



Adrastia Prudentia PID Controller Performance

Ionic on Mode: Final Report in Retrospect

April 19, 2025

Adrastia Prudentia PID Controller is a feedback-loop mechanism that adjusts interest rates to achieve optimal utilization. Ionic aimed to utilize the PID controller to reduce the spread between supply and borrow rates by having the controller ensure consistently high utilization of its target markets. Ionic integrated the PID controller for their USDC, USDT, and WETH on August 07, 2024, and it remained in effect until an unrelated exploit occurred on February 04, 2025. Following the exploit, the Adrastia team decided to withdraw from Ionic. This report analyzes the effectiveness of the Adrastia Prudentia PID Controller in retrospect.

Data, charts, analyses, and observations on the utilization and error rates for USDC, USDT, and WETH are provided.

Two to three time periods are compared for each market: before PID activation, after activation, and after a PID tuning, where applicable. In December 2024, the Ionic team granted the Adrastia team the ability to tune the PID controller, and tunings were made in mid-December for the USDC and WETH markets. Comparing data from the period before the activation of the PID controller to distinct periods of PID tunings allows for analyzing the effectiveness of the change in rate model and the effectiveness of PID tunings, where applicable.

Despite challenges such as poor DEX liquidity, poor bridging support, and skewed market dynamics, the PID controller was highly effective at improving the utilization rates of all markets.

Utilization & Error

Target utilization for all tokens is 85%.

Error is calculated as the target rate minus the input rate.

Data is limited to that produced by Adrastia's Utilization and Error oracle. Having more data from before the PID activation would be beneficial, but time constraints prevent us from accessing and processing more data.

USDC

USDC Utilization and Error

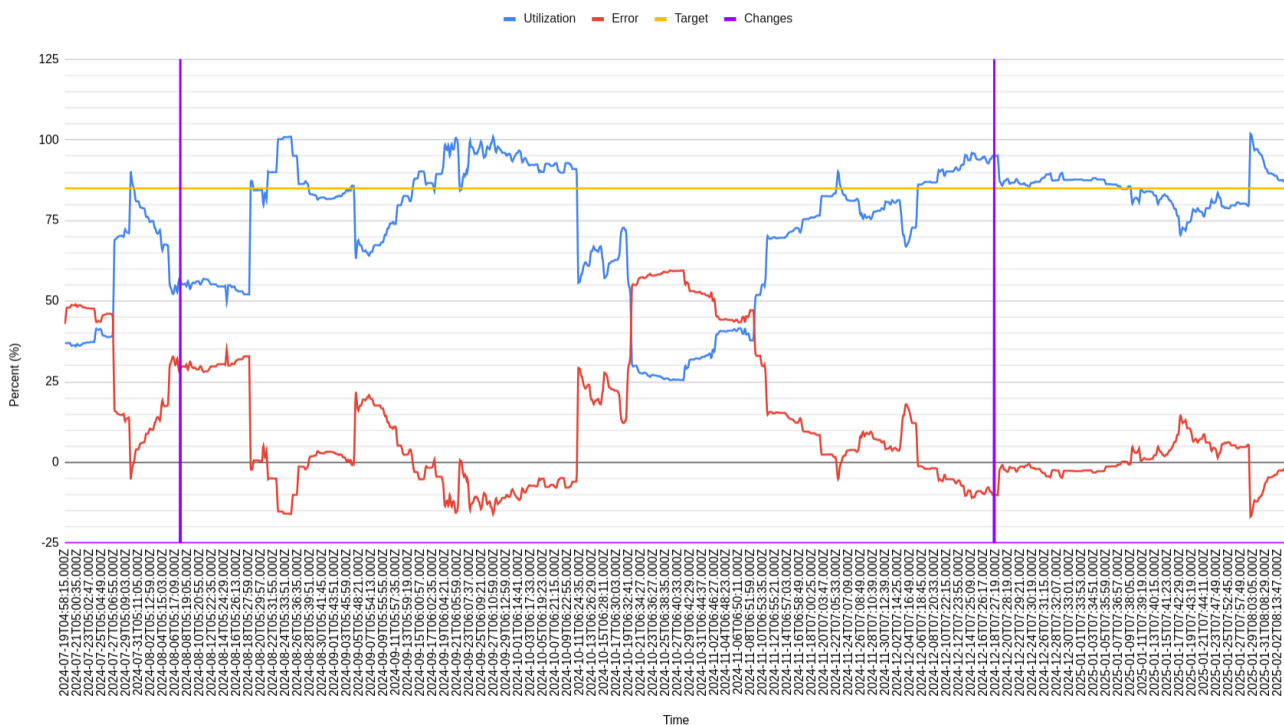


Figure 1: USDC Utilization and Error Chart

Utilization error rates by part

- From July 19, 2024 to August 06, 2024: Pre-PID
 - Average error: 28.09%
- From August 07, 2024 to December 17, 2024: Post-PID (initial tunings)
 - Average error: 12.45%
- From December 18, 2024 to February 03, 2025: Post-PID (adjusted tunings)
 - Average error: 0.08%

Related external challenges

- USDC liquidity on Mode DEXs (data snapshot taken October 07, 2024):
 - Swapping \$10K USDC to ETH results in about 1.8% slippage.
 - Swapping 1% of the Total Supply to ETH results in about 1.9% slippage.
- Fast bridging was/is available.
- Supply was/is slightly skewed, as evidenced by the following chart produced on April 16, 2025:

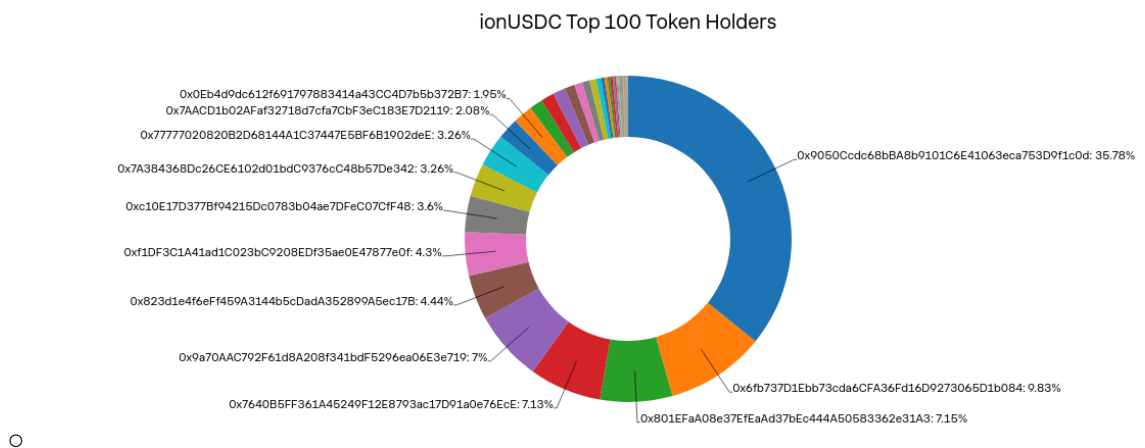


Figure 2: ionUSDC Top 100 Token Holders (modescan.io, 2025)

- As illustrated in Figure 2, three accounts hold over 50% of the supply of USDC on Ionic.

Analysis

The activation of Adrastia's PID controller resulted in a 55.68% reduction in the utilization error of USDC. The PID tunings made by Adrastia in December resulted in a further 99.36% reduction, for a final net **99.72% reduction** in the utilization error of USDC. An average error of 0.08% is minuscule and suggests that the PID controller is highly effective at achieving the target utilization level.

USDT

USDT Utilization and Error

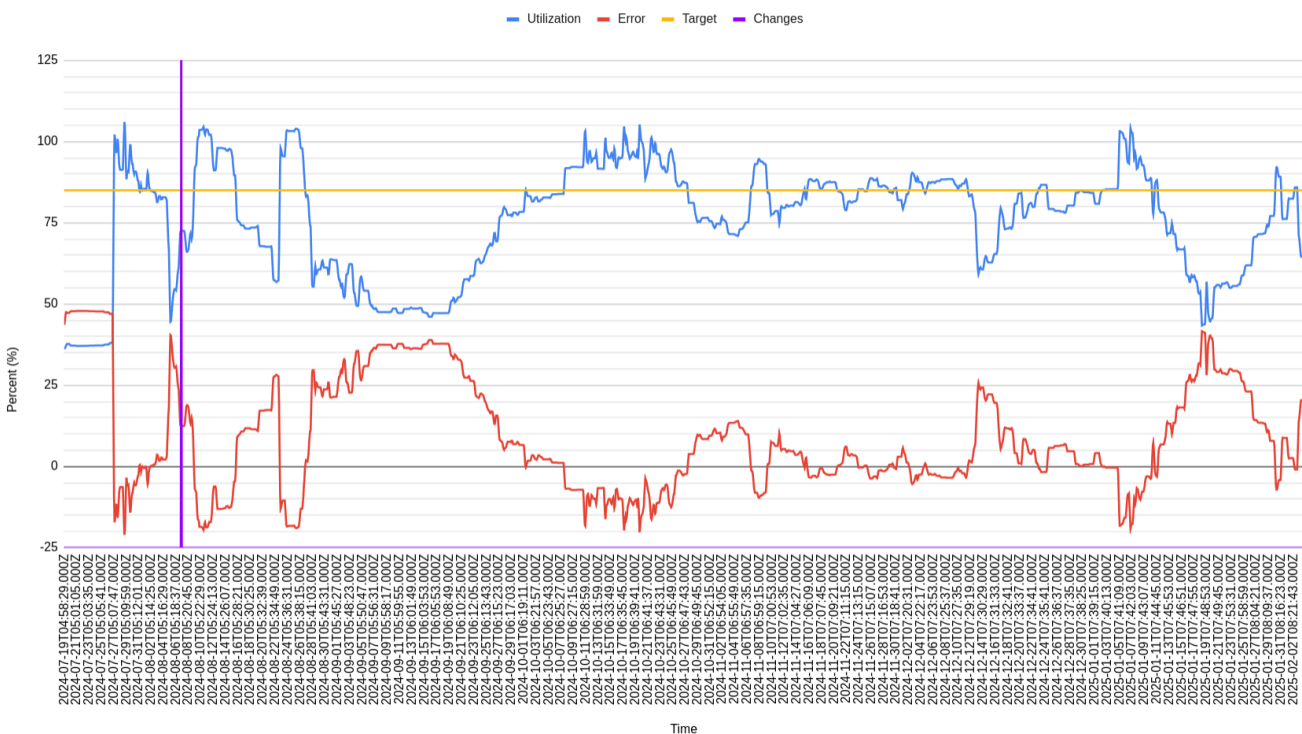


Figure 3: USDT Utilization and Error Chart

Utilization error rates by part

- From July 19, 2024 to August 06, 2024: Pre-PID
 - Average error: 21.33%
- From August 07, 2024 to February 03, 2025: Post-PID
 - Average error: 7.73%

Related external challenges

- USDC liquidity on Mode DEXs (data snapshot taken October 07, 2024):
 - Swapping \$10K USDT to ETH results in about 4.8% slippage.
 - Swapping 1% of the current Total Supply to ETH results in about 3.4% slippage.
- No fast bridging existed/exists. Withdrawing USDT takes 7 days.

- Supply was/is highly skewed, as evidenced by the following chart produced on April 16, 2025:

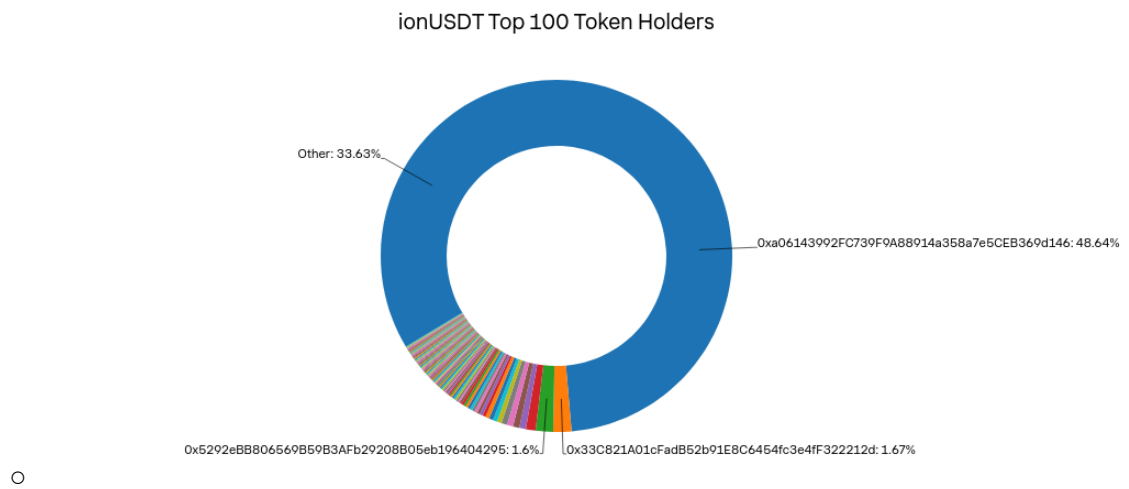


Figure 4: ionUSDT Top 100 Token Holders (modescan.io, 2025)

- As illustrated in Figure 4, one account held nearly half of the USDT supply on Mode.

Remarks

The inability to do anything with borrowed USDT without a 7-day delay or significant slippage may have decreased its attractiveness and slowed market participant response times.

Analysis

The activation of Adrastia's PID controller resulted in a **63.76% reduction** in the utilization error of USDT.

WETH

WETH Utilization and Error

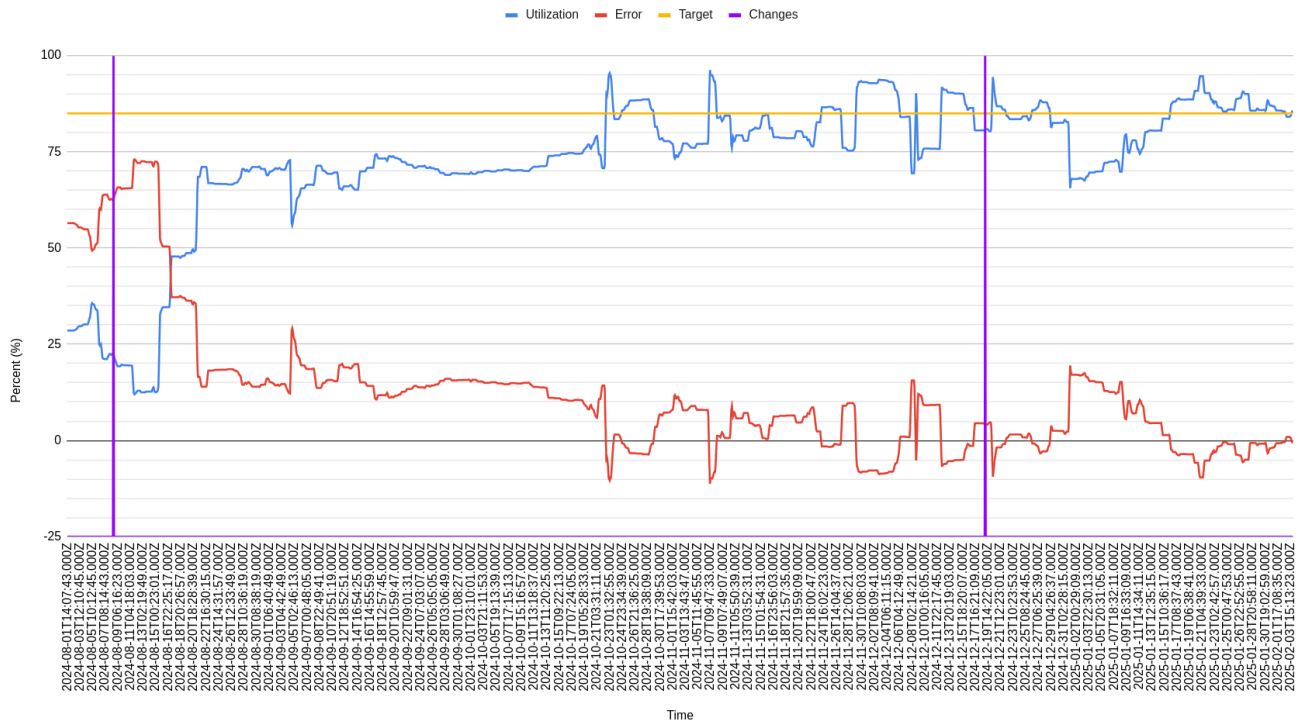


Figure 5: WETH Utilization and Error Chart

Utilization error rates by part

- From August 01, 2024 to August 06, 2024: Pre-PID
 - Average error: 55.03%
- From August 07, 2024 to December 18, 2024: Post-PID (initial tunings)
 - Average error: 13.14%
- From December 19, 2024 to February 03, 2025: Post-PID (adjusted tunings)
 - Average error: 2.55%

Related external challenges

- Fast bridging was/is available.
- Supply was/is highly skewed, as evidenced by the following chart produced on April 16, 2025:

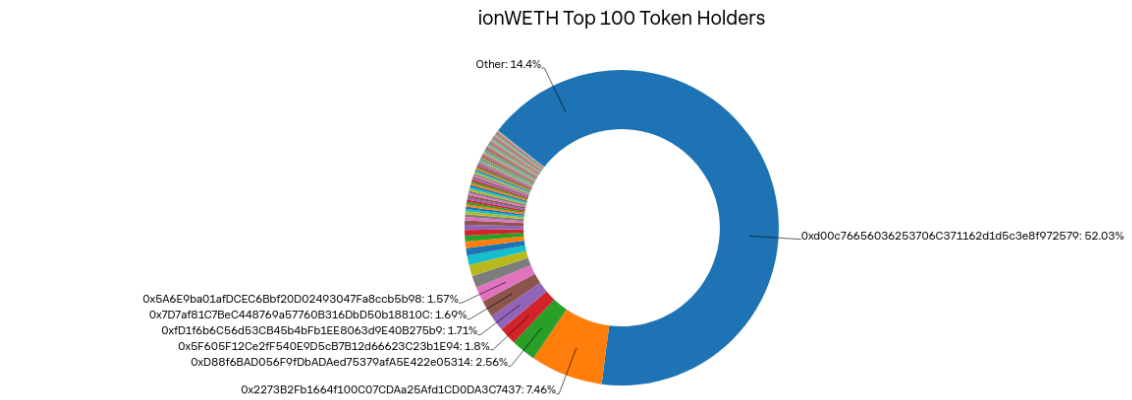


Figure 6: ionWETH Top 100 Token Holders (modescan.io, 2025)

- As illustrated in Figure 6, one account held over half of the WETH supply on Mode.

Analysis

The activation of Adrastia's PID controller resulted in a 76.12% reduction in the utilization error of WETH. The PID tunings made by Adrastia in December resulted in a further 80.59% reduction, for a final net **95.37% reduction** in the utilization error of WETH. An average error of 2.55% is low and suggests that the PID controller is highly effective at achieving the target utilization level.

Conclusion

After introducing the Adrastia Prudentia PID Controller and after some tunings, the USDC, USDT, and WETH markets on Ionic experienced utilization error rate reductions of **99.72%**, **63.76%**, and **95.37%**, respectively. Despite challenges such as poor DEX liquidity, limited bridging support, and skewed market dynamics, the PID controller significantly reduced utilization error rates and demonstrated success in helping Ionic achieve its goal of reducing the interest rate spread.

References

modescan.io, 2025, ionUSDC Top 100 Token Holders, accessed April 16, 2025, <<https://modescan.io/token/0xc53edEafb6D502DAEC5A7015D67936CEa0cD0F52/tokenholderchart>>.

modescan.io, 2025, ionUSDT Top 100 Token Holders, accessed April 16, 2025, <<https://modescan.io/token/0x94812F2eEa03A49869f95e1b5868C6f3206ee3D3/tokenholderchart>>.

modescan.io, 2025, ionWETH Top 100 Token Holders, accessed April 16, 2025, <<https://modescan.io/token/0x71ef7EDa2Be775E5A7aa8afD02C45F059833e9d2/tokenholderchart>>.