Neutrino Index

XTN - Neutrino Index Token

Introduction

USDN collateralized by WAVES token used to be a reliable option to store value. However, the unprecedented bear market volatility in 2022 showed that the current USDN setup fails. This document describes transformation of USDN into XTN token collateralized by a set of multiple Waves Ecosystem tokens.
In addition to the main task of solving the ongoing USDN crisis, the transformation is aimed at the following objectives:

- the new product should be lively and engaging both for the new and the existing community members;
- 'issue' and 'burn' operations should no longer drain the reserves (BR), which is the case with the currently existing swaps;
- the existing SURF, NSBT and gNSBT incentives should remain in place;
- the protocol should use all possible mechanisms to replenish the main contract reserves, such as collecting the protocol fees or staking WAVES and other tokens in reserves.

New Name and Ticker

USDN gets a new name and ticker XTN.
The renaming will be made by means of [Update Asset Info Transaction].

XTN Multi-collateral

Instead of the single-token WAVES collateral of USDN, the new token employs a multi-collateral system. XTN is backed by 'S' set of tokens:

$$S = \{B_i | 1 \leq i \leq n\}$$

where:

n - is the number of different tokens in reserves;

B_i - is the amount of i-token in reserves;

Users are able to add new collateral tokens to the basket (set 'S') by means of Neutrino governance. This means that gNSBT holders are responsible for selecting and approving the collateral tokens to the XTN reserves.

XTN Price

Unlike USDN, XTN will not be hard-pegged to USD. This approach has pros and cons.
The main disadvantage is the significant pivot in a different direction from the original intention of Neutrino, where USDN was supposed to be a stablecoin.
However, this also is an advantage of the new system, because the depeg from $ guarantees the swap for full circulating supply of USDN to the collateral tokens.
It is worth mentioning that unlike USDN, XTN is no longer capped at $1 and can be worth more, i.e. it can be considered as an index of the Waves ecosystem.
With the new system implemented, the price of the XTN in relation to $ can be calculated by the following formula:

$$Price = \frac{\sum_{i=1}^{n} (B_i \cdot p_i)}{emission - outOfMarket},$$

where:

n - is the number of different tokens in reserves;

B_i - is the amount of i-token in reserves, i.e. $B_i \in S$;

p_i- is the price in $ of i-token in reserves;

$emission$ - is the amount of issued XTN;

$outOfMarket$ - is the amount of issued but locked XTN, meaning the tokens that do not participate in circulating supply.

NSBT, SURF and gNSBT

Managing two utility tokens (NSBT and SURF) is quite difficult both for the users and the developers. Moreover, since XTN is not pegged to $, the SURF token has lost its main objective - recapitalization.
This is why the protocol's long-term objective is to get back to the one-token setup, meaning that in the future NSBT will be the only one utility token.
This does not mean that already issued SURF loses its value or gets seized from the ecosystem. The new Neutrino 2.0 system still guarantees that SURF will be converted to the XTN when the XTN token price reaches $1.15. This means that there is a 'buy wall' limiting significant XTN price growth above $1. However, when the 'buy wall' will be overcome (meaning that the whole issued SURF supply is liquidated), then the further growth of the XTN price will be possible.

gNSBT entity remains in place to fulfill the same functions as it does now:
- issue/burn (aka swap) Max Swap Amount;
- rewards based on collected swap fees (Protocol Fees);
- governance.

Issue XTN

To issue XTN users should add an accepted collateral token to the reserves.
Users have a native incentive to issue XTN because they get a discount from the market price.

For example, if the reserves consisting of token A, B and C contain:
- enough amount of token A,
- excessive amount of token B,
- not enough amount of token C.

it is more profitable (because of a bigger discount) for the users to issue XTN for token C rather than for A or B. On the contrary, issuing XTN for token B is the least profitable and may even imply additional fee.

The amount of discount a user gets is determined by 3 factors controlled by Neutrino governance:
- etalon token weight (w_i) - is the target share of i-token in the reserves, i-token being the token a user is depositing;
- max discount (D) - maximum possible discount in the system that a user can receive;
- Δ - parameter that allows calculating discount for the etalon token weight, i.e. $d(w_i) = D - \Delta$

The issued amount of the XTN is calculated by the following formula:

$$usdnToReceive = \frac{amount_i \times price_i}{Price} \times (1 + d_i)$$

where:

$amount_i$ - is the amount of i-token that the user wants to send to reserves to issue XTN;

$price_i$ - is market price of i-token in \$;

$Price$ - is the price of XTN on the contract, see 'XTN Price';

d_i - is the discount for issuing XTN for i-token, where: $-\infty < d_i < D$, and D is the max possible discount. A negative discount can be considered as an extra fee.

To specify the discount function, let's also introduce x_i and define it as the current weight of the i-token:

$$x_i = \frac{B_i \times p_i}{\sum_{j=1}^{n} B_j \times p_j}$$

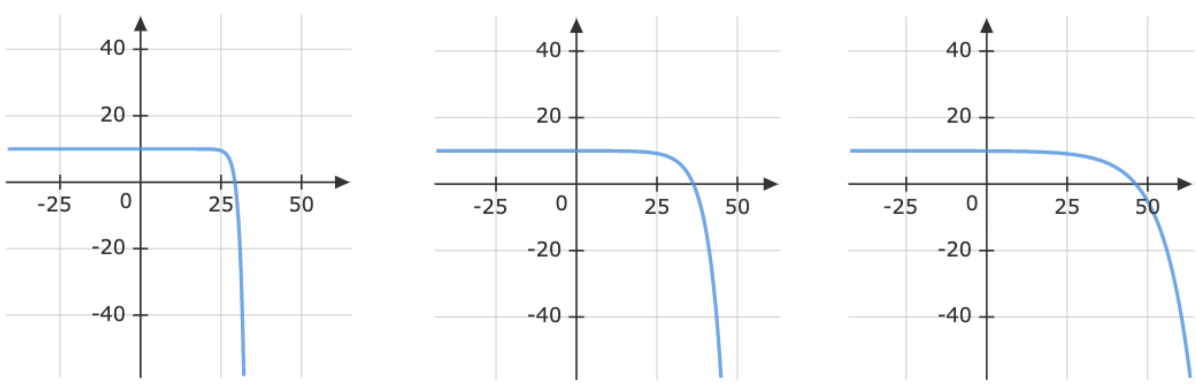
Based on all definitions above we can define discount function d_i as follows:

$$d_i = b^{a+x_i} + D$$

where:

b - is the coefficient that is responsible for the reduction rate of discount d_i (inclination of the curve) when the (x_i) share of the i-token increases. The value of this coefficient is in $(-\infty, -1)$ range, see the charts below;

a - is some dynamic curve coefficient that allows calibrating the curve, so that the max discount D occurs in certain bounds of x_i;



b=-2
a=-26

b=-1.25
a=-26

b=-1.12
a=-26

Picture 1. Impact of the coefficient b.

What is coefficient a?

a - is a dynamic value that affects the whole discount function. This coefficient allows calibrating d_i at any time depending on the market or contract conditions. To calculate this coefficient, we need to specify some limits. To do so, let's define for each i-token its' w_i, such way that

$$\sum_{i=1}^{n} w_i = 1$$

where:

w_i (etalon token weight) - is the target share of i-token in the reserves, meaning the share that i-token should tend to.

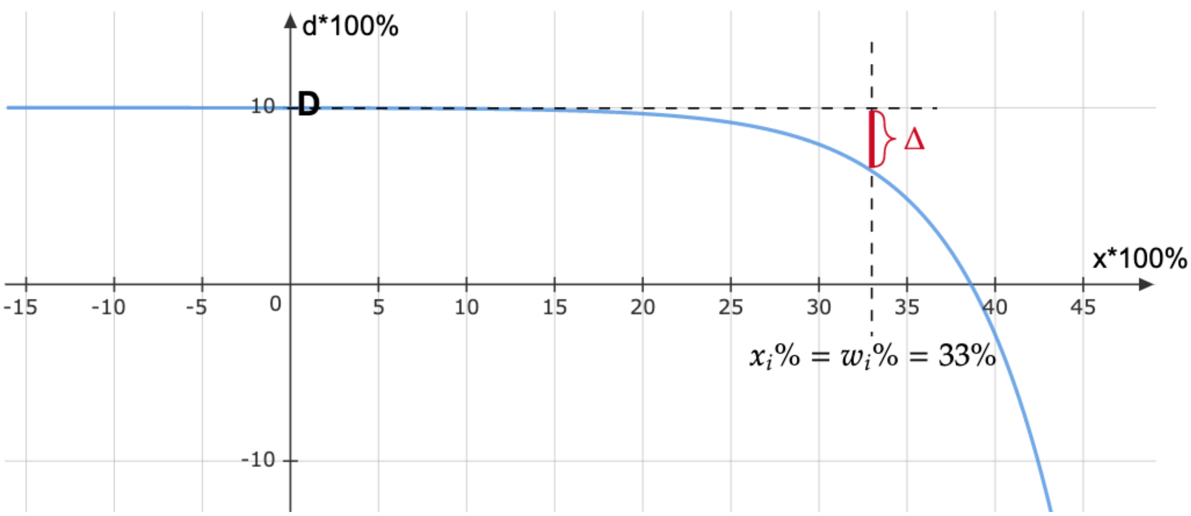
Also, let's introduce such condition that if $x_i = w_i$ then,

$d_i = D - \Delta$

Where:

Δ- is some specified deviation (see the chart).

So, if for i-token $w_i = 0.33$ or 33% then we can represent d_i chart the following way:



Picture 2. Example of Δ .

Then, having all the above definitions and assumptions, we can find coefficient a at any time as follows:

$$\begin{cases} d_i = D - \Delta \\ d_i = b^{a+x_i} + D \\ x_i = w_i \end{cases} \Longrightarrow a = log_b(-\Delta) - w_i$$

This makes it possible to control the discount d_i by changing the values of D and Δ via governance and create the incentive for issuing XTN and maintaining the balances of the collateral tokens in reserves.

This approach also introduces additional difficulties in the development of the system, because it is necessary to have all collateral token prices on chain. So, it is important to be careful when voting for adding new tokens to the reserves, taking into account various factors that affect the token price.

Burn XTN

Burn process should:

- have no effect on reduction of BR;
- prevent system arbitrage through sequential issue/burn operations using discount tokens

Therefore, a swap of $usdnAmt$ to a set of collateral tokens from the reserves implies $k \times D$ fee. Mathematically, the burn process is calculated as follows:

$$P = \left\{ usdnAmt \times \frac{B_i}{circulatingSupply} \times (1 - k \times D) | \, B_i \in S \right\}$$

Where:

$usdnAmt$ - is the amount of XTN, that the user burns;
B_i - is the amount of n-token in the reserves;
S - is the set of all the tokens in the reserves;
D - is the fee equal to max discount;
k - is the coefficient to manage issue/burn spread to control contract arbitrage process, it is managed by Neutrino governance and is equal to 1 at the launch.

Links

https://blog.waves.tech/en/usdn-wixt
https://neutrino.at/governance/proposal/113