Sharing Performance Verification Results in the Future of Productions System

Background

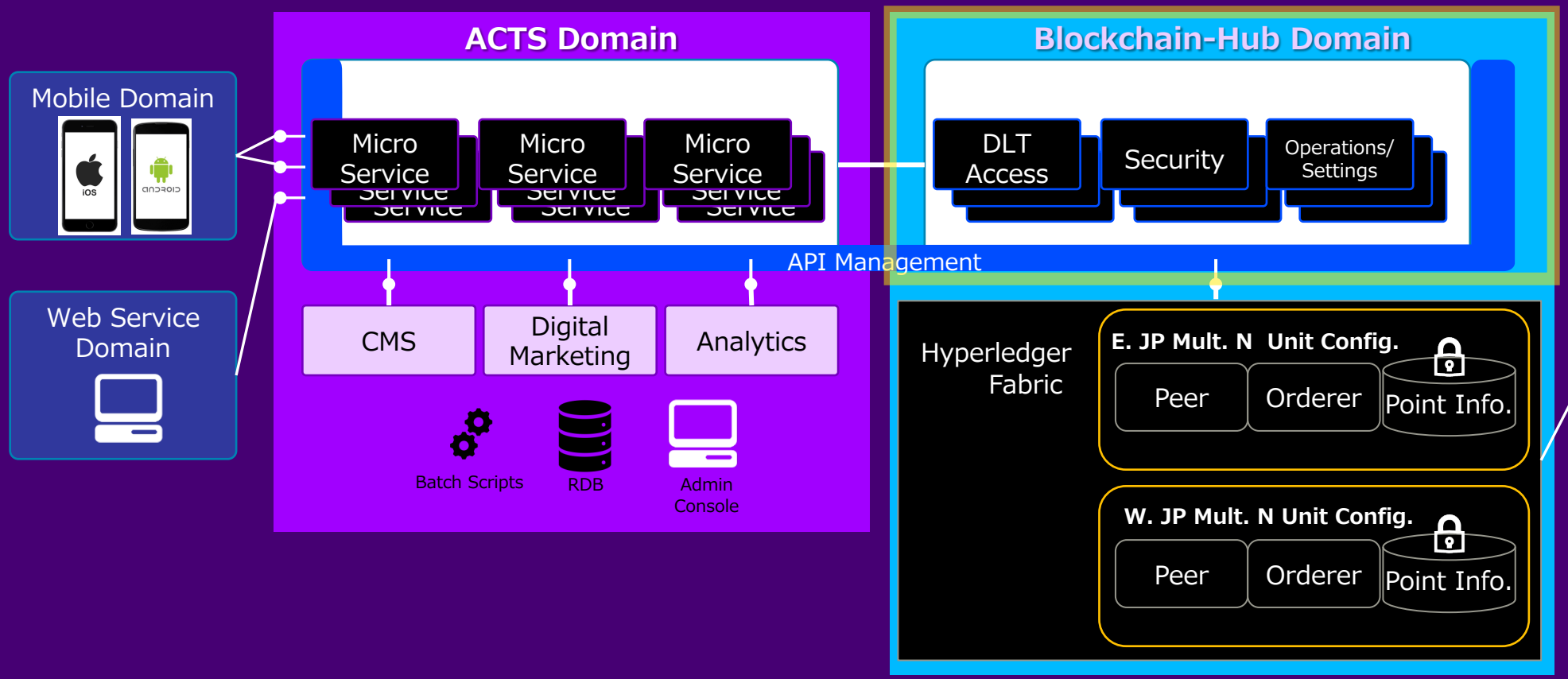
- ✓ Data adds up over time as the blockchain is a write-once architecture with no data deletion.
- ✓ Accumulated data increase leads to a search and write performance decrease in general systems.
- ✓ Age deterioration is a relatively unknown variant in the blockchain system.

If there is no frame of reference, we must find it ourselves!

- ✓ We simulated two years of processing performance using the current user and transaction numbers from a commercially operated financial institution blockchain system.
- ✓ We will share our findings since it was that processing performance is affected by other factors aside from data accumulation.

System Overview

- Point data is managed by the blockchain for a more complete and high-availability point management system.
- Hyperledger Fabric is used for the blockchain infrastructure, and Peers (nodes) are geographically dispersed.
- Monthly transactions: Reference= 1,000,000 transactions, Write=1,500,000 transactions

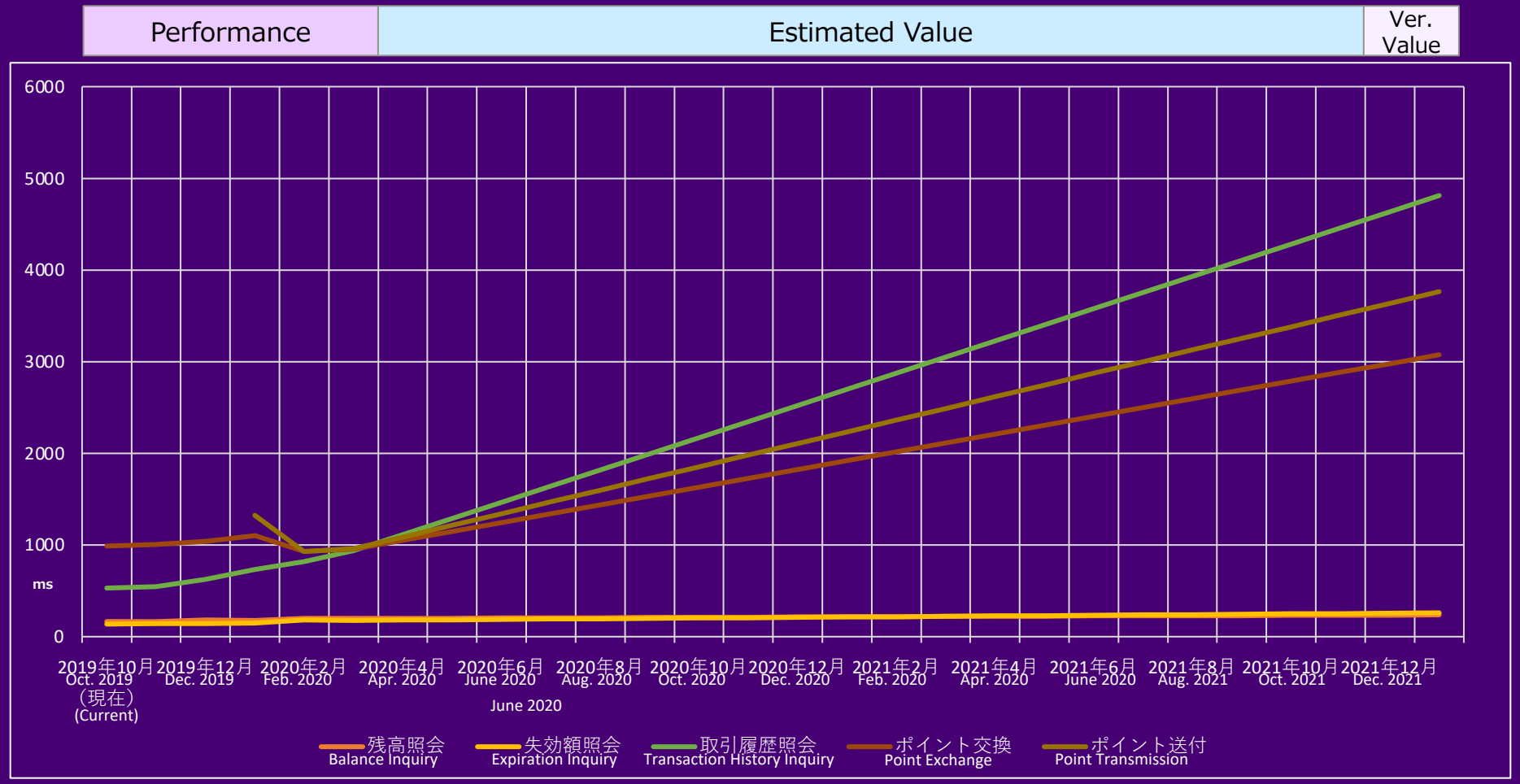


These functions are run with a smart controller.

- Point Issue
- Point Exchange
- Point Transmission
- Point Expenditure
- Point Inquiry
- Transaction History Inquiry
- Expected Expiration Inquiry

Future Performance Prediction Verification Results

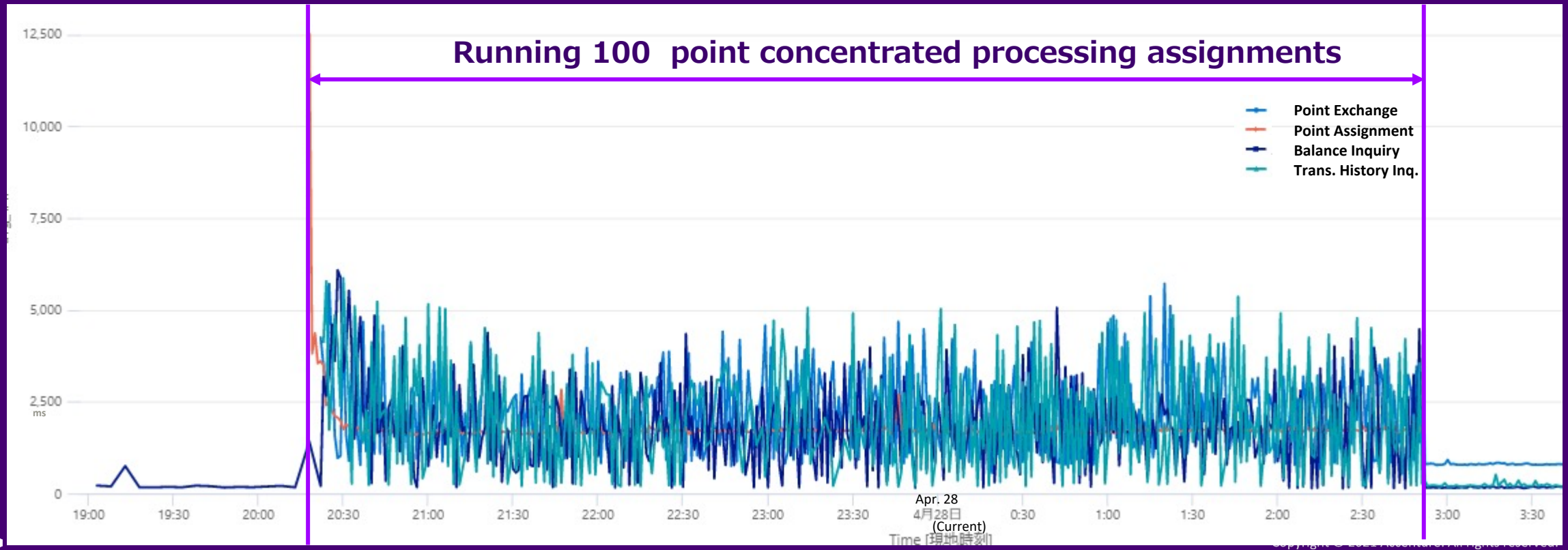
- 2-year data estimates were calculated from the actual transaction amount, and measuring its accumulation on the blockchain.
- There appears to be a positive correlation between the accumulative data increase and the TAT of each process.



TAT Effect Verification Results with Concentrated Write Processing

- We measured TAT effect in the blockchain write process on 1,000,000 point transmissions over a concentrated short period of time.
- Significant deterioration was immediately observable upon initiating point transmissions processing, with other TAT levels returning to normal upon completion.

Testing Conditions
1. Verification is to be run in identical conditions to the production environment.
2. Run exchanges/balance inquiries once every 30 seconds, and transaction history inquiries once every 60 seconds.



Conclusion

Observed Results	Opinion
Deterioration of the blockchain system and general RDB system occurs simultaneously with data accumulation.	• Processing functions do not stabilize even when pasting the Hyperledger Fabric State DB into the index. • It may be necessary to stabilize the data amount.
Time Application increases and. TAT processing deteriorates with concentrated write process loads	• The Hyperledger Fabric chaincode（≒smart contract) is highly reliant on the StateDB, but the StateDB becomes bottlenecked during times of concentrated loads. • It is recommended to periodically distribute processing amount and timing in order to keep the load from becoming concentrated.