisions will be made collectively through DAO mechanisms

Call to the Community

TN Vault invites developers, investors, and everyday users to become part of this ecosystem. You can contribute by:

- Participating in platform testing
- Providing liquidity at early stages
- Reviewing the code and proposing improvements

Together, we can build a transparent, efficient, and secure financial future, where blockchain technology and artificial intelligence work hand in hand for the benefit of all participants.