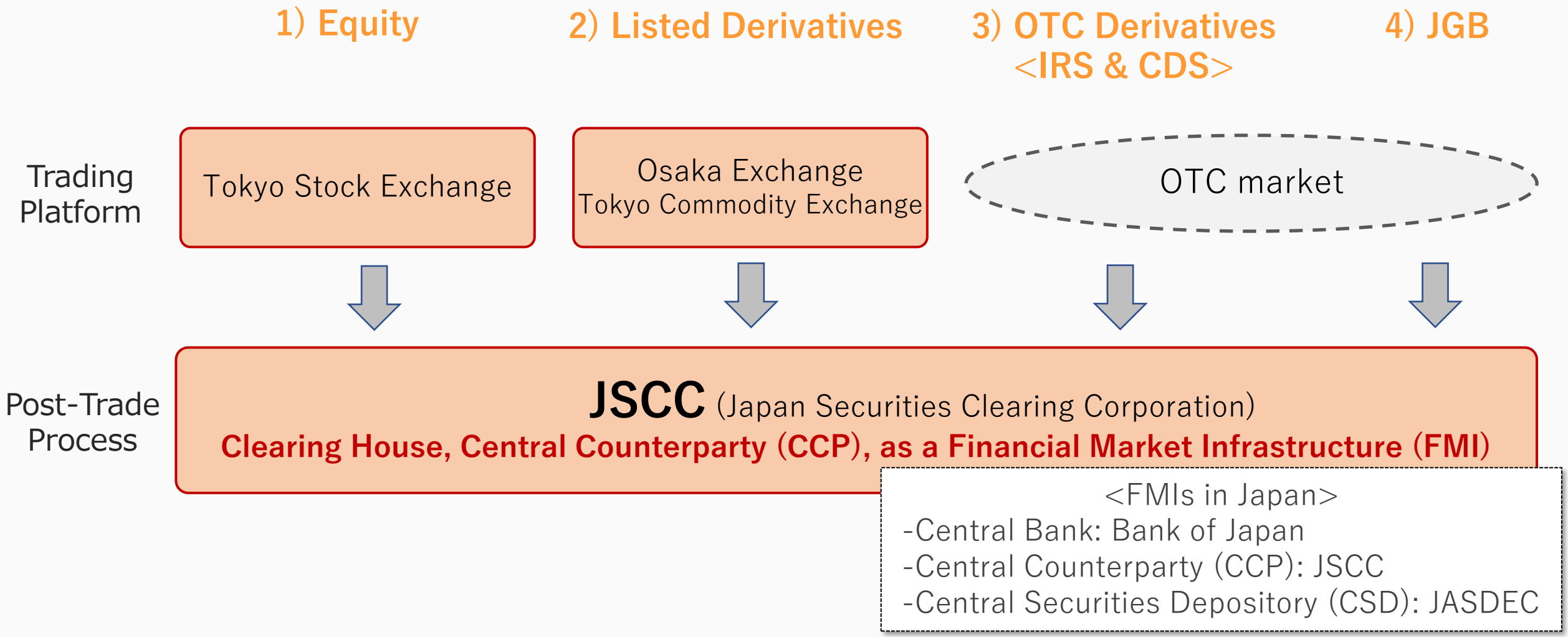
Confidential

JSCC’s Besu Production Launch and its Next Steps

6th March, 2024

JPX
JAPAN EXCHANGE GROUP

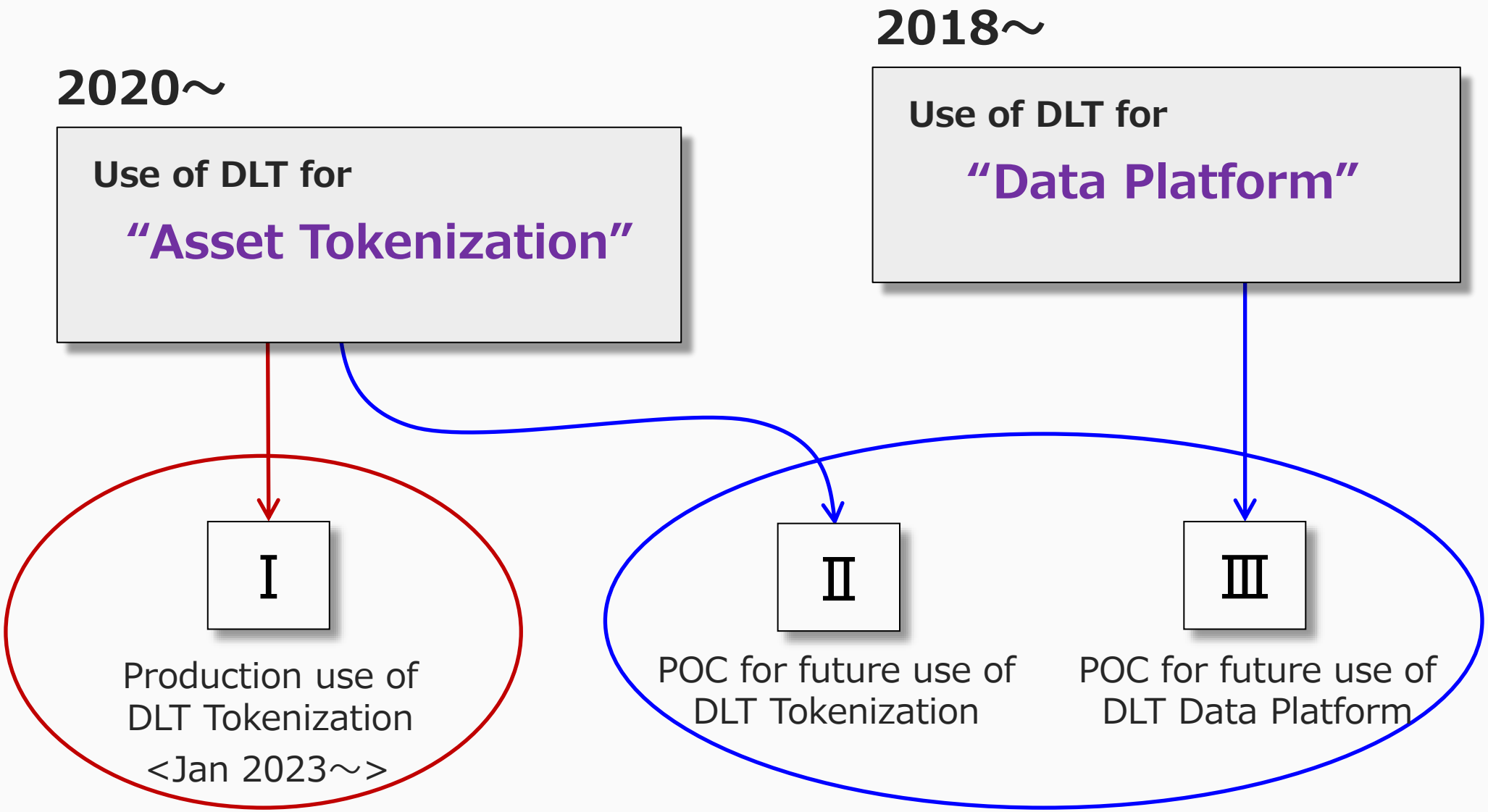
About JSCC and JPX Group



<JSCC daily average notional values of trades cleared (Q4 2022)>

1) Equity	2) Listed Derivatives	3) OTC Derivatives <IRS & CDS>	4) JGB
11.6T yen	**5.4T yen**	**4.4T yen**	**108.9T yen**

DLT project in JSCC



Short-term Vision (The First DLT Production Use)

Physical delivery process for commodity futures' final settlement

- **Phase 1 :** RSS (Rubber) **Launched in January 2023**
- **Phase 2 :** Precious Metal (Gold, Platinum, Silver) **Now under design**

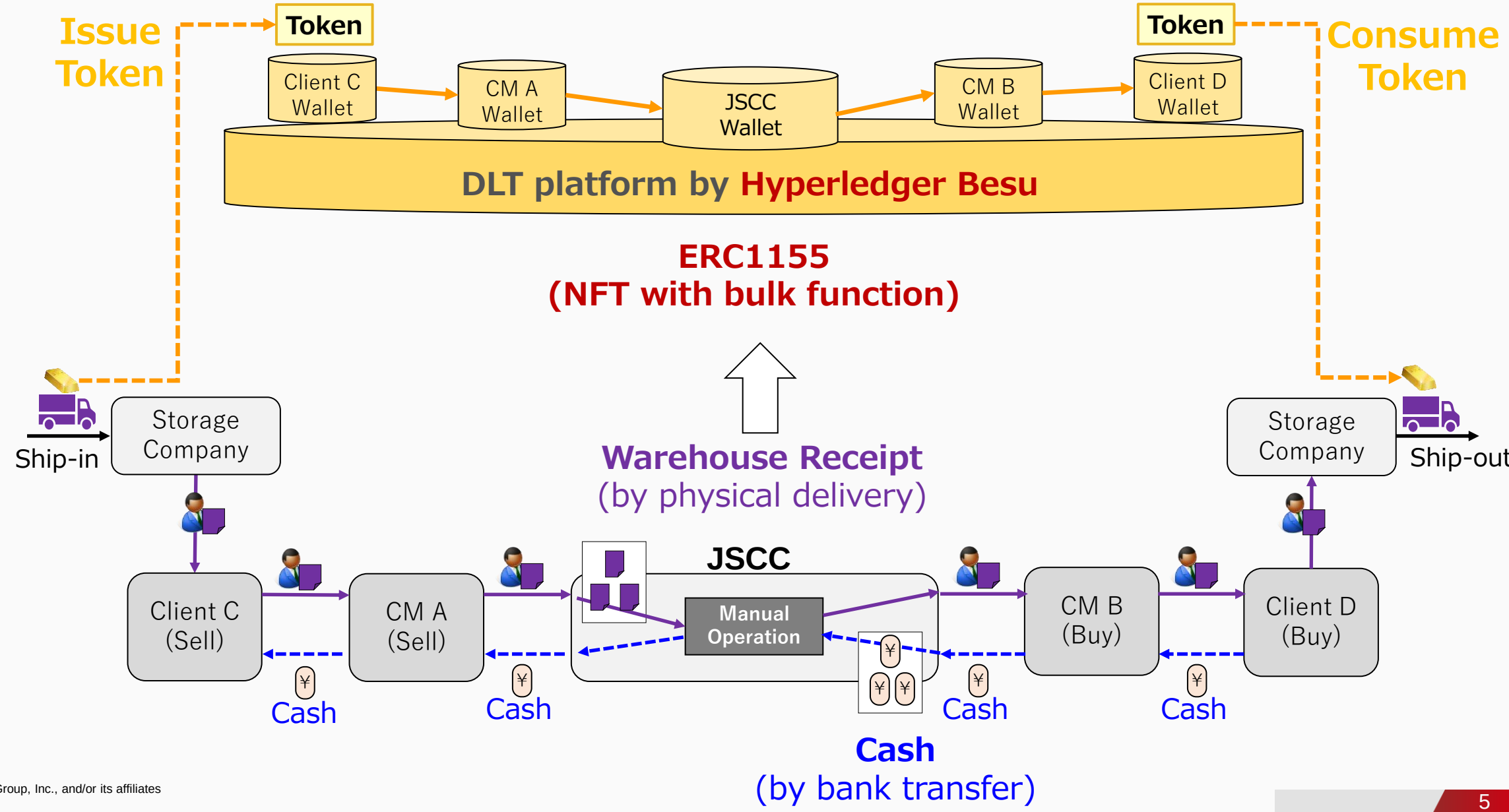
Key Concepts:

① Scope within a narrow area where possible
② Obvious benefit of operational efficiency
③ Physical delivery risk reduced under pandemic circumstances
④ Globally standardized DLT for future expandability
⑤ Quick & low-cost launch

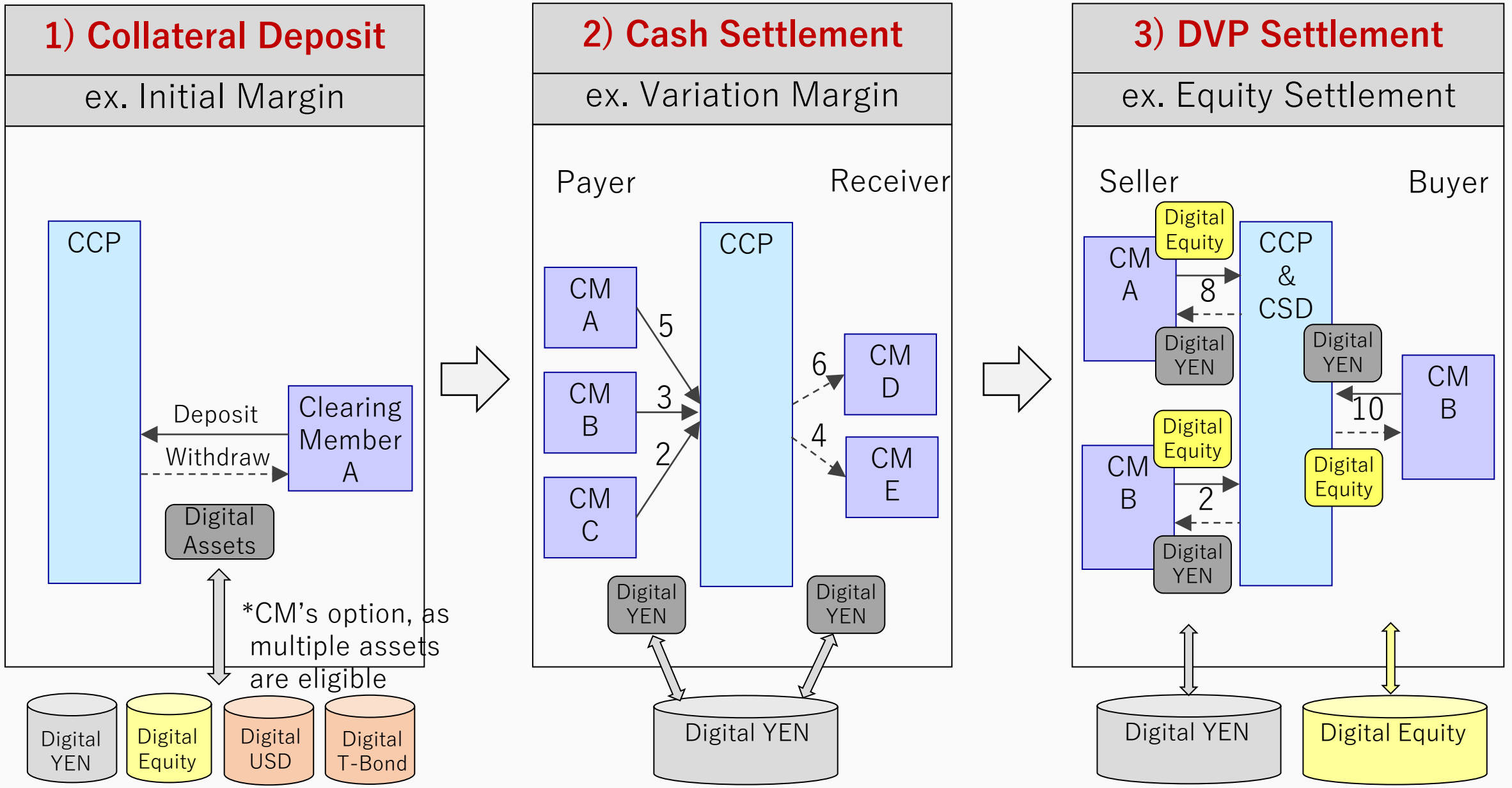
Short-term Vision (The First DLT Production Use - Overview)

TO BE

AS IS



Long-term Vision (Possible digital asset flow at CCP)

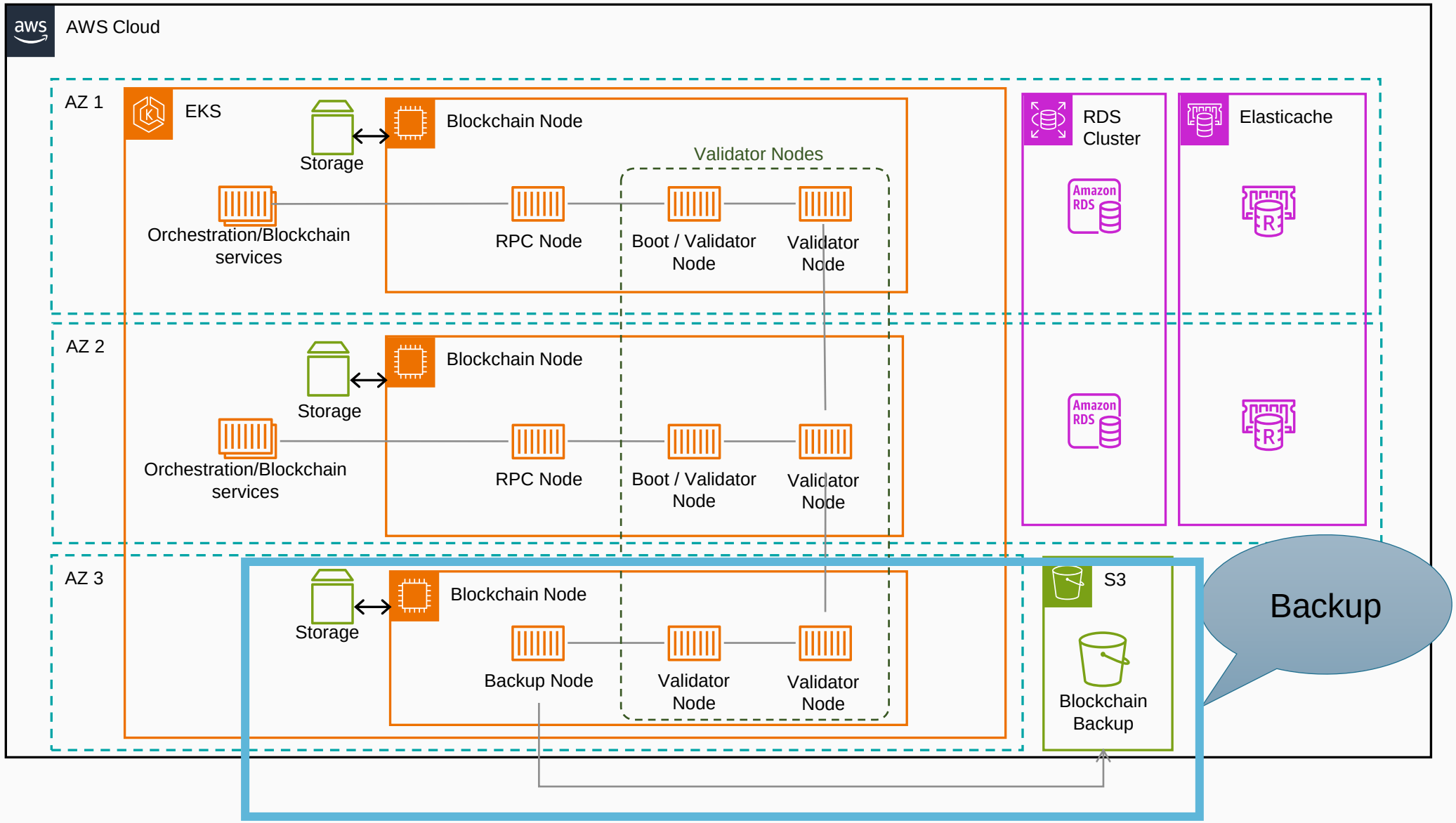


Backup and Token Bulk Processing - Challenges

Non-functional Requirements for backup/bulk upload

- No down time and data loss toleration during failure of any one availability zone
- Backup creation should be seamless and automated.
- Consider future growth of Besu ledger
- Ledger backup data should be secure and not accessible by outside parties
- Bulk processing of up to 50 tokens in a single transaction
- Retention of logs for a minimum of two years
- Recovery time within two hours in case of region failure

Current Besu Architecture – Single Region



Challenges faced with Bulk processing and Backup

- Growth of data in ledger
- Besu read-only node state during backup
- Frequency of backup
- Nonce challenges with Orchestration layer during bulk processing
- Handling the retention of backup files on S3

Disaster Recovery

Our requirements for disaster recovery

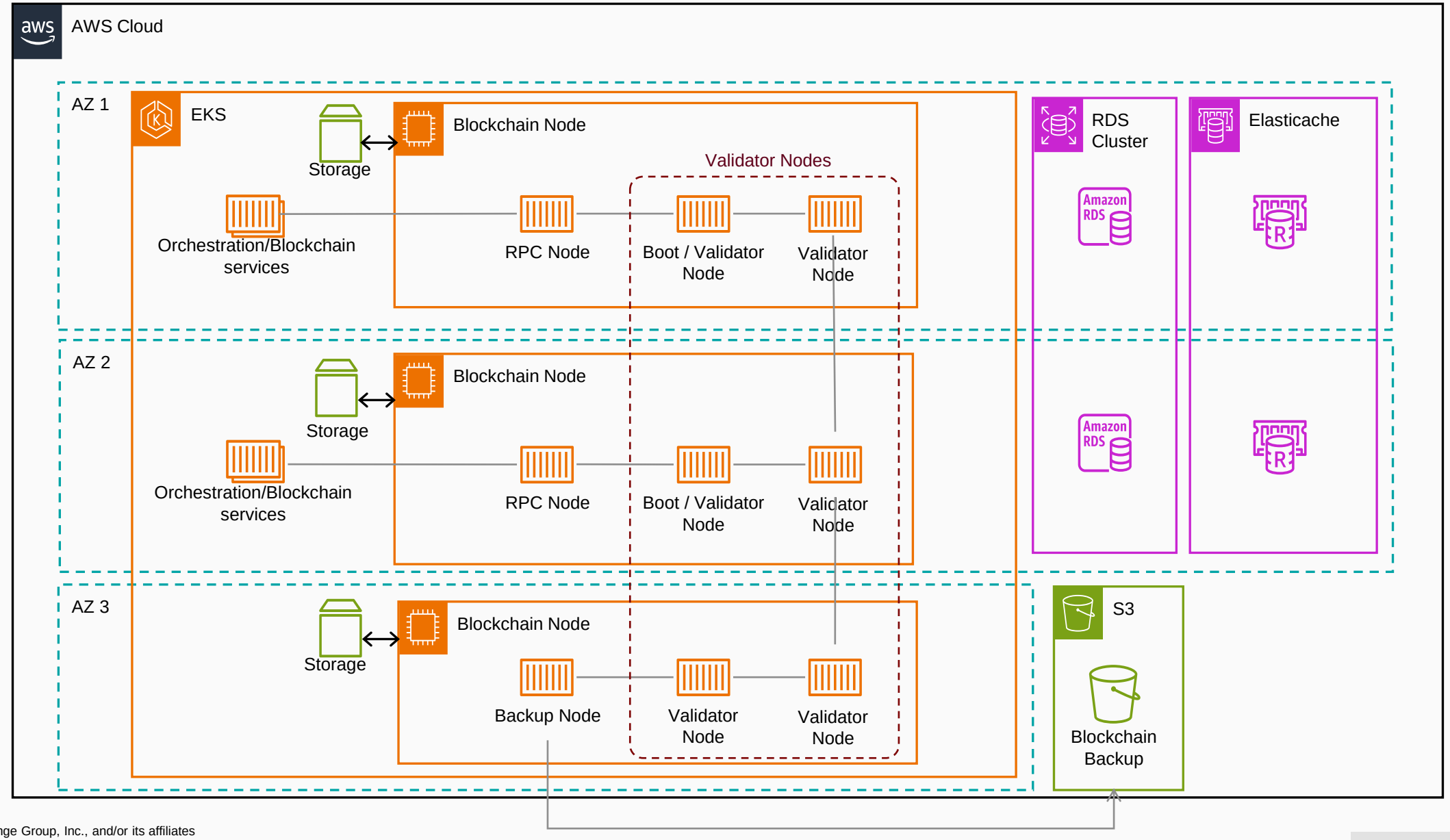
Why implement disaster recovery ?

- Japan is a high-risk zone for natural disasters.
  - Earthquakes, Tsunamis, Typhoons

JSCC Requirements & Policies

- In case of an incident, system recovery needs to be completed within less than 2 hours
- Backup system needs to be in a separate region
- All systems need to be hosted in Japan
  - Authority proof need to be QBFT
  - No gas fee
  - We need to have 2/3 of validators running to have a valid network

Our Architecture



Future Initiatives

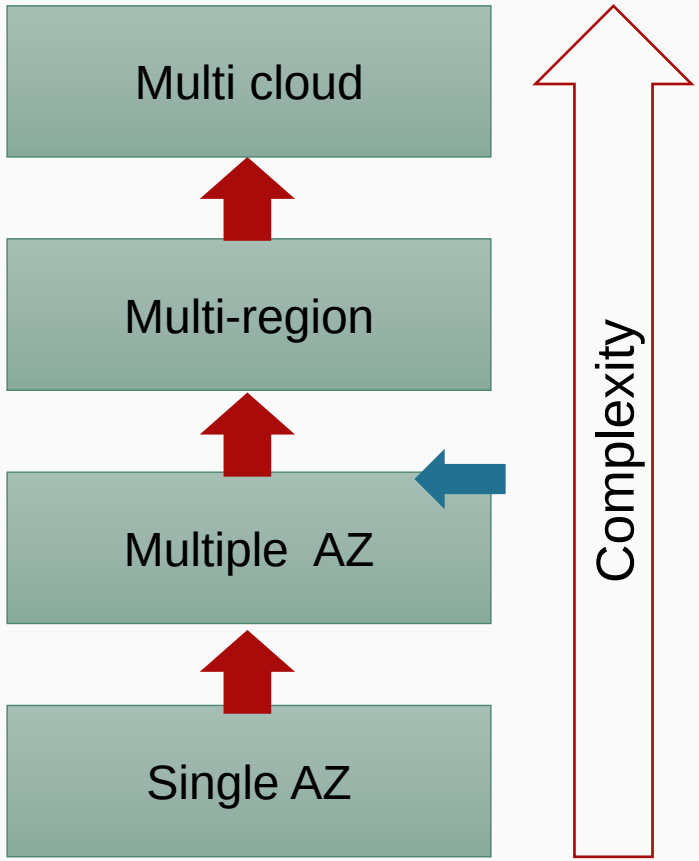
Future Initiatives: multi-region and multi-cloud setup

Why multi-region?

- Minimize data loss in case of entire region failure
- Ability to work with organizations other than JSCC
- Higher resiliency and lower down time

Challenges:

- Secure communication between Besu Nodes
- Latency within Besu nodes spread across multiple clouds
- Integration of cloud specific services.



Future Besu Architecture – Multi Region / Multi Cloud