# BlockMargin Testing Report

This document is complementary to the BlockMargin Closeout report and it details the testing performed on the BlockMargin platform

The testing report contains evidence for:

1. A test trade run over the course of 7 days and shows the platform handling a variety of market conditions and posting/withdrawing margin on each of the days
2. A load test to of 3,000 plus trades to test the platform's capability to handle

## 1. Test Trade over 7 days

*A test trade will be done on the testnet to validate functionality and identify bugs. It will be run over 7 days to check the initial trade and daily collateral management functionalities.*

We used two wallets in the test:

- Buyer of 4 FRAs with address:
addr_test1qp9taa56ajxa3gwur82zsf4gqu5ws32azd5hc2aghvwj6zvqxqh67agupnpctsuaurr0c2np7jeg0rwtgk6t7jtez3gs2tjzc9

- Seller of 4 FRAs with address:
addr_test1qz9t3xfz0y65e2zks9h89tldhmfg7tyc0y8jlcfge7ae0la05ctxy4jhwguxlnqpfh45d49uunlz4978r87n0q2lm3zqam6kav

The below transactions can be consulted at https://preview.cardanoscan.io/ as shown by the first 4 transactions below for which links are also provided on cardanoscan.io

8-Sep-2025

The buyer initiated 4 FRA transactions as a package of trades through the Product using the 1Y Hedge product. These transactions were also placed on the order book for another party to take the other side.

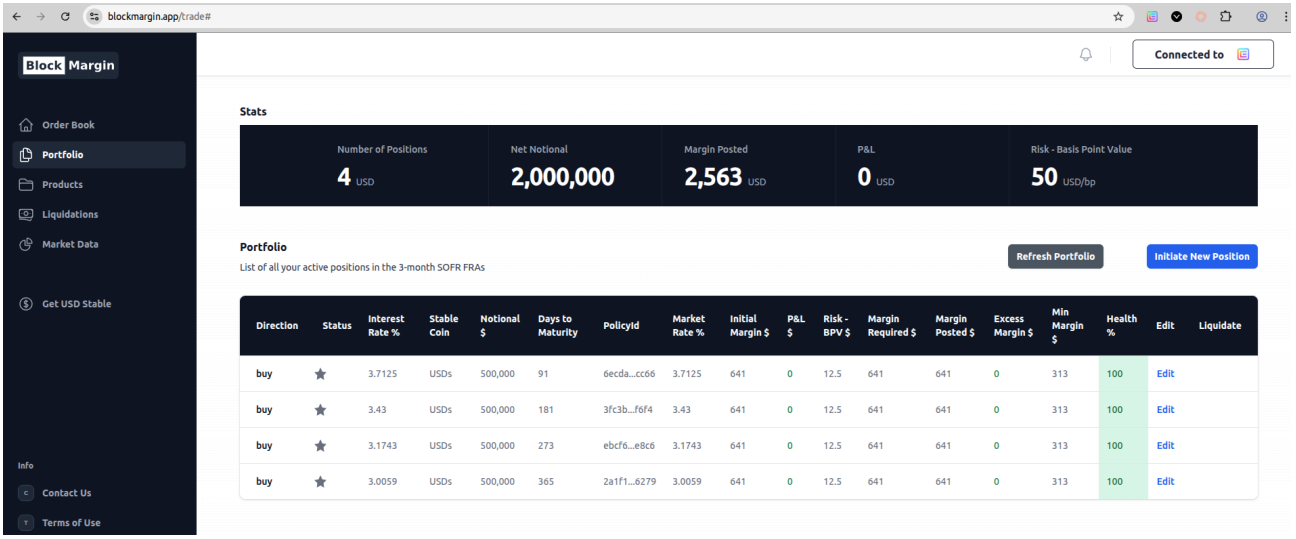
Transaction IDs

aca58023fe6e1d80f12ff94de57b0d19866e6e6397bfb674c7aa35b1ec387efd

543b11503cfd4f9633abc4fae47b5c63511cf4321363e73e1df3a4249f712cee

511d46daa2cde2fc44b5385e19e8b4ce09b4e5922e42ed69ff516c840c264d11

e77a00fee6663b5c67af752b39b75aaa7ee3a431c3e1831e26b87ece9d07bd12




The seller took the other side of the trade from the Order book

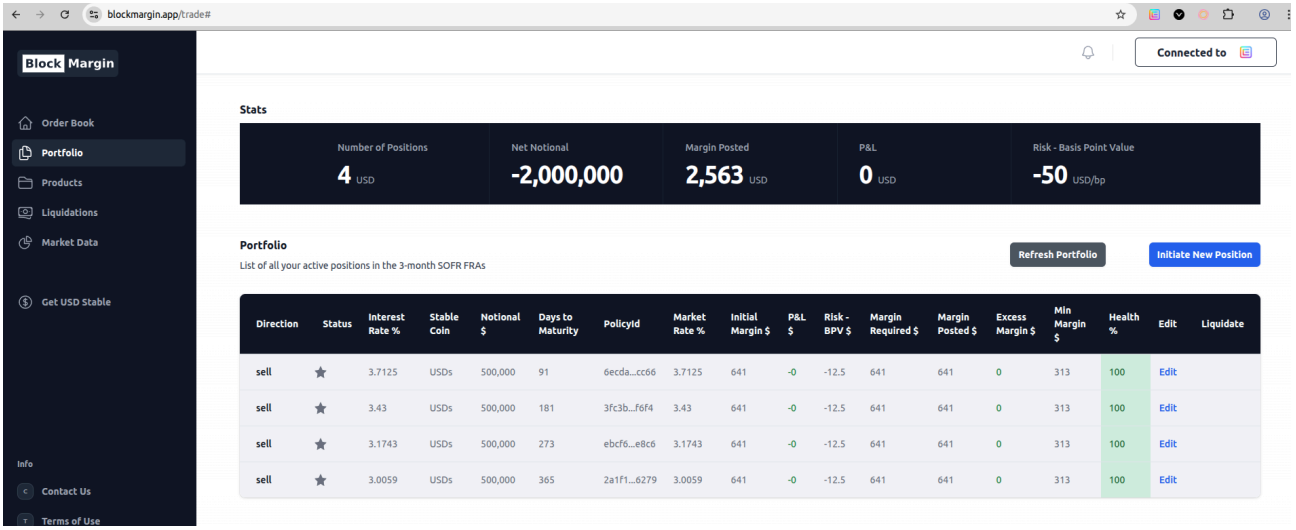
Transaction IDs

b6d53df03244ac8dd69a919e967f19fcc1e3dccb9fc8bb6a2efa1e4b2f51bf51

812d416c864adbc75d0a95396abd12c636f2317ff11153fcbca248ac5ffb9f39

0babcff9510bf2d02f6cb90bce1722475fe00294810df7642d544fdca30ac3d5

9de0e0b3458d97a958315b105384d0654c1b454fd4aa89f6c9dff5a636386943



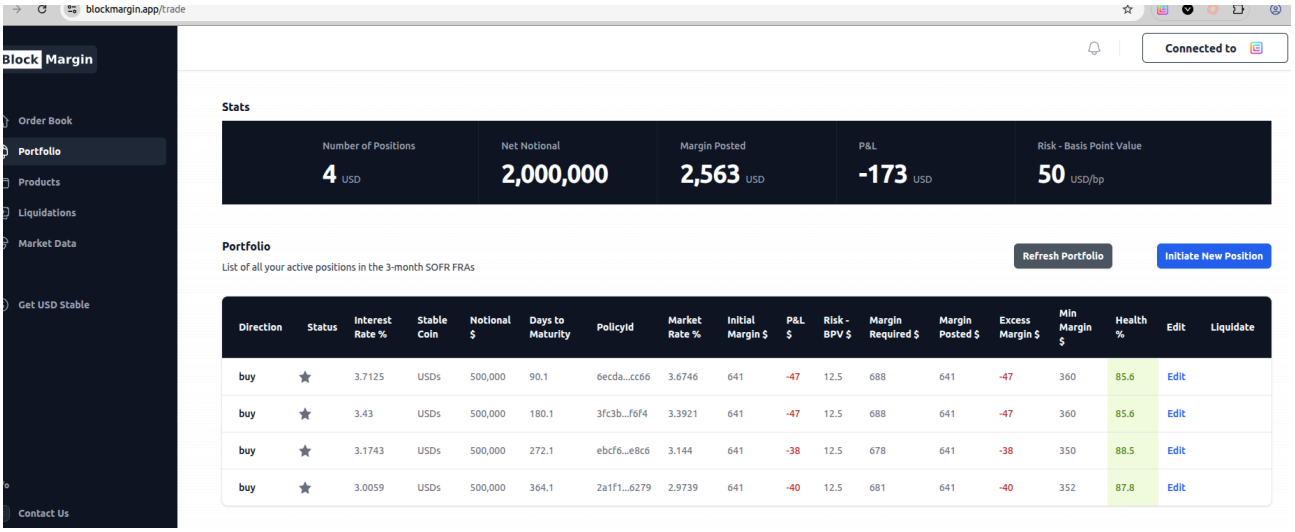

<u>Observations:</u>

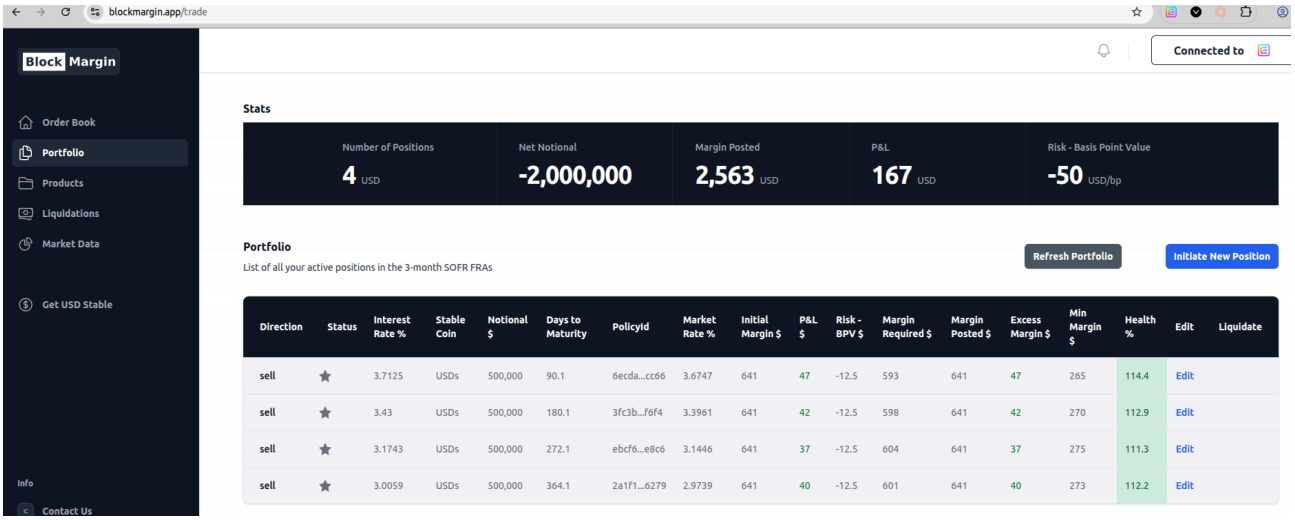
The buy and sell side have opposite risks at inception

Chained transactions performed as expected with the next transaction using the utxo from the previous transaction in the wallet

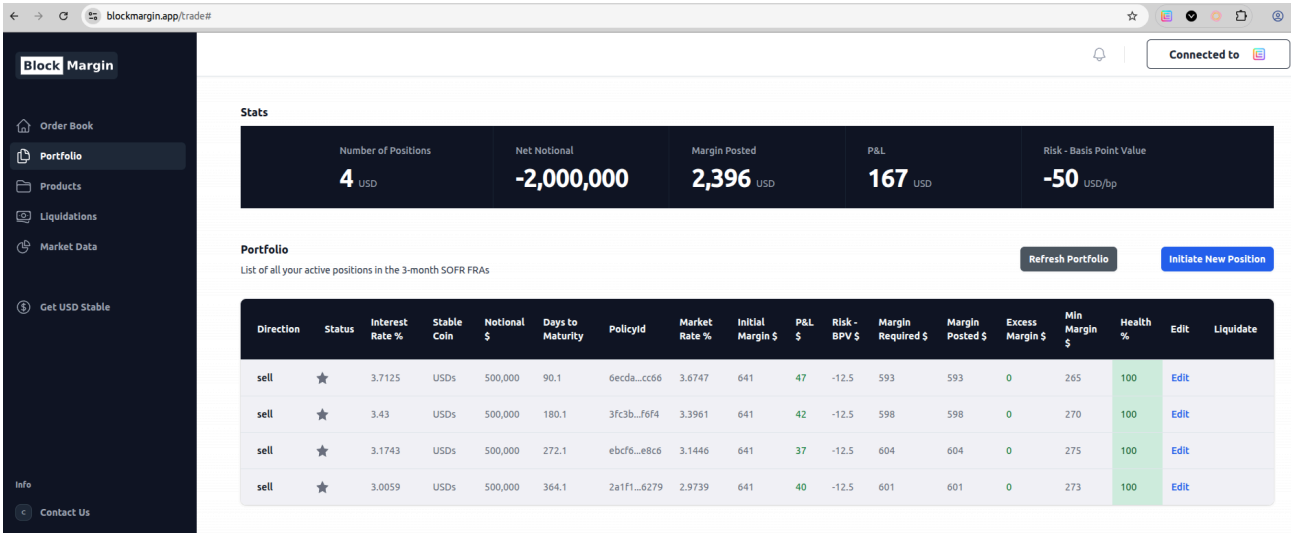
<u>09-Sep-2025</u>

Interest rates decreased slightly versus the previous day, so the buyer's positions lost some values as they agreed to borrow at a higher rate than the current market rates. The seller's positions increased slightly in value. As a result the buyer needs to post margin and the seller can withdraw excess margin




After Margin posting / withdrawal



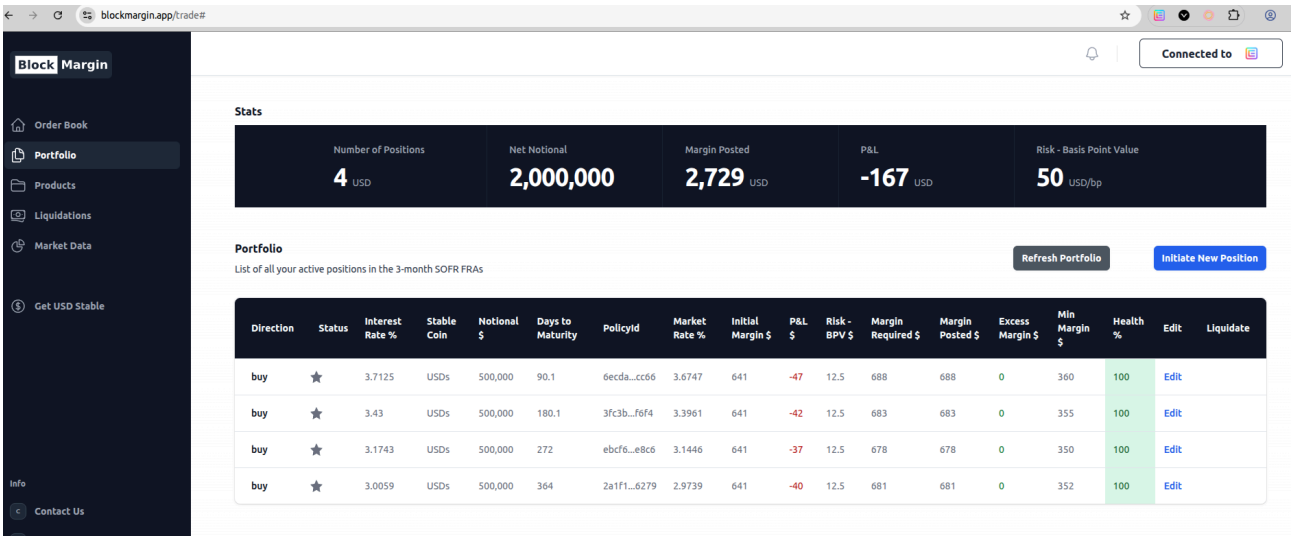

Transactions:

f330ac94aab0002b76f806a91d20327bef6083072aa73413761bd16972474755

93e52cd054066f45aee52237220bec8640f6a100894c62a8f9719e8271ac2026

7f6f4820236230a52112f14361358363ac1698e5b071e4e4fa402f19d1a034a1

28bfc480b2f967329ea1d58294d91dc81c5e7022a53dbe7dc0b6e96e8e8580c4




Transactions:

fe7a4dae9dd1886594ad4dc863e017396ef4644cf5aa1401852e58d706aae00f

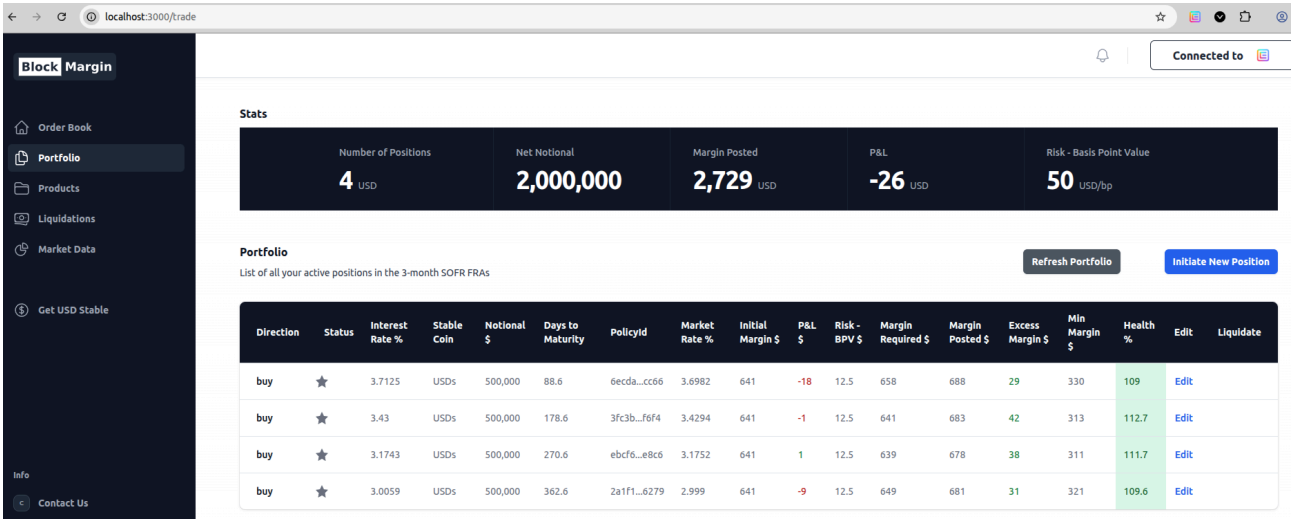
8efc4f1464a6e2143e2af27d8a4530657c70ec2e053b33a8e9f6dea9aead9ce2

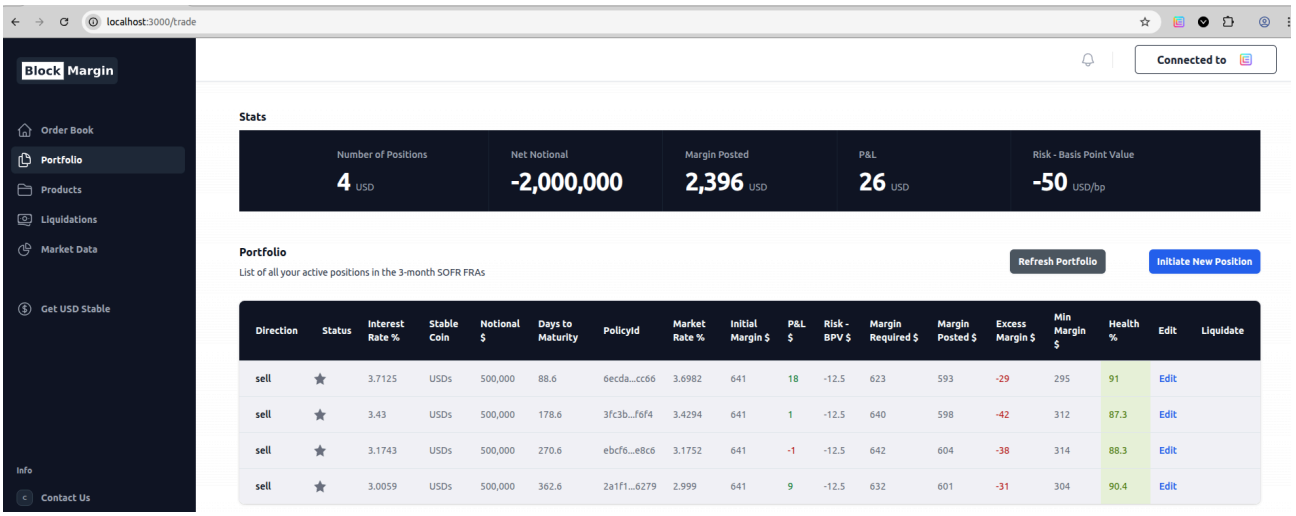
d8db8435dd81619d57f07a58623e3bd047406633bfc8776404a4c54009d6afaa

b46e92783857958e999d4f281054e1b5164b314fd6882fc312eccf71e94eee5a

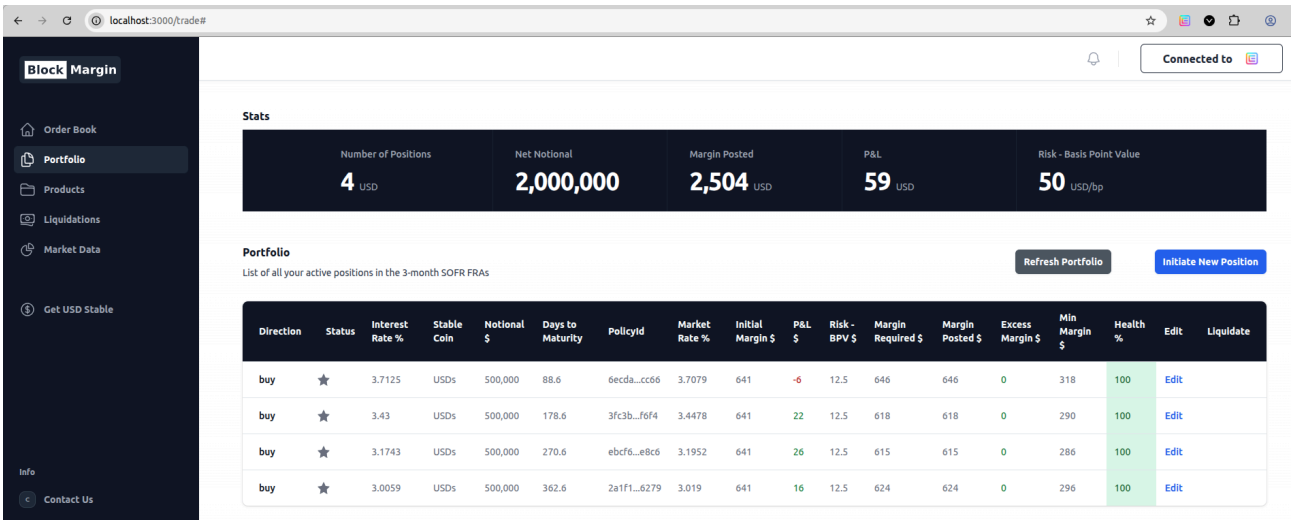
10-Sep-2025

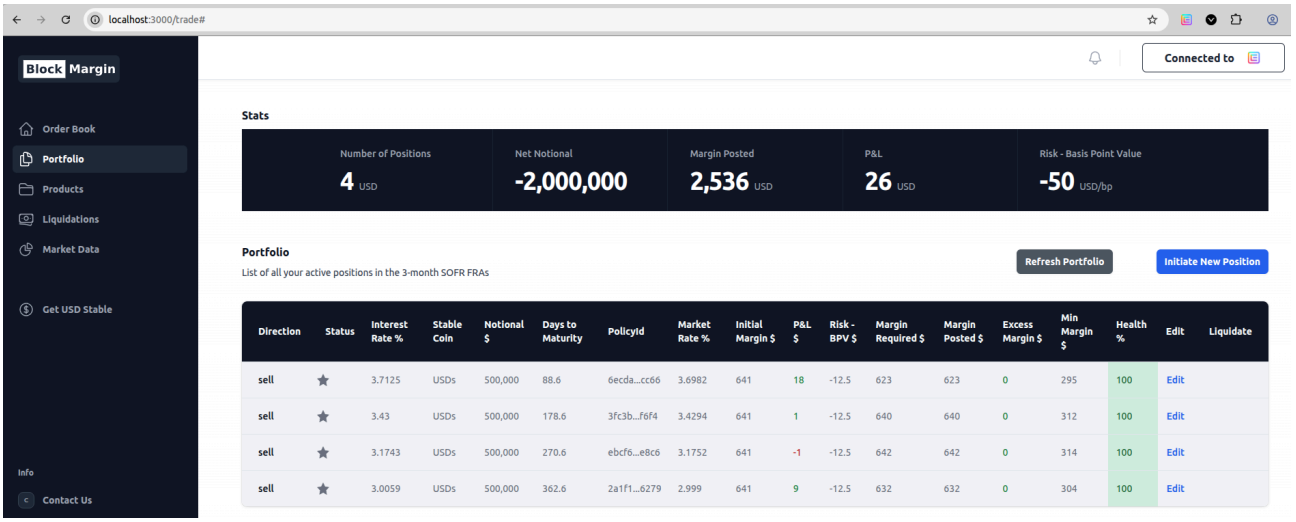
Interest rates increased slightly from previous day, this led to the buy position increasing in value and the sell position reducing in value. The following are the new margin requirements for Buy and Sell sides



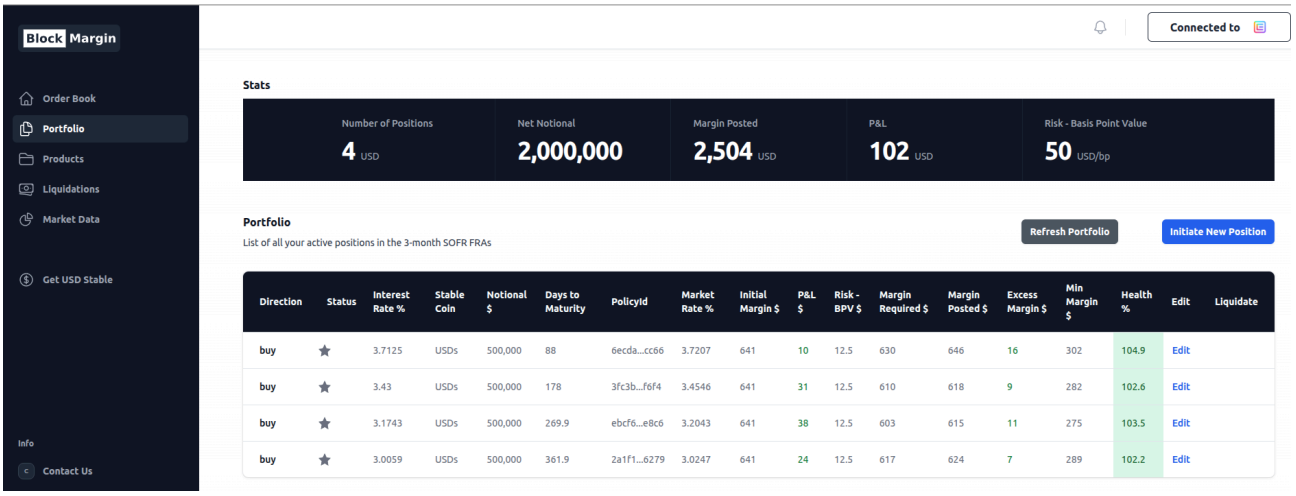

And these are the screens after posting / withdrawing margin from the two accounts

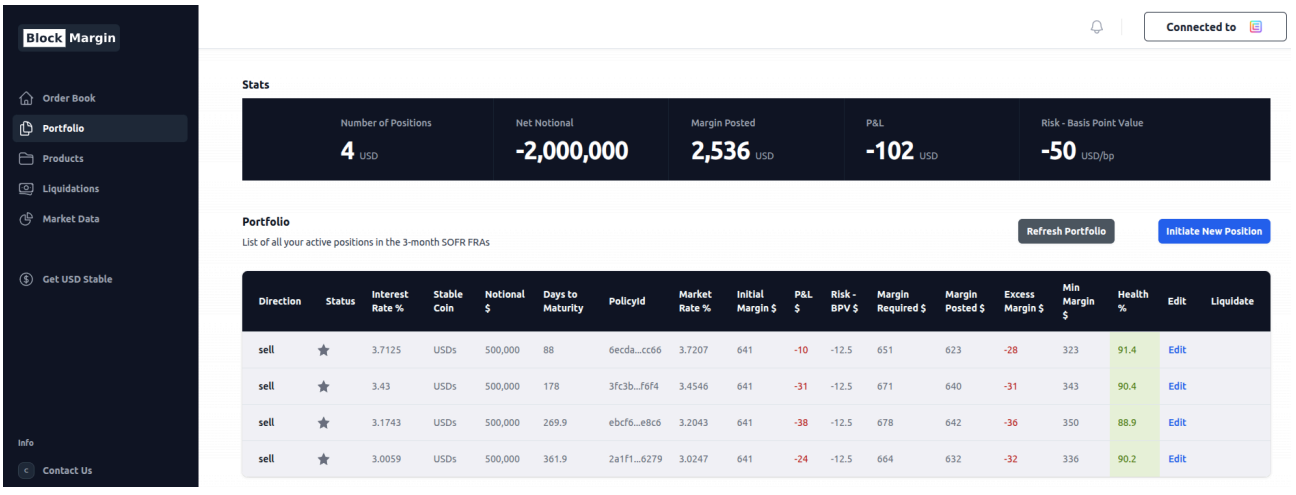




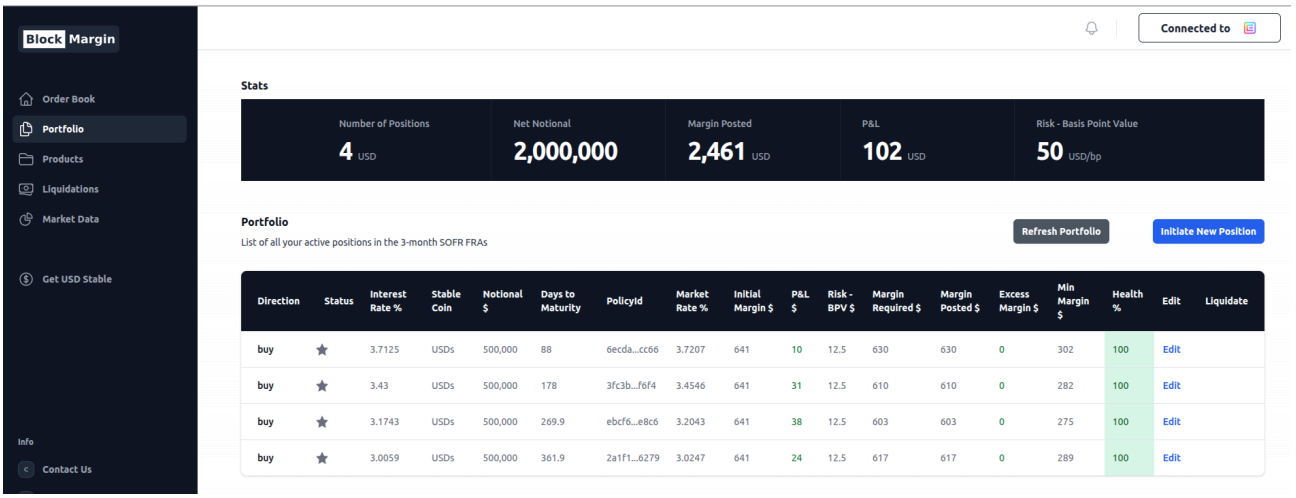

11-Sep-2025

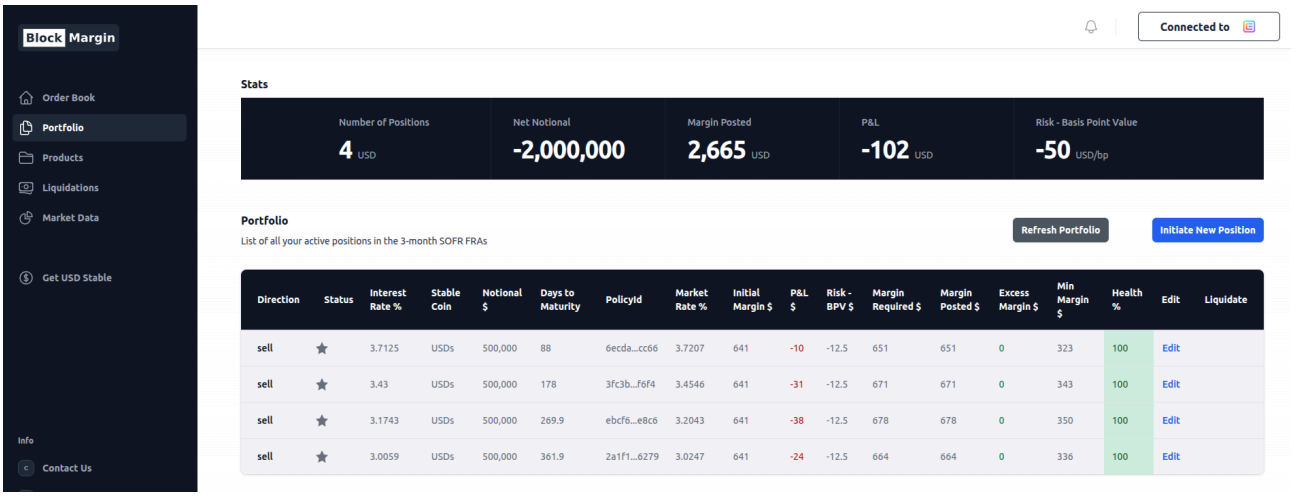
Interest are slightly higher today, so the buy positions gained in value and sell positions lost some value



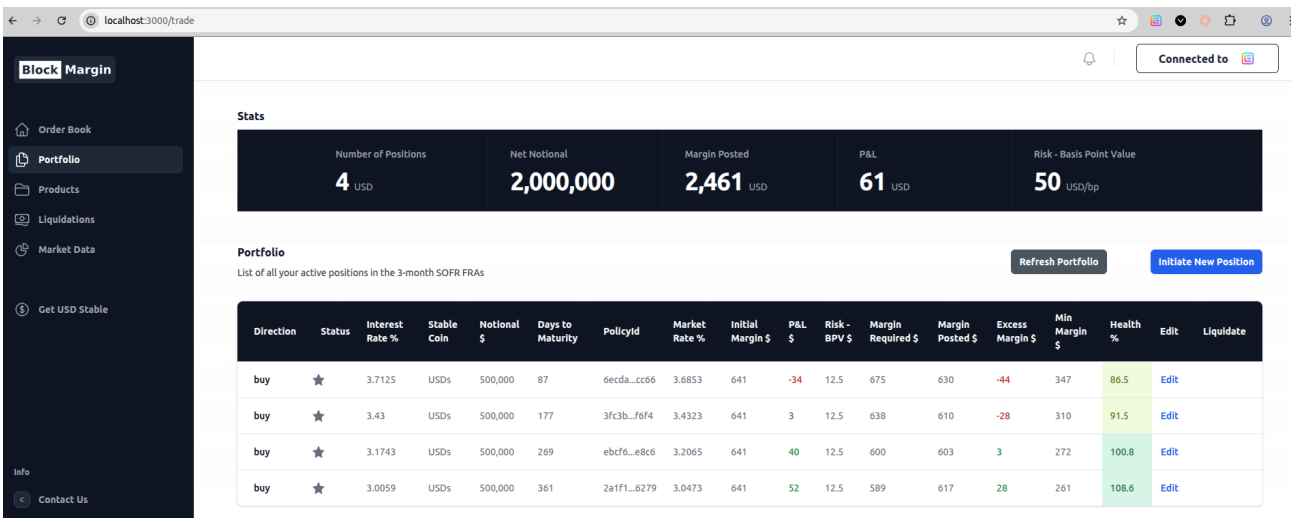

After margin postings / withdrawal these are the resulting positions for the day. The buyer of +102 USD of PNL and the seller is -102 USD of PNL

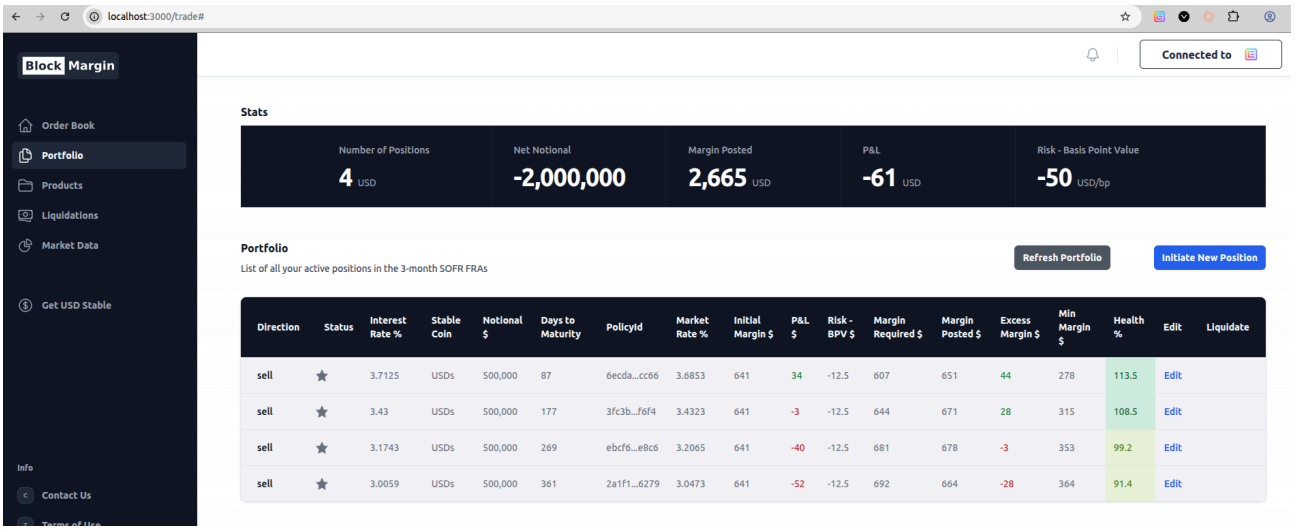


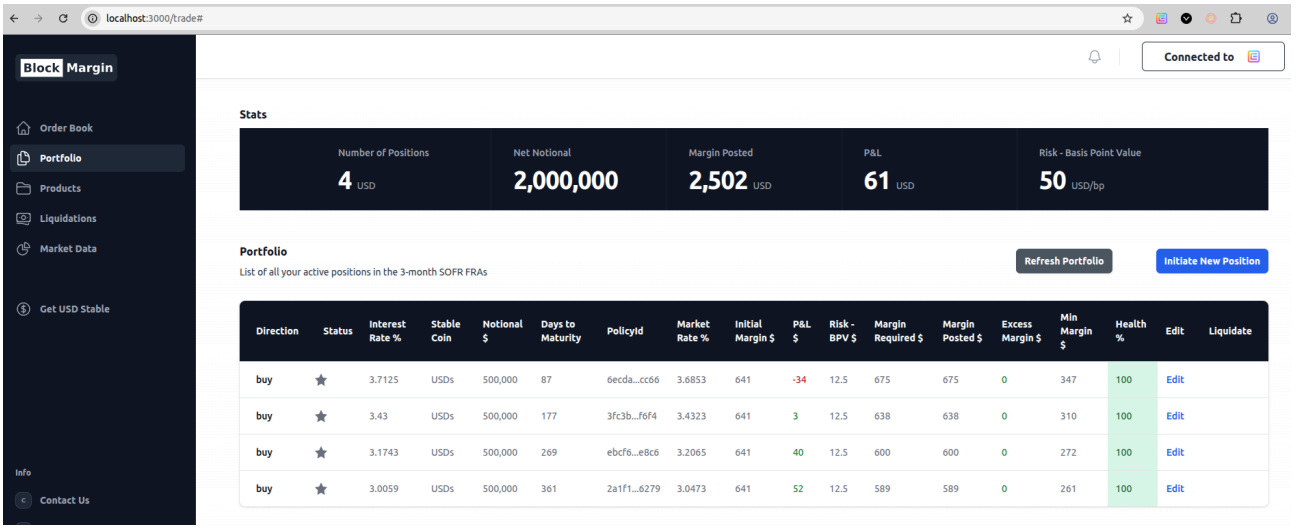

## 12-Sep-2025

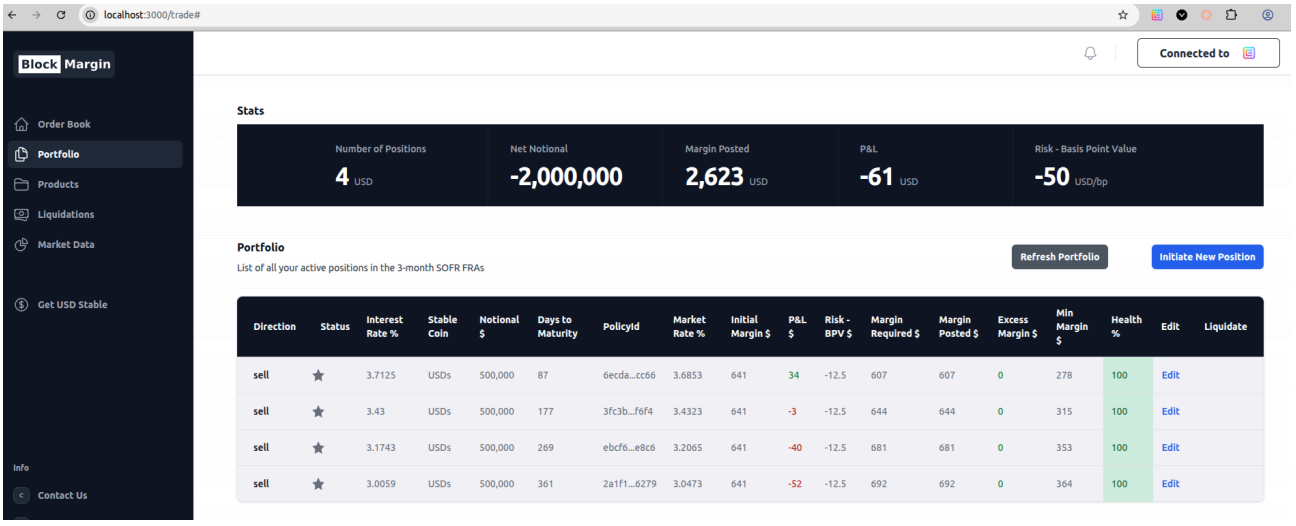
The interest rate curve increased at the short maturities and flattened. This made the short dated positions on the buy side lose value and the longer dated positions on the buy side increase in value. The inverse happened on the sell side. This dynamic demonstrates that that we can have the margin requirement move in opposite directions depending on the maturity of the trade






After margin posting / withdrawing



15-Sep-2025

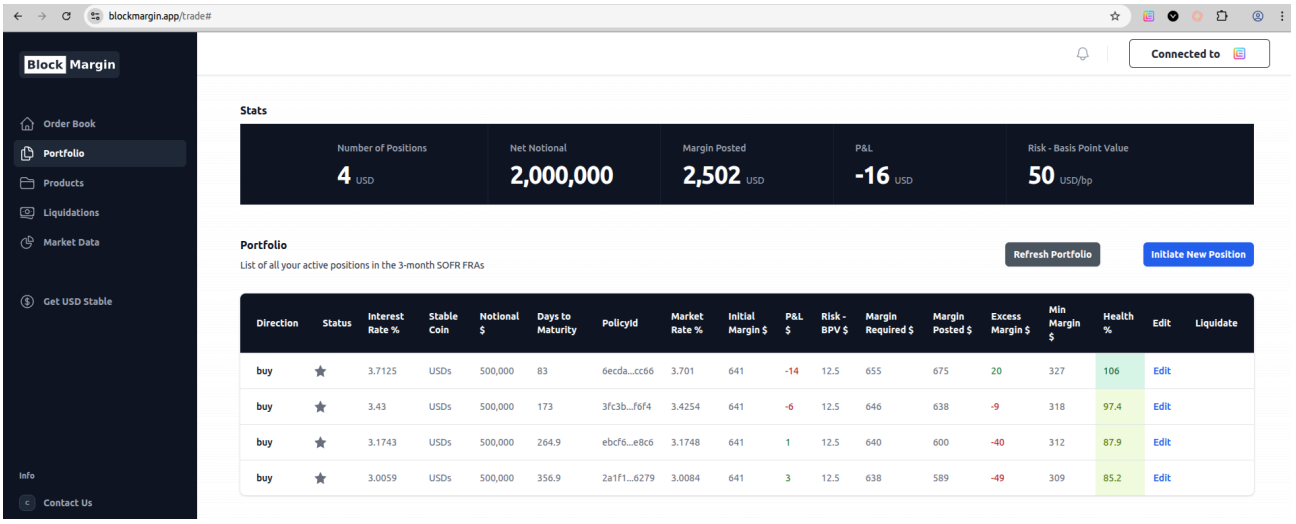
The day was skipped for testing purposes as we dedicated the time for fixing bugs and improving the UX and there were no material market moves during the day. The following features were changed / added:

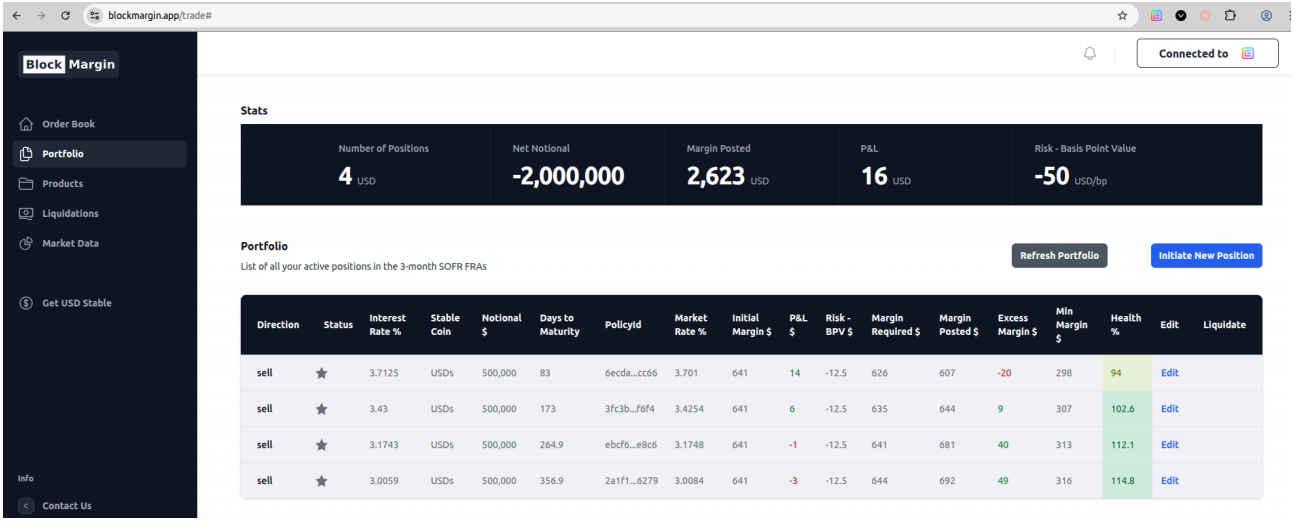
- All maturities to show in UTC time and show the FRA start and end date (previously a start timestamp was shown)

- In the “edit” menu of positions, only allow the actions according to the state of the contract (e.g. only allow to post / withdraw margin when the contract has been accepted by both parties)

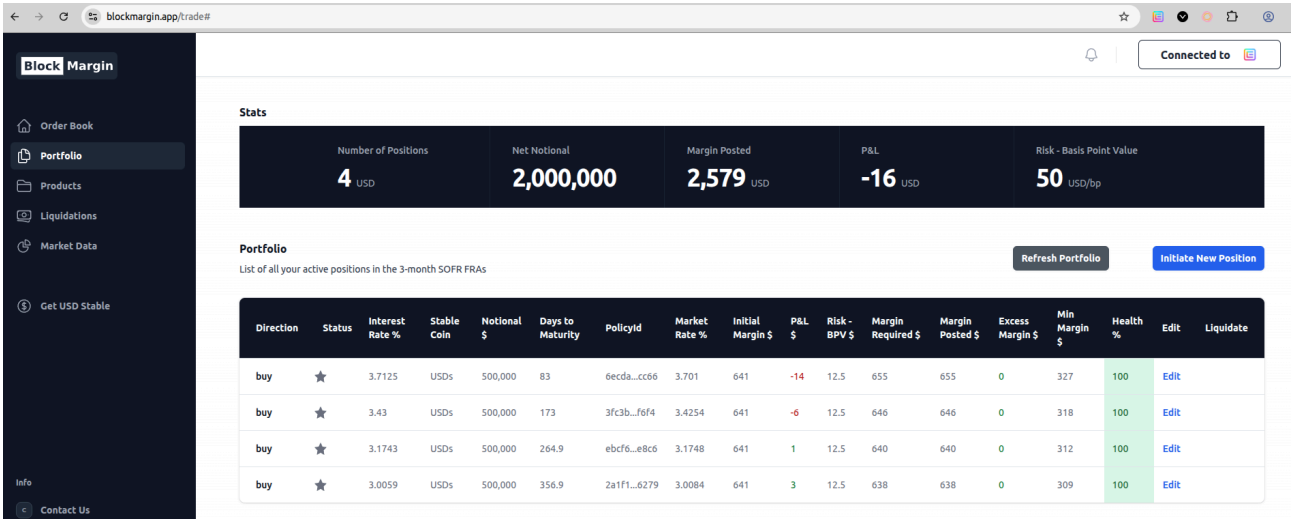
- Improved how liquidations are shown to the liquidated user, who can now withdraw any remaining amounts post liquidation

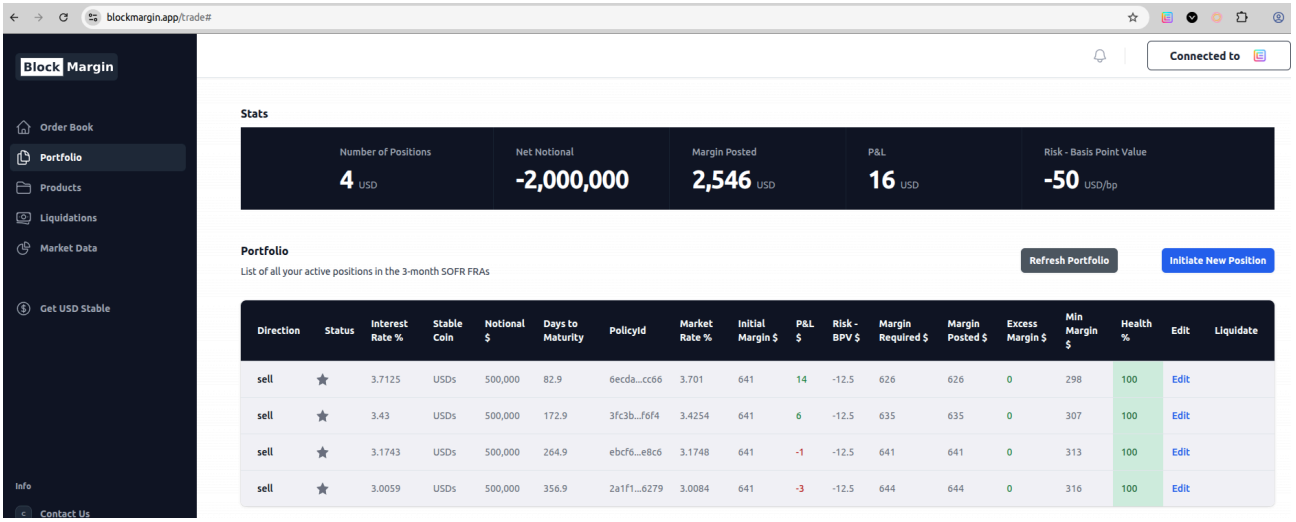
16-Sep-2025




After margin posting / withdrawing



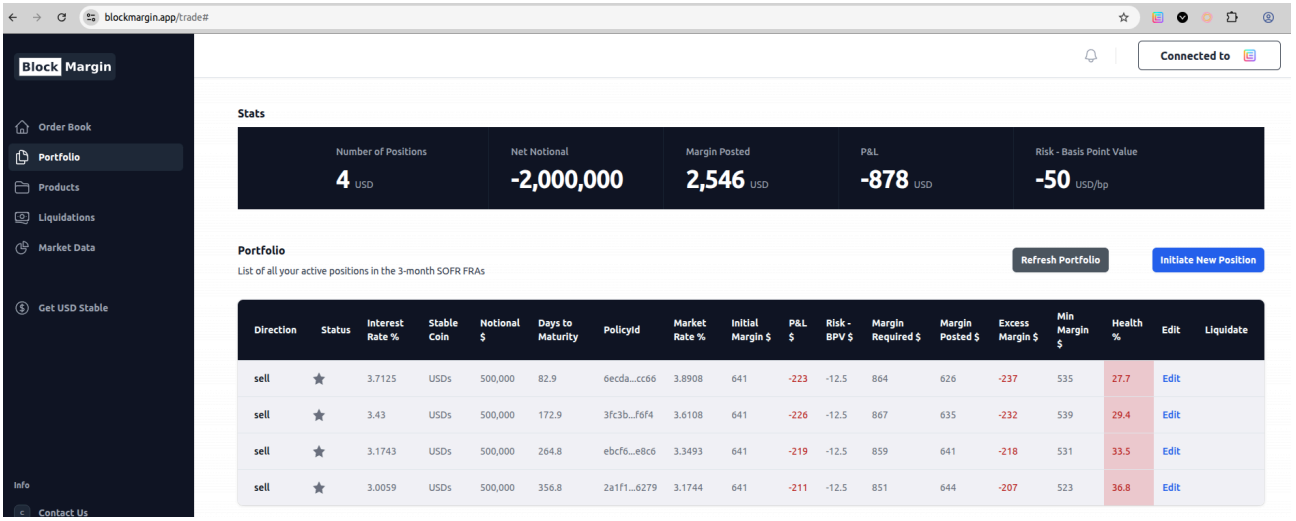




Stress Test within Risk Parameter

*manually move the market by a large amount, but within the estimate of the Risk Engine and check that the trade behaves normally. In this example, the Oracle will be updated manually and will be different from the market to simulate the large*

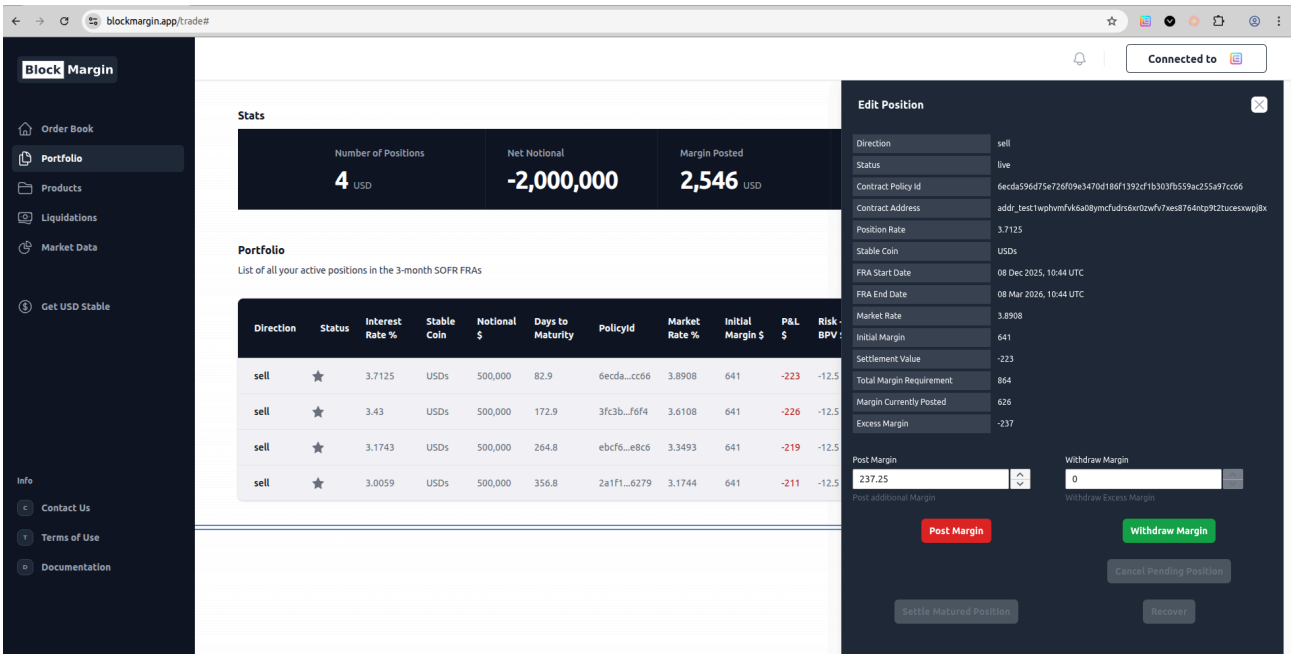
We move the interest rate curve by a multiple of 1.05. So for example an original interest rate that is 4% will become 4.2%, so a total change of 0.2 percentage points. This is still within maximum market move of 0.2625 (0.5125 Risk Parameter - 0.25 Min Margin requirement) before risking liquidation.

As this is an increase in rates the Seller loses market value

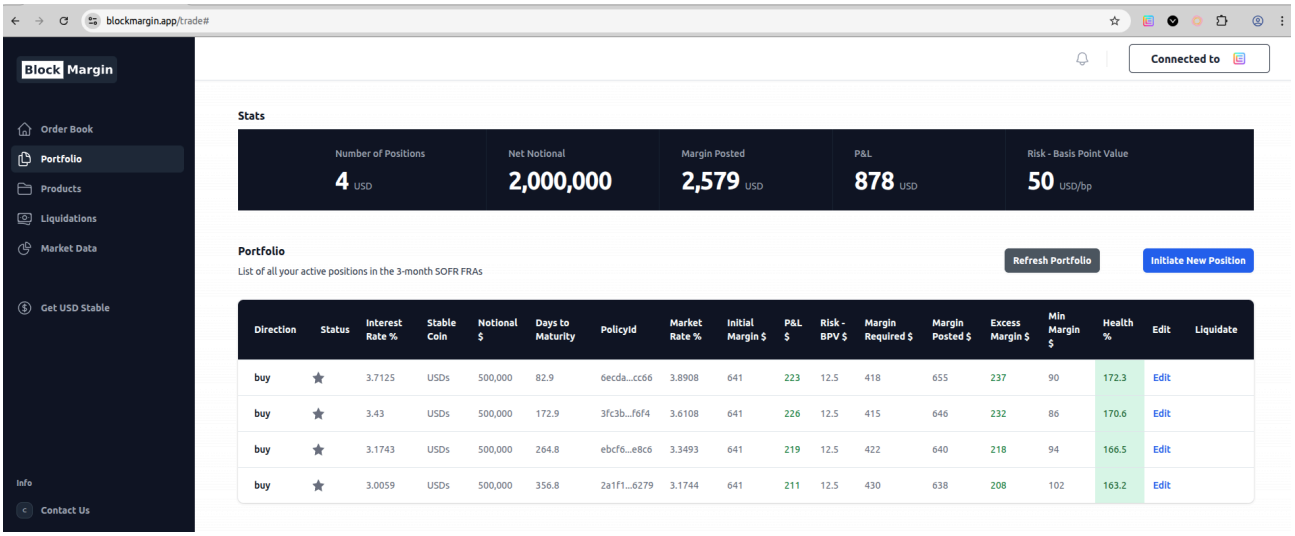



- The Posted Margin is currently higher than the Min Margin therefore there are still no liquidations

- The seller will need to post enough margin to return back to at least the Margin Required level. More margin can be posted if the seller wishes to have a buffer against similar size market moves in the future




The buyer has the opposite position.



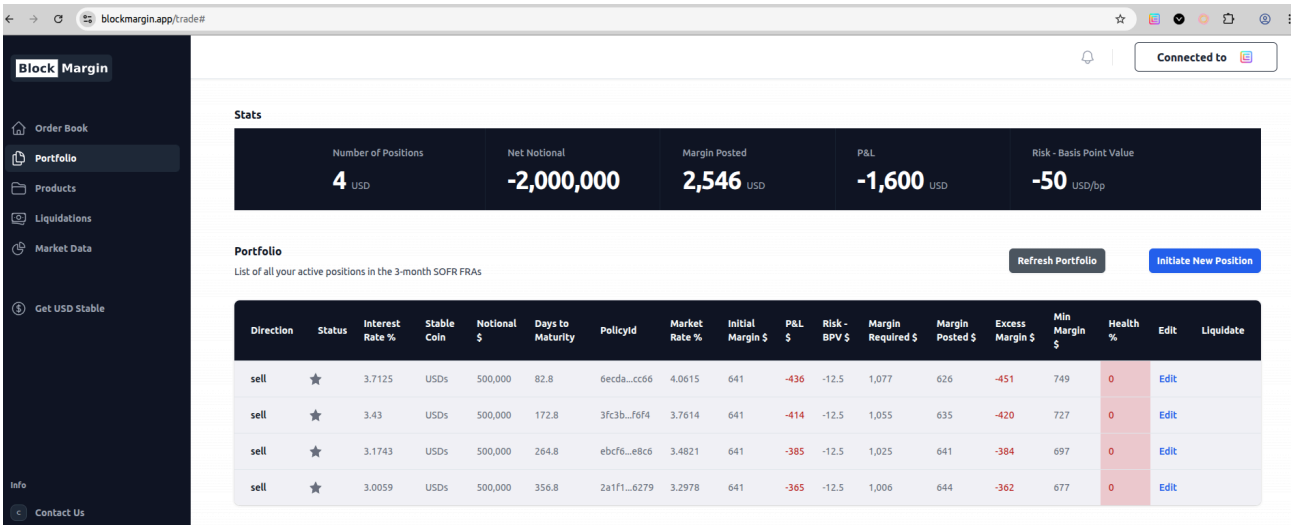

The application continues to function as normal and both parties can continue to post and withdraw margin

Stress Test outside of Risk Parameter

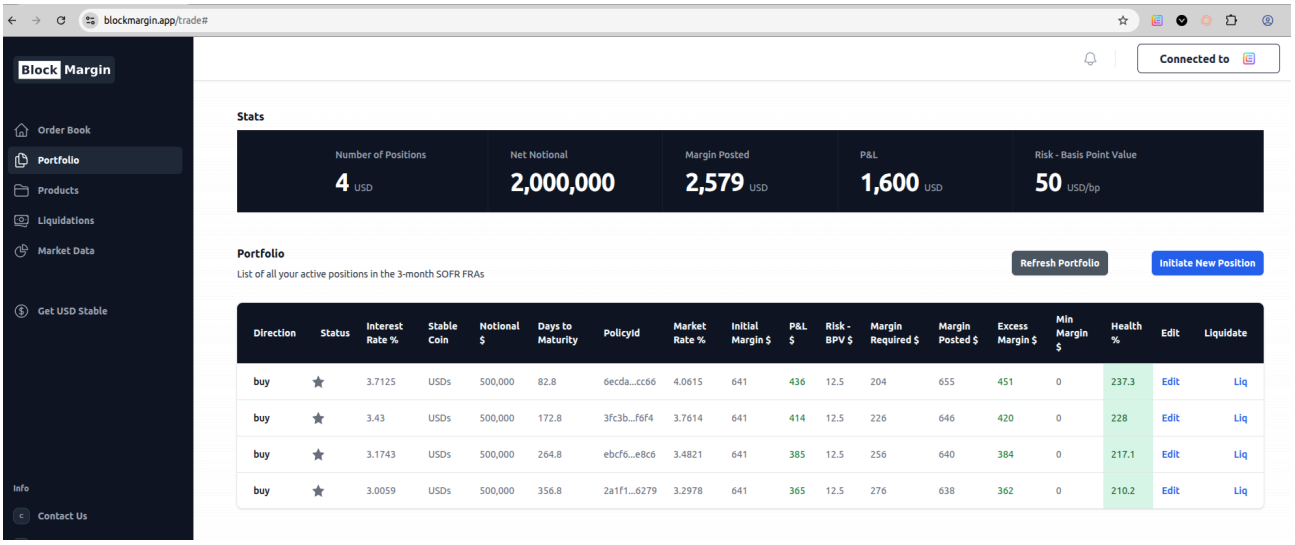
*test what happens if the market moves by more than what is predicted by the Risk Engine, in this edge case the platform should continue operate although the economics would be such that 1 of the users would have a high incentive to default on the trade.*

In this scenario we will move the market by a larger amount. We will apply a multiple of 1.1 to the interest rate curve. So for example the market interest rate of 4% will become 4.4%, a market move of 0.4 percentage points. For this size of a market move the Buyer will be able to liquidate the Seller's positions and receive an extra 10% of the margin to cover for costs and risk of finding another counterparty.

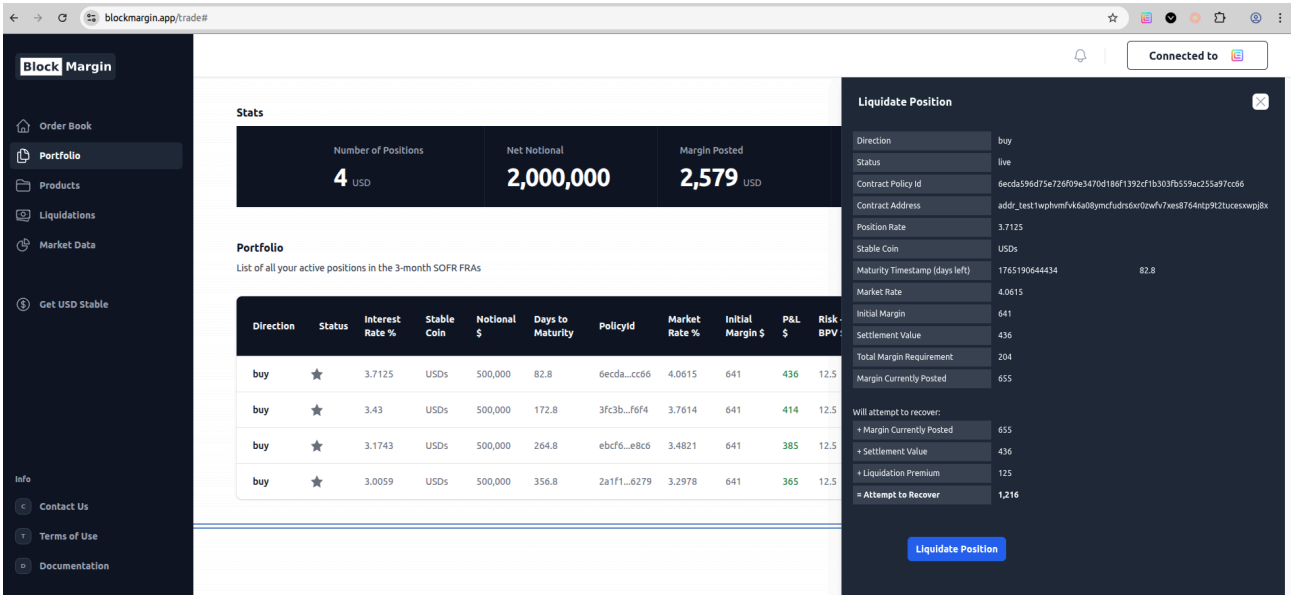
For this large market move the seller's margin health is at 0 as the posted margin is now less than the Min Margin. The seller. The seller can be liquidated if margin is not posted promptly.




The  buyer's market value increased significantly and is at risk that the seller just walks away from the trade if additional margin is not posted. At these levels the buyer can force liquidation to recover assets. A new button has appeared under the Liquidation column.

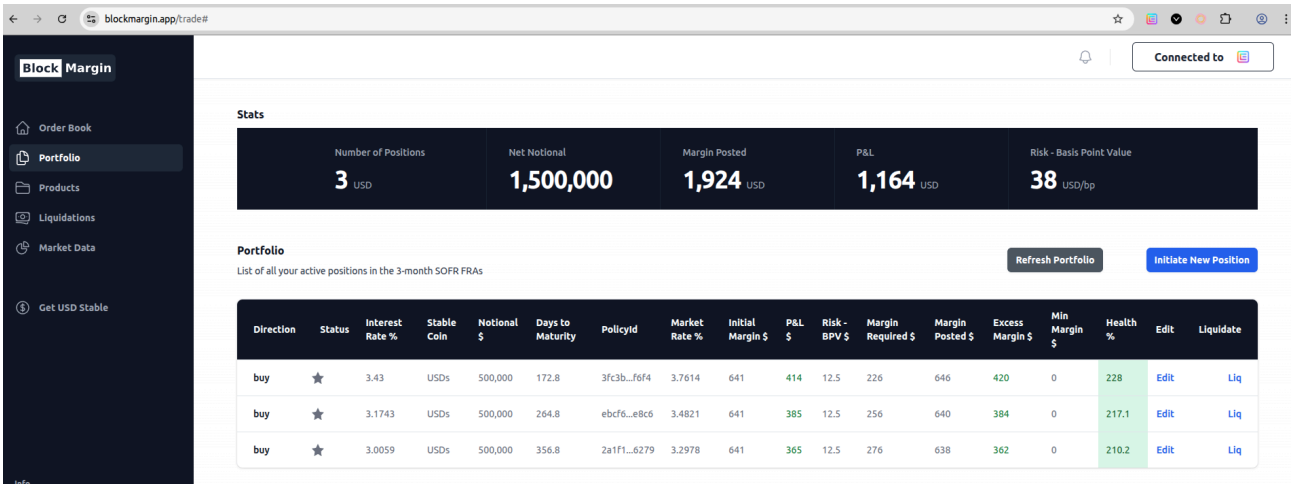



Pressing the “Liq” button opens up a side bar with the position details. Pressing the “Liquidate Position” in the side bar will attempt to recover the the Buyers margin, the P&L from the trade and the 10% liquidation premium

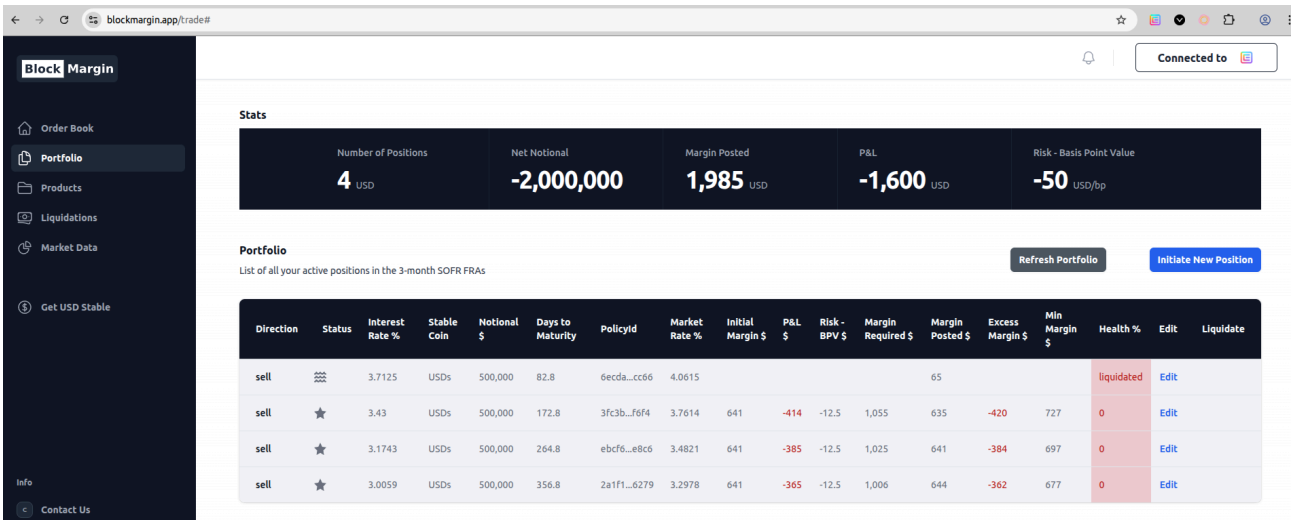



We will liquidate one positions to evidence the transaction on chain that was recorder with a hash: 8dae3653143656115da6c413ef81e6afd707ac2da579548f4df1cba9593848c3

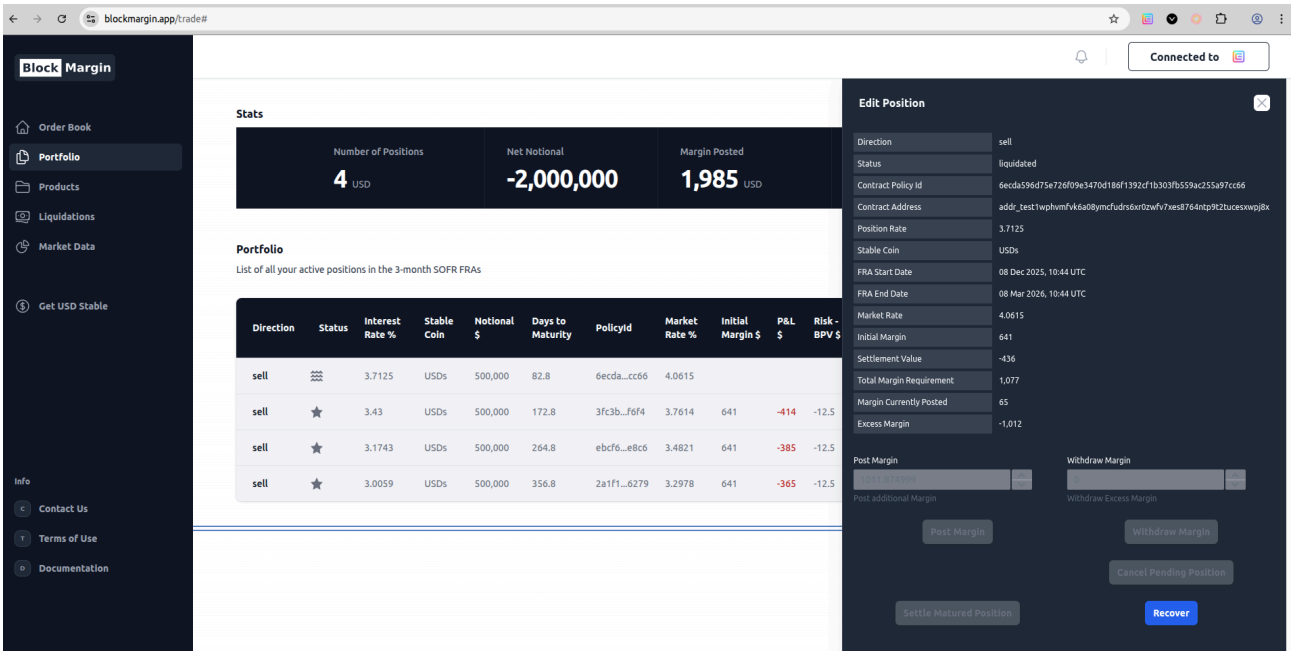
After the position has been liquidated, the buyer no longer sees the position in their portfolio



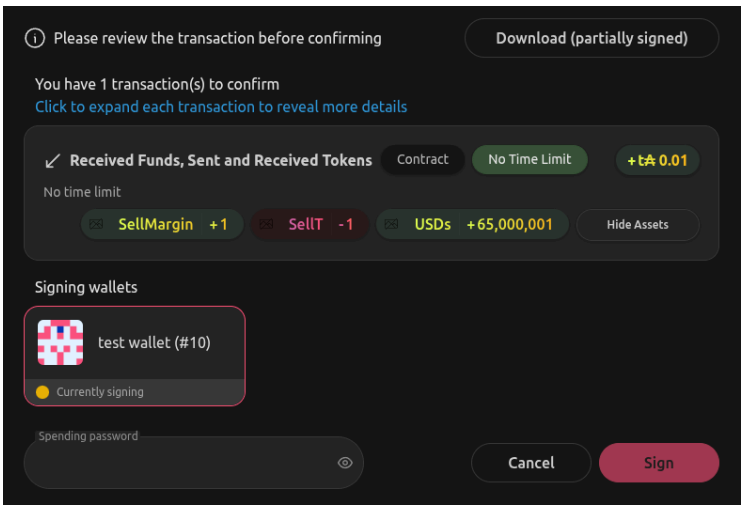
From the Seller's side, the seller now sees that 1 of the positions has been liquidated




And so can go into the "Edit" menu to recover any remaining amounts with the "Recover" button

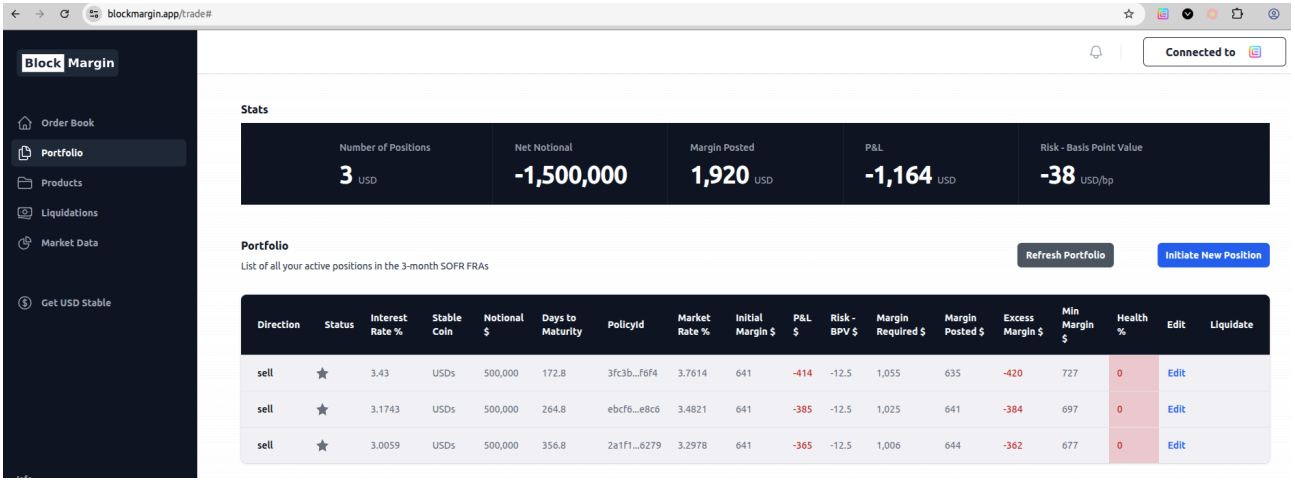



After the transaction has been built we see that the remaining amount of 65 USDs can be recovered (ignoring the 6 last digits that do get interpreted as decimal points on the testnet)



Transaction hash: 720803dd3a53383633d0915a29c13bba284e9be090bc9aec740a591c8f65e860

After the final recovery of remaining funds, the position is removed from the portfolio and the remaining 3 are left



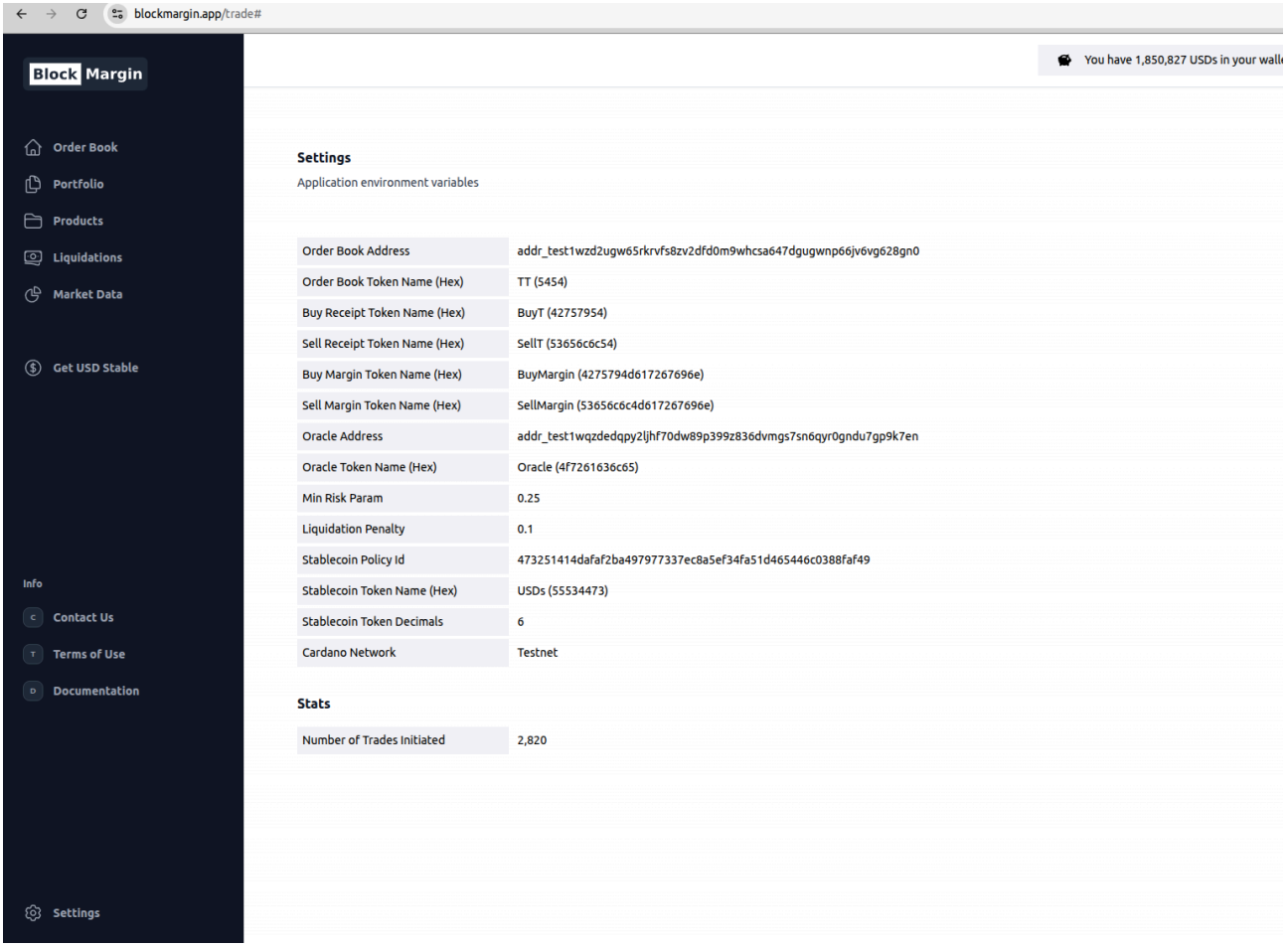

The platform behaved as expected under this extreme market move with a workable resolution for both buyer and seller.

## 2. Load Test

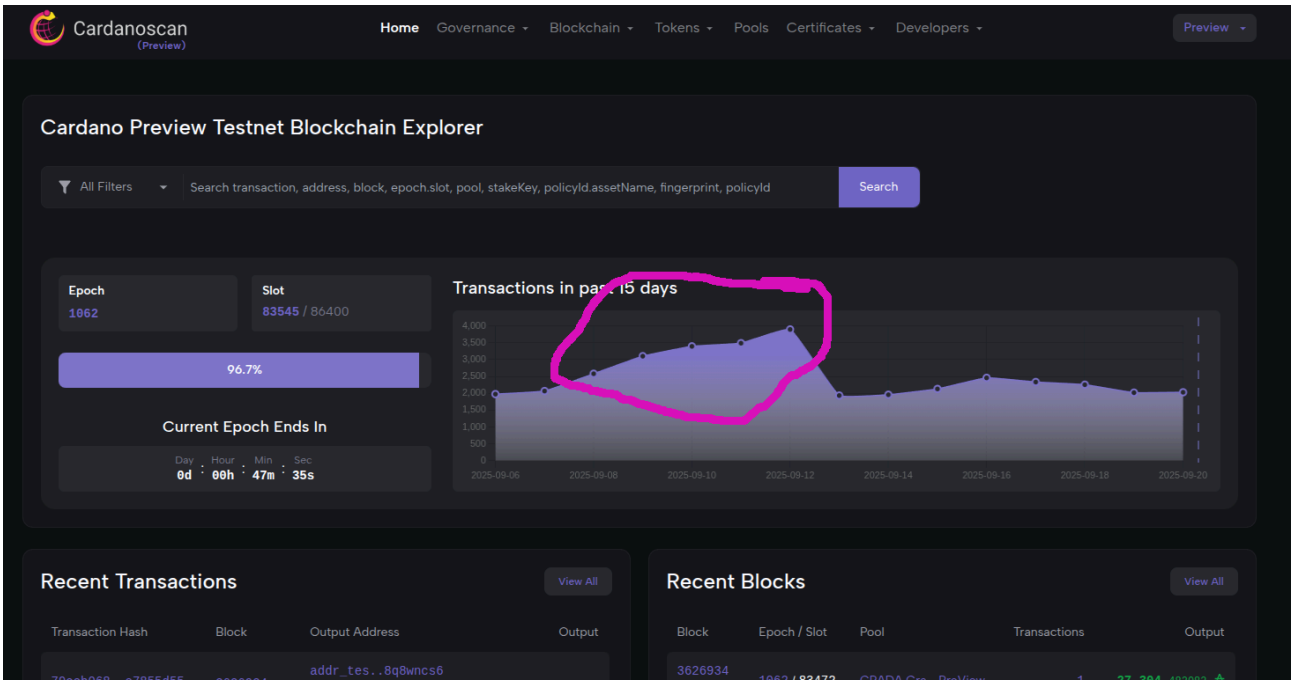
*A load test consisting of 1000 new transactions initiated per day on 3 consecutive days (3 x 1000 = 3000 new trades in total) and the collateral managed on them for 5 days after trade initiation. This will test the capacity of the platform to handle realistic transaction volume.*

The settings section shows the stats on the total number of trades initiated. This is reade from the order book smart contract address. In the printscreen it shows 2,820 trades initiated, each trade has 2 transactions, the buy and a sell. The majority of these were created over 3 days

The full log of trades can be found by looking up the Order book address on a blockchain explorer: https://preview.cardanoscan.io/address/709aae21daa0ec3626071314d4b5fb2baf887755f351c43a61d6a4cd31




The large number of trades cause a spike in the total number of transactions on the Preview testnet as shown in the printscreen below from preview.cardanoscan.io




**Log of Bugs identified during testing and resolution**

| Bug Name | Bug Description | Resolution |
|---|---|---|
| Order book load issue | The order book is decentralized in that a token is minted for each new contract and sent to a specific address on the blockchain. The front end then looks for recently added tokens to that address. When there are a lot of new orders the blockchain indexer fails to return all of the tokens at an address past a certain blocktime | Split the query into multiple chunks and query 30 tokens at a time. This increases the load time during times of high activity on the platform, but ensures that all the orders on the order book get loaded |
| Koios throttling | During heavy loads we noticed that some requests to Koios would timeout or give a “429 - too many connections” error. | We implemented a throttled version of the Axios fetch protocols to confirm to a max of 100 requests per 10 seconds |
| Chained Transactions | During the load test we tried to maximize the number of chained transactions that could be executed at once. We managed to do up to 96 transactions at a time. A bug was identified that unless a sufficient amount of ADA was provided to the 1st of the chained transactions then subsequent transactions could fail as each transaction consumed a small amount of the initial ADA. | Add a threshold parameter of 50 ada to the MeshJS Transaction builder. This bug is not expected to reoccur after this limits and also because the front end only allows to create up to 8 chained transactions at a time which much less than 92 that we tried in testing |
| Wallet compatibility | Not all wallet support the chained transactions | After testing most of the wallets on Cardano we identified that 3 of them support the Preview testnet (Eternl, Vespr and Lace) and only 2 of these support chained transactions (Eternl and Vespr). |