Overview of CBDC initiatives

*Insights on leading projects & progress status**

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Nov 2020

**Regular updates - Mainland China DC/EP excluded*

1- CBDC: Overview of main initiatives*

*Excluding Mainland China

MAS – Project Ubin

2020-11-18

Strategy	*Multi-currency Blockchain-based RTGS payment system to simplify fund transfers*
Scope	*Full digitization of SGD & Cross-Border transfers*
Stakeholders	*Monetary Authority of Singapore & Temasek [Lead]* *JPMorgan then Consensys from Aug. 2020 [Quorum Platform & technical developments]* *Accenture [Use Cases]*
Technical specificities	*Leverage on Quorum Tech capacities:* • *Use of Quorum Open-Source Platform - based on Ethereum Protocol – to develop the Interbank Network* • *Use of JPM Coin for payment technology (JP Morgan)*
Planning	*Started in November 2016:* • *Phases 1-2: Build technical capabilities for Domestic Payment Network* • *Phases 3-4: Build interoperability to enable DvP & PvP* • *Phase 5: Multi-currency settlements*

Updates

Status: *PoC & Pilots*

Progress	*Probably one of the most advanced & ambitious CBDC project apart from China's DC/EP:* ⇒ *July 2020: Multi-currency settlements PoC successfully completed with 40 participant companies (FIs & non-FIs)* ⇒ *Ready for diversification with 124 Use Cases identified by Accenture in the Financial Industry & beyond (No news since July 2020)*
Modifications in scope	⇒ *Diversification of Use Cases outside Financial Services: Provide services in exchange for value (Media & Advertising), salary payments, account receivables, etc.*

Bank of Thailand (BoT) – Inthanon Project – Wholesale CBDC (1/2)

2020-11-18

Strategy	*Thailand's **Wholesale CBDC project** to set a decentralized RTGS for Thailand's interbank payments based on DLT Technology*
Scope	*Build a DLT-based Real-Time Gross Settlement [RTGS] system for cash, bond, liquidity Management*
Stakeholders	*9 participating Banks: Bangkok Bank / Krungthai / Krungsri / Siam Commercial Bank / HSBC / Standard Chartered / Bank of Ayudhya / Kasikorn bank / Thanachart Bank* *Partnership: R3*
Technical specificities	*Use of Corda DLT Platform*
Planning	*Launched in August 2018:* • *Phase 1: Build a PoC concept around Tokenisation of cash, bonds & automated liquidity provisioning* • *Phase 2: Bond Life Cycle Management, Interbank Repo & Trading, Data Reconciliation & Compliance / Privacy definition*

Updates

Status: *PoC & Live*

Progress

Completed:

⇒ *Phases 1 & 2 PoC successfully completed on time with convincing results*

⇒ *Sept. 10th 2020: Go-Live of Government Savings Bond Platform ["DLT Scripless Bond Project"]: No feedback yet*

Next Steps:

⇒ *July 2020: Start of PoC for Fund Transfers between large corporates (Until end of year) with fast implementation expected if good results*

⇒ *Broaden the scope of Government Bonds (Retail & Wholesale): Dependent on recent Go-Live results*

Modifications in scope

=> Inthanon-LionRock Project [Wholesale]:*

- *Cooperation project with HKMA leveraging on Inthanon's key milestones*
- *Objective: Improve Cross-border settlement efficiency between HKG & Thailand: Fund Transfer, Liquidity Management, Compliance, Privacy, etc.*

*=> It is not clear yet how the **Inthanon project** Wholesale CBDC will evolve regarding what is already Live Vs the recent partnership between BoT & ConsenSys in Sept. 2020 (See hereafter)*

**Inthanon-LionRock Project – See hereafter*

Bank of Thailand (BoT) – Digital Baht (2/2)

2020-11-18

Strategy	*Thailand's newly announced **Retail CBDC project** to complement the Inthanon Project (Wholesale CBDC)*
Scope	*Retail CBDC for Individuals & SMEs [Digital Baht]*
Stakeholders	*Leader: Bank of Thailand (BoT)* *Participating Banks: Not yet disclosed* *Partnership: Consensys, Siam Cement Group/Digital Ventures (DV), Atato (Thai Blockchain Fintech)*
Technical specificities	***Technology** (ConsenSys): Quorum (ETH-based permissioned Blockchain), ERC-20 Smart Contracts, HyperLedger Besu (Software). Implementation with Atato* ***Platform** (DV): Tests to be performed on B2P platform initially developed by DV/Accenture (Procurement solution)* ***Wallet** (ConsenSys): MetaMask Crypto Wallet*
Planning	*No planning disclosed yet*

Updates

Status: *New direction*

Progress	***Next Steps:** To be monitored when Working Groups are more mature*
Modifications in scope	• ***Major strategy shift:** Siam Cement & BoT were already working on a retail CBDC leveraging Corda's platform since Q2 2020* • ***ConsenSys** seems to be taking on APAC since the purchase of Quorum from JP Morgan. The recent partnership with HKMA & long-standing project UBIN with the MAS in Singapore will further push their positioning in Asia in 2021**

**Inthanon-LionRock Project – See hereafter*

Inthanon-LionRock* Project

2020-11-18

	Phase 1	Phase 2
Strategy	*DLT-based corridor for cross-border payments between two Hong Kong & Thailand*	
Scope	***Phase 1** (Original scope): **Wholesale** CBDC for Corporates Cross-border settlements between HK & Thailand ** *	***Phase 2** (From Sept. 2020): Work on a PoC for Cross-Border payments using CBDC between HK & Thailand (No details yet)*
Stakeholders	*Leaders: HKMA & BoT* *2 HK Banks (HSBC / ZA) + 8 Thai Banks* *Partners: R3 / CryptoBLK*	*Leaders: HKMA & BoT* *Participating banks not disclosed yet* *Partnership: ConsenSys / PwC / Forms HK*
Technical specificities	*- Corda platform (R3) implemented with CryptoBLK* *- Report (CH&Co)*	*ConsenSys's Quorum* *Forms HK to support Implementation* *PwC to probably write report*
Planning	*Complete PoC by end of 2019 (Report in January 2020)*	*TBD*

Updates

Status: *PoC*

Progress

Completed:

⇒ *Phase 1: Completion of PoC & report in January 2020 covering Real-Time Cross-Border Settlement tests & Compliance capabilities*

Next Steps:

⇒ *Phase 1: Go-Live of Wholesale Cross-Border Payments by Q4 2020 => TBC?*

⇒ *Phase 2: First workshops to start by end of year (No precisions yet)*

Modifications in scope

⇒ *Strategy shift with the recent partnership HKMA / ConsenSys meaning switching everything from platform to Blockchain solution*

⇒ *Not clear if the scope of work of phase 1 with R3 will be completed or overwritten by Consensys in the project strategy*

**** LionRock Project:** Not detailed here as it was limited to a study on Wholesale CBDC issuance. The initiative took off only when HKMA joined the BoT initiative*

***** Phase 1 Report** main takeaways available in Appendix 2)*

Sveriges Riksbank Sweden – e-Krona

2020-11-18

Strategy

- *Implement a User-friendly & "inclusive" CBDC, that must serve everyone including elderly, disabled*
- *DLT-based RTGS system with a clear preference for a centralized model with private sector intermediaries:*
  - *Central Bank solely authorized to issue/redeem e-Kronor token or add new participants to the Chain*
  - *Private Payment/Service Providers authorized to handle operations (Transactions, platform, etc.) with the above limitations (Still not fully defined – dependent on Pilot)*

Scope

- *Must cover most of financial needs (Deposit, transfers, withdrawals, cross-border remittances, loans)*
- *Access (Mobile App, Smart Watch, Cards & offline solutions to ensure inclusive model)*

Stakeholders

- Accenture: Multi-access Digital Wallet, API & Tech architecture with Central Bank systems

- R3: Corda private-DLT

- Commercial Banks to be involved during the PoC

Technical specificities

Use of Corda DLT Platform incl. the notary node system to avoid duplications of tokens

Planning

1 year-Pilot launched in February 2020 with Accenture:

- *Technology: Build e-Krona architecture (R3) & multi-access user interface (Accenture)*
- *Scope: 1st phase focused on Deposits & transfers*

Updates

Status: *PoC*

Progress

⇒ *Pilot launched in February 2020 to be completed in Feb. 2021 with main objectives:*

- *To validate main functionalities & UX*
- *Ensure security (AML/KYC, security of process)*
- *Validate Performance*

⇒ *Mature approach with the release of a dense report in June 2020 that analyses the needs, challenges & risks associated with CBDC projects incl. experts' detailed views*

⇒ *Cross-Border remittances do not seem to be the core topic for the first phase of the PoC but interoperability is a main concern for Sweden*

Modifications in scope

⇒ *Initial scope quite broad including analysis of future deposit & loan systems with the full adoption of CBDC*

⇒ *Central Bank opened to analyse other innovations such as auto-deposits & transfers and other non-financial services depending on the results of the current PoC*

Bank of Canada – CBDC Initiative

2020-11-18

Strategy	*Retail CBDC*
Scope	*Retail CBDC with Central Bank opened to P2P & P2B transaction schemes* *4 Conditions: Universal, free, high-level of privacy, possibility of offline transfers*
Stakeholders	*Bank of Canada (Internal Working Group & Project Team)* *In parallel, BoC shares views & progress with BIS* dedicated Working Group (See Appendix)*
Technical specificities	*DLT-based [Technology not yet defined]*
Planning	*Official project launched in summer 2020 with the setup of a dedicated project team to work on the conception and pilot program [3 year timeline]*

Updates

Status: *Project initiation*

Progress	⇒ *Recent launch of the CBDC Project Team (Members recruited in June) with the objective to design & test a Retail CBDC respecting the guidelines and directions formalized by the Bank of Canada since Feb. 2020* ⇒ *Bank of Canada seems to be willing to move fast & then actively joins global working groups, esp. as they fear to be outpaced by other CBDCs that may interfere in their monetary system (Currency dominance risk)*
Modifications in scope	

** See Appendix for summary of 1st BIS Report on CBDC*

Bank of Japan [BoJ] – Digital Yen

Strategy	*Improve efficiency of transactions & competitiveness of the Japanese Yen*
Scope	*Fund transfers, P2P payments, Interoperability with Private Digital Currencies & other nations' CBDCs*
Stakeholders	*Bank of Japan [Working Group Participants not disclosed, but probably major FIs of the country]*
Technical specificities	*Early stage Working Groups*
Planning	*No planning to launch a CBDC*

2020-11-18

Updates

Status: *Working group*

Progress

⇒ *July 2020: Announcement that the BoJ is boosting its CBDC Working Group efforts and wishes to perform tests, without giving further details on implementation timeline*

⇒ *January 2020: BoJ joined Working Group with the EU, Canada, UK, Sweden, Switzerland to cooperate on interoperability of CBDCs & Privacy/Compliance issues**

⇒ *Oct. 2020: Announcements on next steps:*
- *Basic tests (Issuance / Distribution) will be performed from April 2021*
- *Preference for an indirect distribution model via commercial banks instead of direct BoJ distribution of Digital Yen*

Modifications in scope

⇒ *Contradictory messages from the BoJ that showed little interest for CBDC re. Japanese economy in Dec. 2019, then now rushes efforts probably due to the fast progress of other nations, esp. China's Digital Yuan*

** See Appendix for summary of 1st BIS Report on CBDC*

Fed USA – Digital Dollar

2020-11-18

Strategy	*Establish a Retail CBDC strategy to protect the position of the US Dollar regarding International competition from other Central Banks, Financial Institutions & Tech actors*
Scope	*- Domestic, cross-border & Government benefits payments* *- P2P payments*
Stakeholders	*- Fed: Different branches of the Fed have organized working groups to analyse Use cases to push* *- Accenture/Digital Dollar foundation (DDF): Whitepaper of guidelines for the Digital USD*
Technical specificities	*Probably Token-based* Private DLT handled by Fed [Nothing defined yet: Propositions will have to be validated by the Congress]*
Planning	*- No clear timeline defined: Congress approval of Whitepaper necessary before starting operational implementation (Painful process)* *- Stakeholders of Working Groups suggest 5-10 year timeline for implementation regarding the sensitive role of the USD in international trade & financial system*

Updates

Status: *Early stage*

Progress

⇒ *Slow process with Congress representatives quite skeptical about the necessity to issue CBDC*

⇒ *…But ongoing local working groups in parallel:*

- *June 2020: Publication of Whitepaper urging for a move on CBDC implementation (DDF)*
- *August 2020: Announcement of cooperation program between the Fed NY & the Bank of International Settlements (BIS) "Innovation Center Lab" to accelerate the launch of a pilot*
- *August 2020: Cooperation between Fed Boston & the MIT to assess the best technical solutions for a CBDC (Most advanced research work)*

⇒ *Oct. 2020: J. Powell clarified the FED view: "Issue a CBDC but not hurry the process"*

Modifications in scope

⇒ *Sept. 2020: Currently actively analyzing the possibility of direct distribution of Digital $ to US citizens w/o commercial banks intermediation (Not defined though)*

** As opposed to Account-based approach*

European Central Bank [ECB] - Digital EUR

2020-11-18

Strategy	*Still to be defined (Dedicated Task-Force by ECB and EU-members' Central Banks)*
Scope	*- Wholesale CBDC preferred to Retail model [TBC] … - …because, the EU Zone already has an efficient & integrated payment system making it difficult to find added value for retail CBDC (SEPA, DSP2 regulations etc.)*
Stakeholders	*EU Members' Central Banks*
Technical specificities	*Not yet defined*
Planning	*Not yet defined*

Updates

Status: *Slow progress*

Progress

⇒ *May 2020: Launch of working Groups between ECB & EU members' Central Banks to analyse Retail CBDC's concerns (Risks/Compliance/Legal)*

⇒ *In parallel, Working Group Program by French Central Bank [April 2020] to brainstorm on CBDC applications with a focus on 3 areas:*

1. *Payments against other CBDCs*
2. *Payments against Digital Assets*
3. *Payments against Financial Instruments*

⇒ *Oct. 2020: ConsenSys joins Working Group with SG Forge among others*

Modifications in scope

Sept. 2020: ECB Seems to confirm the focus on a Wholesale CBDC arguing that Blockchain technology may not be necessary for retail exchanges as the Euro Zone already has a mature, efficient & secured system

Nov. 2020: ECB announces the publication of report in January 2021 with potential shift to a Retail Digital EUR (2-4 years implementation timeline) - TBC

Bank of England [BoE] – CBDC project

2020-11-18

Strategy	*Offer new payment facilities along with exiting ones (Cash, etc.)*
Scope	*Work in progress (Use of DLT, Retail or Wholesale CBDC: Still unclear at this stage)*
Stakeholders	*Bank of England* *Private sector solicited along with other Central Banks (BoJ, BoC, etc.) for joint Working Groups*
Technical specificities	*Not yet defined*
Planning	*Not yet defined*

Updates

Status *Late start*

Progress	*As of Oct. 2020: Still not decided whether BoE will issue a CBDC or not* *Working Group still ongoing to define strategy => BoE is a late starter that will have to keep up with other more advanced initiatives if willing to*
Modifications in scope	*Still being defined*

2- Other CBDC initiatives & StableCoins

Other initiatives to be monitored

2020-11-18

Central Bank of the Bahamas	*"Sand Dollar" retail CBDC to allow universal access to payments with below main features:* *- 1:1 with BSD which is pegged to the USD* *- Offline Capabilities (allow users to make a pre-set dollar value of payments when communications access to the Sand Dollar Network are disrupted)* *- Does not pay interest & domestic-only use*	**Progress**	***Launched on Oct. 20th*** *becoming de facto the 1st live retail CBDC in the world*	
Bakong	*Bank of Cambodia CBDC project: "Digital Wallet"* *- Tokenisation of Commercial Banks' deposits (Riel / USD)* *- Objectives: 1- Financial inclusion (Mobile-based, easy access) 2- Progressively decrease use of USD 3- Adopt a RTGS DLT-based system that did not exist yet* *- Partnerships: Soramitsu Blockchain firm, HyperLedger for tech platform* *- Each wallet linked to Commercial Banks. Users send money via QR Code or Phone Number*	**Progress**	***Launched on Oct. 28th*** *for a trial period. Will be issued by Partner institutions in Cambodia*	
Bank of Korea	*CBDC working groups launched quite late (Not yet decided on whether or not to issue a CBDC)*	**Progress**	*Getting started in March 2020 => End of 2021* *Oct. 2020: announcement of partnership with Klaytn (Korean Fintech)*	
BSP Philippines	*Also late actor (Potentially no implementation before 2023 minimum: Prudent approach)*	**Progress**	*Working Group set in July (Slow progress)* *Probably no outcome before next year*	
xxx	*xx*	**Progress**	*xxx*	

Central Bank of Uruguay – e-Peso

2020-11-17

Strategy	***Digital Currency Project*** *to address currency stability issues in the region & improve financial inclusion*
Scope	*Individuals & Corporates* *Online/Offline with possibility for P2P transactions*
Stakeholders	*Antel (State-Owned Telecom): Operator* *Giori: e-Peso creation & management* *InSwitch: MTS e-wallet for end-users* *RedPagos: Transactions, fund transfers*
Technical specificities	*"Digital" Money more than Cryptocurrency as it is not based on Blockchain protocol, which was on purpose originally to enable easy offline access and then enhance inclusiveness*
Planning	*6-month pilot [Nov. 2017-Apr. 2018]:* • *Launch of a PoC with Individuals & Corporates to test account opening & transfers*

Updates

Status *On-hold*

Progress	⇒ *As of today: although Uruguay was among the first movers, no official announcement has been made since the end of the pilot in 2018*
Modifications in scope	⇒ *Delay due to strategy shift ? The progress of CBDC working groups may have influenced Uruguay central bank to adopt DLT-approach*

JP Morgan – JPM Coin

2020-11-18

Strategy	*Enable Real-Time settlements of irrevocable transactions using a Digital Asset backed by USD*
Scope	*Wholesale CBDC for Corporate Clients of the bank (1st step)*
Stakeholders	*JP Morgan (Owner)* *Consensys (Tech & Business Partner)*
Technical specificities*	*Architecture: Permissioned Blockchain built on Quorum (now owned by Consensys) using Go-Ethereum Protocol*
Planning	*Project officially launched in Feb. 2019* *⇒ 1st phase: PoC using JPM Coin for securities, commodities & bond exchanges with some large corporate clients in Europe, US & Japan*

Updates

Status *JPM Coin Live*
Quorum applications thriving

Progress

JPM Coin Progress:

- *⇒ Discreet Live with 1st Big Corporate clients [Oct. 2020]*
- *⇒ Creation of Onyx BU dedicated to Blockchain projects*
- *⇒ Next steps: No plan to widen to retail clients so far, but project to digitize paper checks using Blockchain*

Quorum developments:

- *⇒ INN (Interbank Information Network - with 344 financial participating institutions) renamed Liink (Oct. 2020) and ready to be used as part of payment validation protocol*
- *⇒ Aug. 2020: Consensys officially completes acquisition of Quorum with JP Morgan taking an important stake in Consensys [Cross-strategy announcement expected in Q4 2020]: JPM Coin still based on Quorum*

Modifications in scope

Leverage on "Consensys Quorum" platform to develop blockchain-based financial services:

- *⇒ Offer technical capabilities to various financial institutions (banks & even beyond FIs)*
- *⇒ Furthermore, Consensys Quorum is already involved in CBDC initiatives: Ubin (SGP), Inthanon-LionRock (HKG/Thailand), Khokha (South Africa)*

**JPM Coin original Model available in Appendix*

Facebook – LIBRA*

2020-11-18

Strategy	*Leverage on the extended customer base of Facebook to create a worldwide payment ecosystem & community*
Scope	- *Priority given to cross-border payments* - *Then, overall scope to be defined to develop a whole set of financial services*
Stakeholders	*Even though the* Libra *is a Facebook initiative, the Governance is shared among the Corporate members of the Libra Association headquarted in Switzerland (Neutrality)*
Technical specificities*	- *Libra is a Stablecoin backed by real assets (Bank deposits, stable currencies: €, $, etc.)* - *Calibra is the Digital Wallet that enables users to store Libra & personal data (Facebook Technology)* - *FastPay is the payment protocol (Facebook Technology)*
Planning	*Libra is a digital asset initiated by Facebook in 2019. The detailed timeline has still to be defined by the members of the Libra Association*

Updates

Status *Unclear*

Progress	*Latest developments:* ⇒ *Mitigated: Sept. 2020 saw one of Libra's Co-founder leave the project but also Blockchain Capital (Major Blockchain VC) join the Libra Association* ⇒ *1st half of 2020: Influent members left the initiative (Ebay, Stripe, Visa, MatserCard, etc.)* ⇒ *Defiance towards Calibra run by Facebook for the 1st phase of the project questioning the independence of the wallet*
Modifications in scope	⇒ *Project scaled back due to Governance issues, regulatory hurdles & growing Governments' demands to weight more in the project* ⇒ *Unsecured future with more & more governments developing own CBDC projects to counter Libra development* ⇒ *Potential to use FastPay payment protocol for other Stablecoin/CBDC projects? - TBD*

**Libra Model available in Appendix*

3- Appendix

1. Key takeaways from BIS first CBDC Report – Oct. 2020
2. Inthanon-LionRock Wholesale CBDC – Project Report Summary
3. Libra high-level Model
4. JPM Coin description

1- Key takeaways from BIS 1st CBDC Report – Oct. 2020 (1/2)

Objective	*Define Key Principles, Main Risks & core features of a CBDC*
Scope	*Retail CBDC (Domestic & Cross-Border)* *Methodology: Working Groups*
Stakeholders	• *Central Banks: Bank of Canada / ECB / BoJ / Sveriges Riksbank / Swiss National Bank / BoE / Board of Governors of FEDs* • *Bank of International Settlements (BIS)*
Summary	*None of the above Central Banks have decided whether or not to issue a CBDC, but they have already defined 3 core principles for a CBDC:* *1- Should not endanger financial stability* *2- Co-exist with other forms of money* *3- Promote innovation & efficiency*
Planning	• *1st report of a series of regular reports and views* • *Part of G20 working group preparation*

Identified motivations & Risks for payment functionalities*

Continuity	*Continuous access (Anywhere / Anytime)*
Resilience	*- Easy to distribute in remote or disaster areas* *- Offline capability should be a basic feature* *- Cybersecurity Risk (Counterfeiting a CBDC will spread faster & impact higher volume than cash)*
Payment Diversity	*Interoperability with other forms of money*
Financial Inclusion	*Accessible for all (offline, illiterate, etc.)*
Cross-Border payments	*- Interoperability of CBDCs is a priority* *- The report points some models (from use of national CBDC to full system interoperability)* *- The priority may be to reinforce international standards (ISO-20022) for CBDC context*
Data Privacy	*Full anonymity is not an option for obvious AML/CFT reasons, however data access must be controlled strictly (Who, what circumstances, etc.)*
Fiscal transfers	*CBDC linked to Digital Identity to facilitate Gvt support to Business (Covid, disasters, etc.)*

**Analysis also of Monetary Policies, sovereignty and Financial Stability problematics but reflexion not yet finalized*

1- Key takeaways from BIS first CBDC Report – Oct. 2020 (2/2)

Instrument Features	**Convertible**	To maintain singleness of the currency a CBDC should exchange at par with cash and private money.
	Convenient	CBDC payments should be as easy as using cash, tapping with a card or scanning a mobile phone to encourage adoption and accessibility.
	Accepted and available	A CBDC should be usable in many of the same types of transactions as cash, including point of sale and person-to-person. This will include some ability to make offline transactions (possibly for limited periods and up to predetermined thresholds).
	Low Cost	CBDC payments should be at very low or no cost to end users, who should also face minimal requirements for technological investment.
System Features	Secure	Both the infrastructure and participants of a CBDC system should be extremely resistant to cyber attacks and other threats. This should also include ensuring effective protection from counterfeiting.
	Instant	Instant or near-instant final settlement should be available to end users of the system.
	Resilient	A CBDC system should be extremely resilient to operational failure and disruptions, natural disasters, electrical outages and other issues. There should be some ability for end users to make offline payments if network connections are unavailable.
	Available	End users of the system should be able to make payments 24/7/365.
	Throughput	The system should be able to process a very high number of transactions.
	Scalable	To accommodate the potential for large future volumes, a CBDC system should be able to expand.
	Interoperable	The system needs to offer sufficient interaction mechanisms with private sector digital payment systems and arrangements to allow easy flow of funds between systems.
	Flexible & adaptable	A CBDC system should be flexible and adaptable to changing conditions and policy imperatives.
Institutional features	Robust Legal Framework	A central bank should have clear authority underpinning its issuance of a CBDC.
	Standards	A CBDC system (infrastructure and participating entities) will need to conform to the appropriate regulatory standards (eg entities offering transfer, storage or custody of CBDC should be held to equivalent regulatory and prudential standards as firms

2- Inthanon-LionRock Wholesale CBDC – Phase 2 (1/3)

- ***HKMA** (Hong Kong Monetary Authority) & **BOT** (Bank of Thailand) have worked together to leverage on DLT to increase efficiency of cross-border transactions between both jurisdictions*

Objectives

1- Implement Real-Time Cross-Border Settlements

2- Simplify Liquidity Management

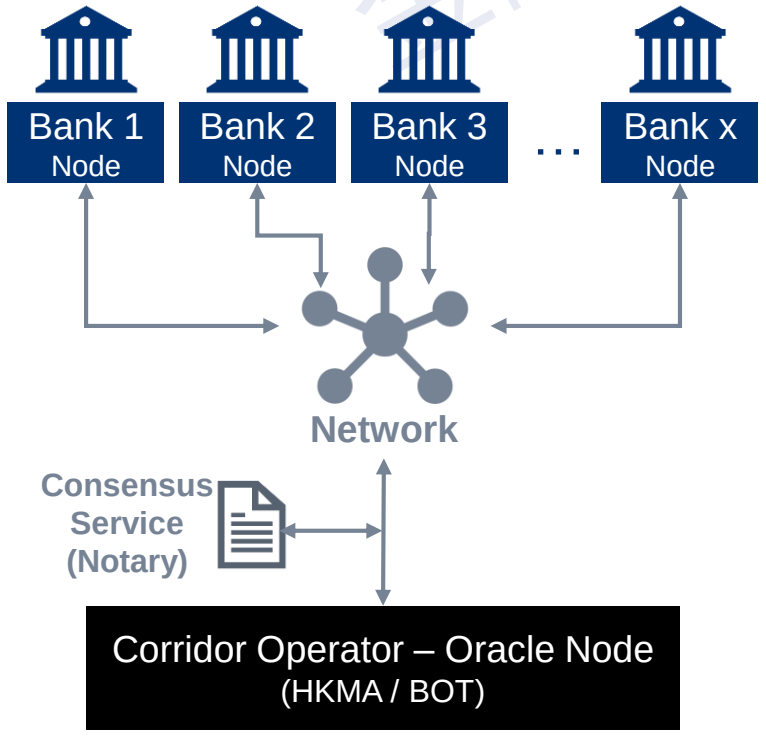
3- Provide Real-Time Compliance reports to improve traceability for the regulator's oversight

Methodology

- **Corridor network Model:** Dedicated Cross-Border transactions' corridor separated from domestic settlement system
- Creation of a **W-CBDC** [Wholesale-CBDC]

separated the cross-border transaction and domestic transaction

Model implemented for the PoC*



***11 participating banks** incl. HSBC, Standard Chartered, ZA (HK), Bangkok Bank, etc.*

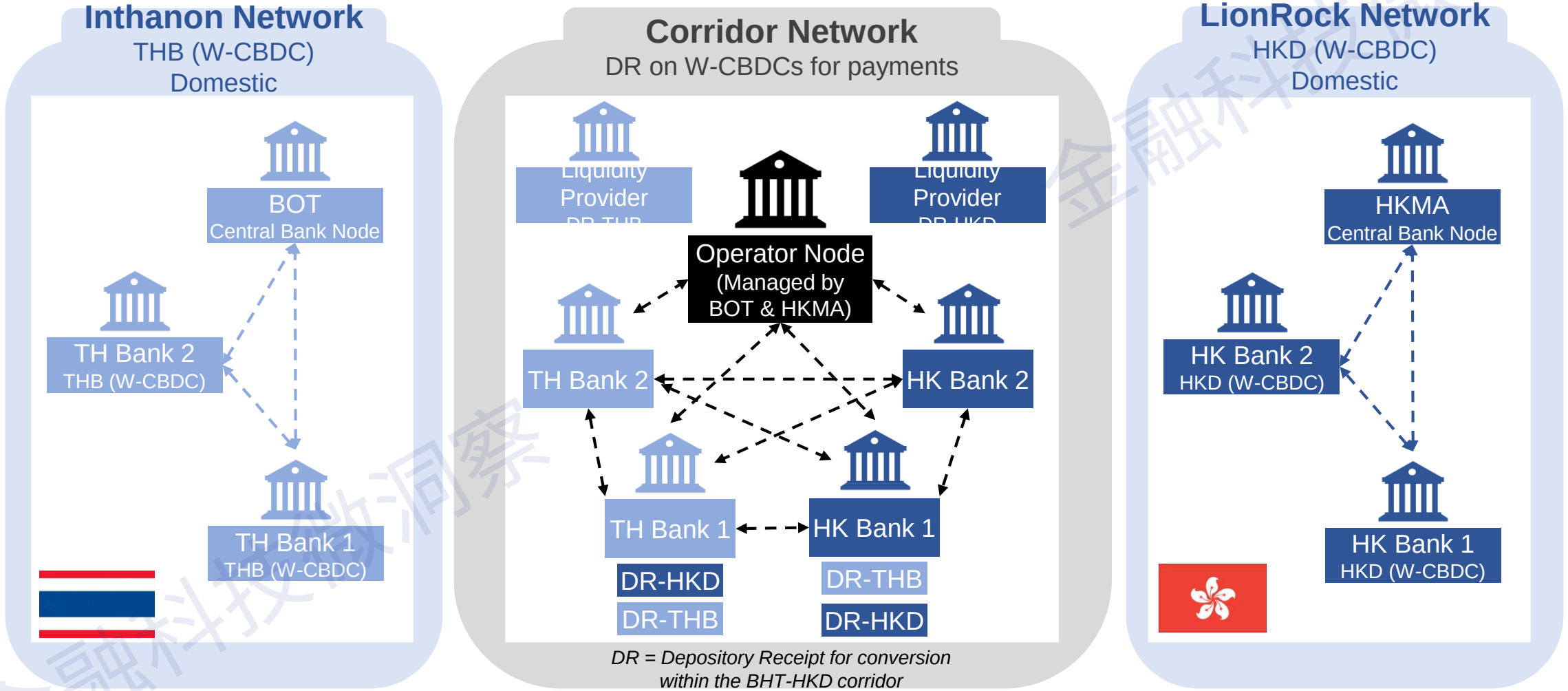
***R3** for the Technology (Corda Platform) & User Interface*

***BOT & HKMA**: Node Masters, oversee Tokens, conversions, provides liquidity, etc.*

**Source: Inthanon-LionRock Project - 2019 Report*

2- Inthanon-LionRock Wholesale CBDC – Phase 2 (2/3)

- ***Operating Model of the Corridor Network*:***



Source: Inthanon-LionRock Project - 2019 Report

2- Inthanon-LionRock Wholesale CBDC – Phase 2 (3/3)

- ***Key principles of the Inthanon-LionRock Corridor Network*:***

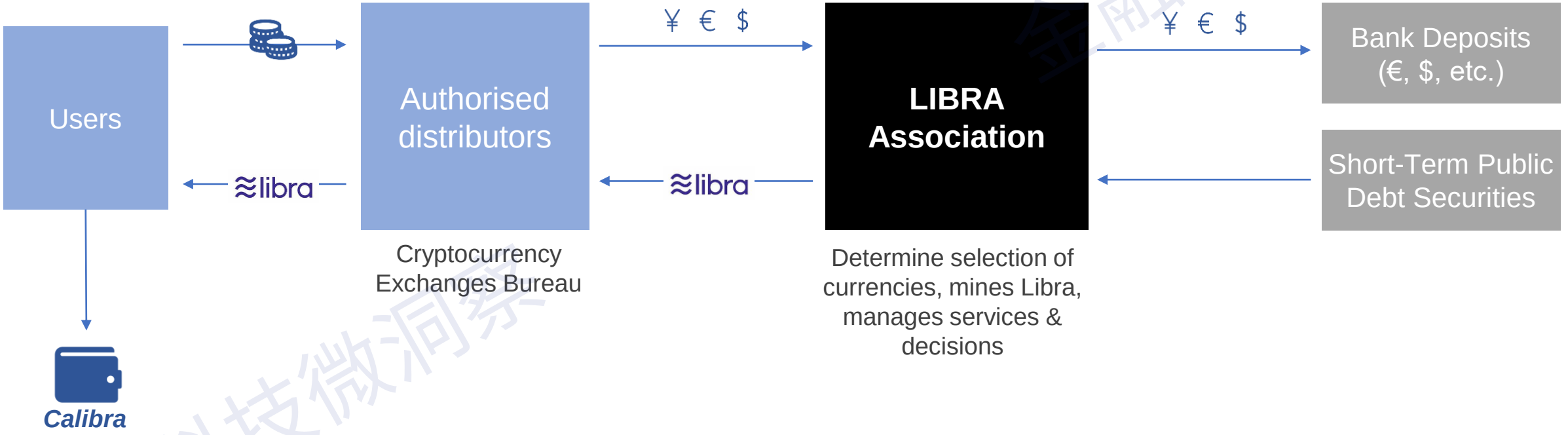
DR 存托凭证

DR Conversion	• On-demand process with banks requesting a number of tokens to be converted from W-CBDC to DR in the corridor network by the Central Bank (Control the amount of DR)
Cross-Border Fund Transfer	• As payments in both DR-LCY (Local Currency) and DR-FCY (Foreign Currency) are allowed in the corridor network, banks are able to transfer DR tokens to other banks in 3 possible scenarios: 1- Send DR-LCY funds to foreign bank, 2- Send DR-FCY to another local Bank, 3- Send DR-FCY funds to a foreign bank
Fund Transfer with embedded FX Execution	• FX conversions are performed on the platform, then FX transaction & fund transfer are executed simultaneously on the Corridor once the rate is known
Liquidity Management	• Netting solution: Queueing mechanism & transfer between participants in case of gridlock in the corridor network => when a bank doesn't have sufficient DR-xxx for the transaction • Just-in-Time liquidity: To resolve a deadlock (no netting solution)
Regulatory Compliance	• Real-Time monitoring: View on the whole process & reporting at any time (Of local & Corridor RTGS) for all kinds of transactions • Compliance with Local Regulation (Tracking of off-corridor arrangements, daily limits, etc.)

**Source: Inthanon-LionRock Project - 2019 Report*

3- Facebook – Libra Model

- ***High-Level Model of Facebook Libra***

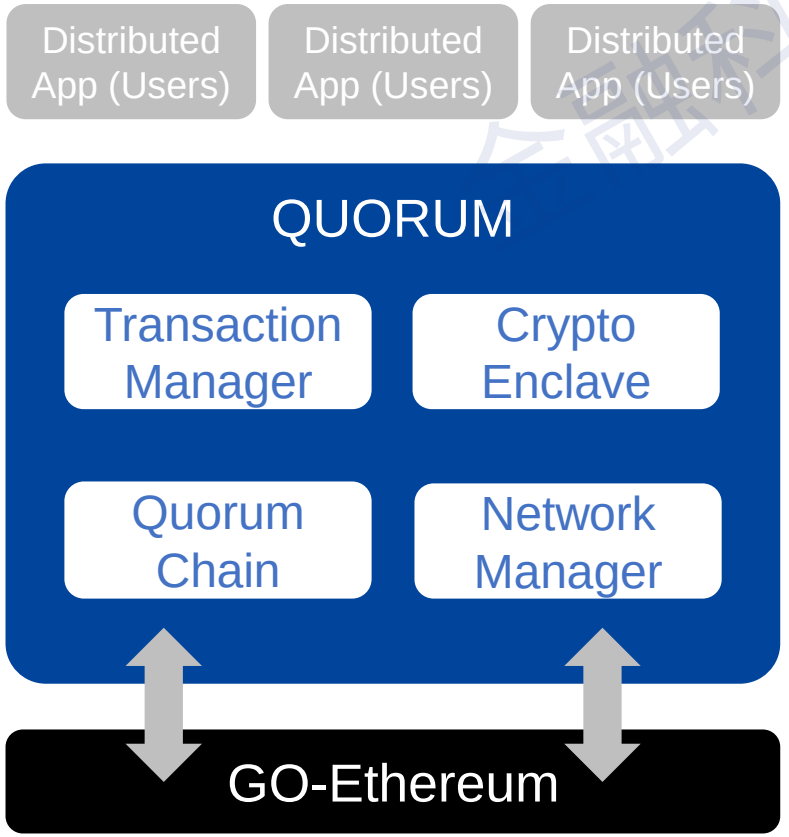


4- JPM Coin basic concept (1/5)

Foreword on JPM Coin

- **Stablecoin** which value is backed by USD (1 JPM = 1 USD)
- **Objective:** Enable Real-Time settlements of irrevocable transactions (Speed & security)
- **Architecture:** Permissioned Blockchain built on Quorum (Internal tool) using Ethereum Protocol
- **Target:** Large corporates (1st phase)
- **Launch:** 2020 *(Still on development phase as of April 2020)*

Quorum Architecture



Transaction Manager: *Controls access to encrypted data for private transactions, local data store & communication with other Transaction Managers.*

Crypto Enclave: *User Private Key Management.*

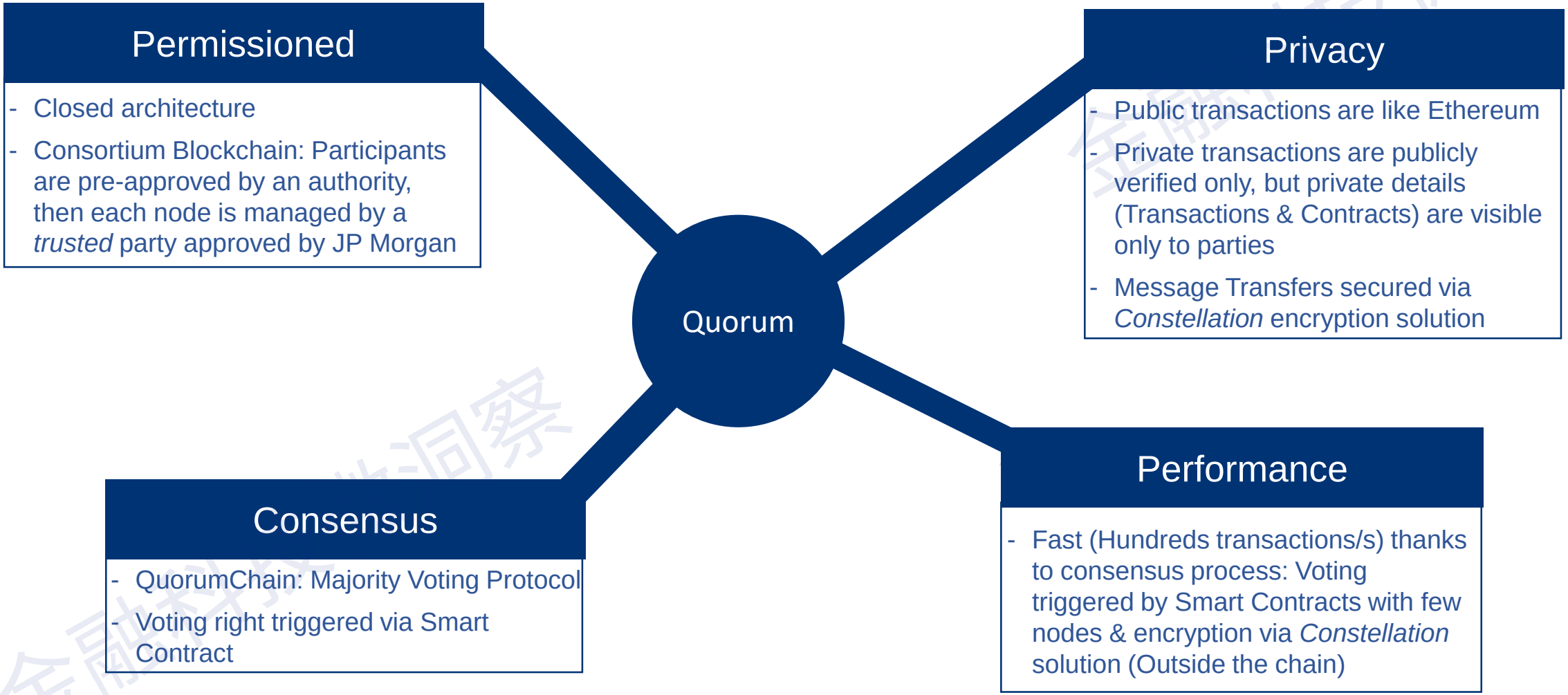
QuorumChain: *Voting-based, BFT-Hardened* consensus mechanism using Ethereum to verify & propagate votes through network.*

Network Manager: *Controls access to network.*

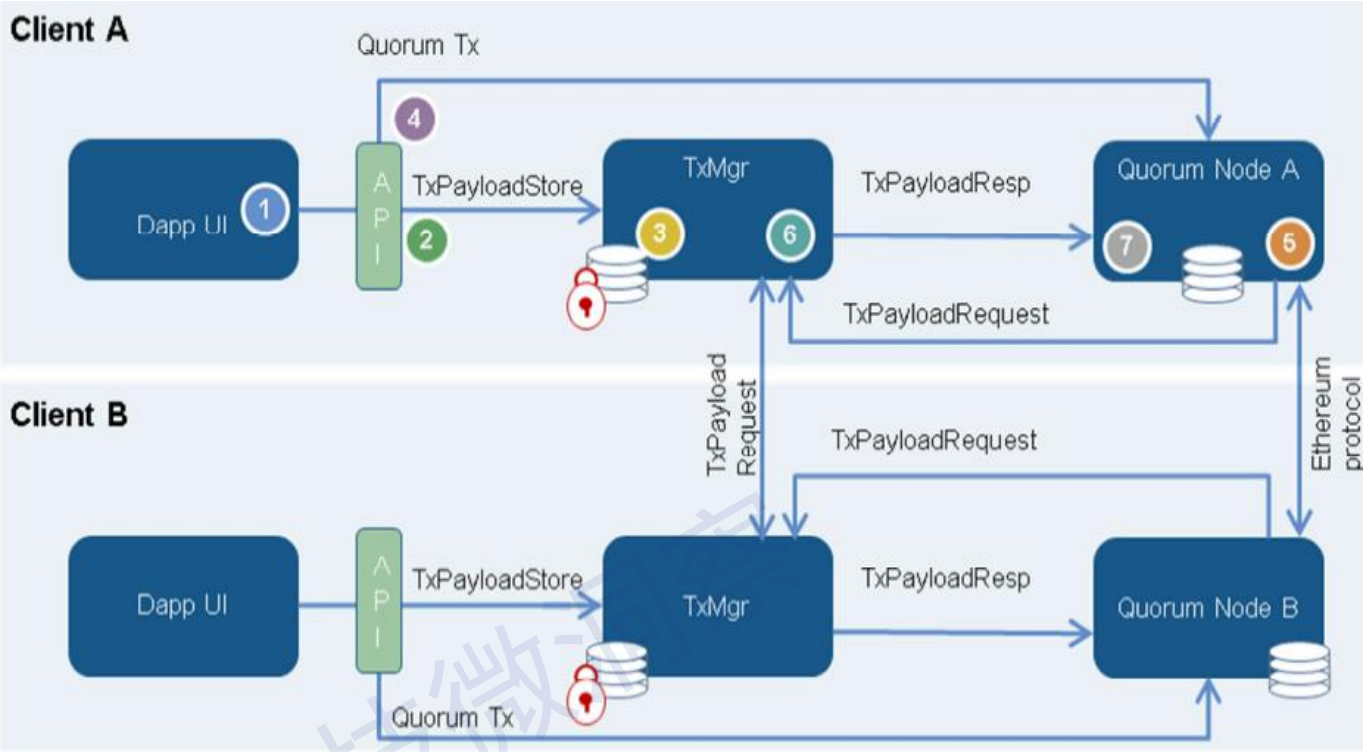
**BFT (Byzantine Fault Tolerant) consensus mechanism highlights traitor nodes. The traitor (which is a flaky or malicious node) sends conflicting messages, leading to an incorrect result of the calculation that the distributed system is trying to perform*

4- Go-Ethereum Protocol (2/5)

- ***Quorum is built on Ethereum Protocol with four main distinctions:***



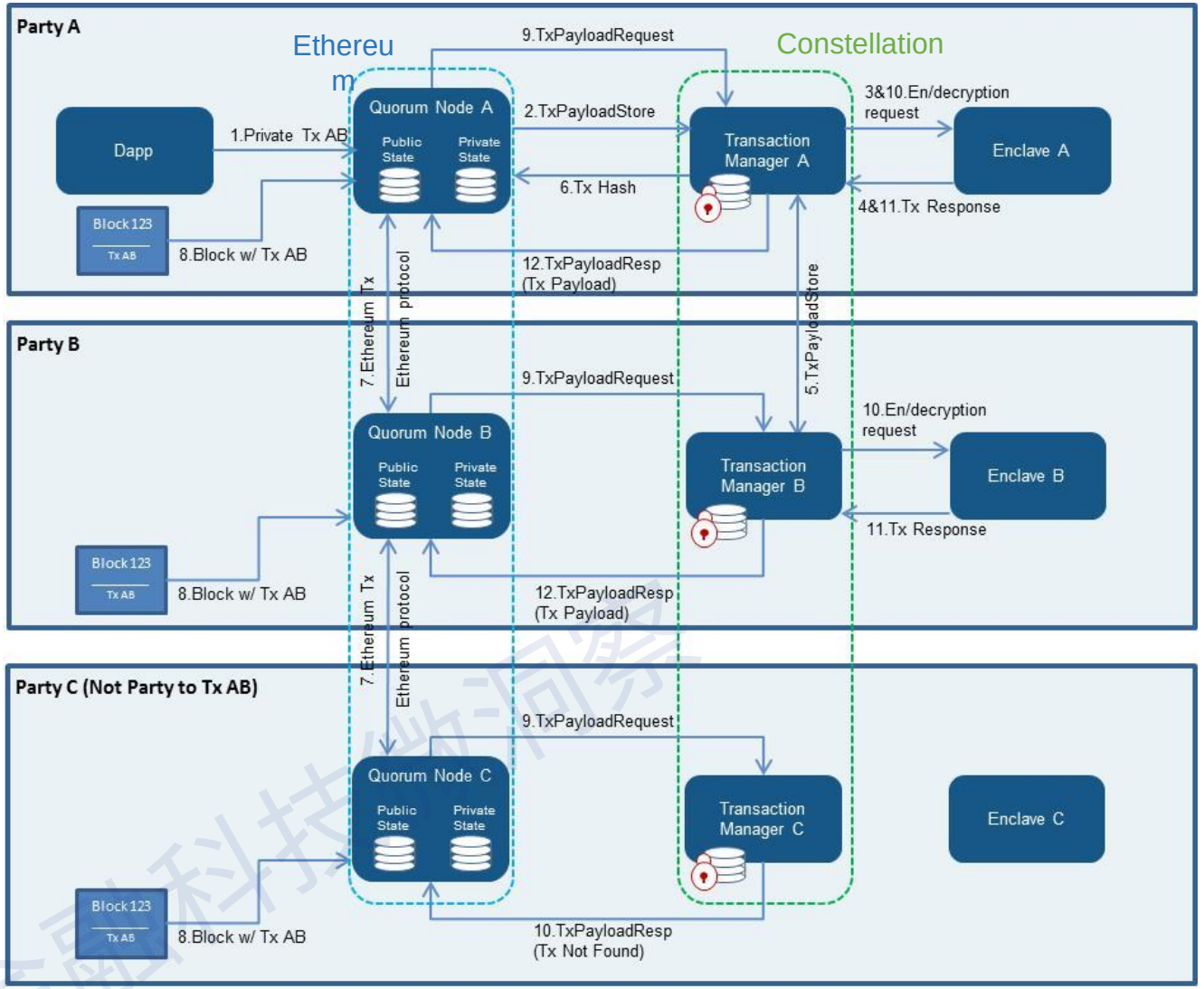
4- Smart Contract illustration* (3/5)



1. *User sends transaction to Quorum Node specifying recipient & transaction payload*
2. *Preparation of transaction Payload Record by generating a symmetric key to encrypt the payload, then links it to the Transactions' parties Public Keys, and finally sends it to the Transaction Manager for storage*
3. *Transaction Manager validates & stores the Transaction payload message*
4. *Transaction sent to Quorum Node with only the hash of the encrypted payload (Generated Step 2)*
5. *Quorum Node receives a new block for validation, then requests the payload data from Transaction Manager*
6. *Transaction Manager validates signature, looks at the transaction hash, checks if the requester is a party to the Tx, then returns encrypted payload & the Symmetric Key*
7. *Quorum Node decrypts the Symmetric Key, the transaction payload, then sends it for execution of the contract*

*Source: GitHub

4- Quorum's Transaction Process* (4/5)



*The nodes of the **parties A & B** (Involved in the transaction) get all the necessary information to complete the transaction*

*The **Party C** is not part of the transaction, and then is only part of the voting-based consensus*

**Source: Stack Exchange*

4- JPM Coin – Stablecoin analysis (5/5)

- ***JPM Coin offers great benefits for domestic & cross-border payments, however as it is still at a project phase, financial institutions will have to closely follow its operational implementation***

Pros

+ Meet most of Banks' requirements for Privacy, security, audit & controls (Financial institutions are still less willing to join public blockchains)
+ Fast protocol
+ Stablecoin backed by USD and a global bank compliant with global regulations
+ Easy plug-in to Quorum Blockchain
+ Evolutive platform based on Ethereum

Cons

- Efficiency relying strongly on the closed loop protocols potentially difficult to maintain with a wider group of users
- Need to diversify assets backing the JPM Coin (Not a blocking point as the platform is asset-agnostic, USD was the preferred choice for the 1st phase of the project)
- Questions about the need for a Blockchain technology to ensure Real-Time Settlements
- Currently targeting only big corporates

THANKS

WeInsights