

Retail DFC

Architecture Options and Use Cases
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Current DFC landscape

- ✓ 22 central banks see themselves “probable” to “very likely” to issue digital fiat currency in the next 5 years (*)
- ✓ Ongoing tenders from Sweden to South Africa
- ✓ The wave is building (partially due to the efforts of this group)

"I believe we should consider the possibility to issue digital currency. There may be a role for the state to supply money to the digital economy.

This is not science fiction. Various central banks around the world are seriously considering these ideas, including Canada, China, Sweden and Uruguay. They are embracing change and new thinking"

Christine Lagarde

International Monetary Fund
Singapore Fintech Festival, Nov 2018



"It is important to update the money the Riksbank issues to a format that suits the modern economy. We will therefore develop a pilot version of a central bank digital currency – an e-krona.

Stefan Ingves

Governor Swedish Riksbank
Future of Payments Summit, Stockholm, Nov 2018

Technology Intelligence
Central banks should look at issuing digital currency, says IMF's Christine Lagarde



* <https://www.bis.org/publ/bppdf/bispap101.htm>;

DFC Properties Sought by Central Banks

Policy	✓ Issued as legal tender by the CB as a liability on CB balance sheet
	✓ Mechanism to effect supply and movement decisions to maintain financial stability
	✓ Distributed to commercial banks and licensed service providers
	✓ Free or low cost to transact and ubiquitous; can be used without bank accounts
Security	✓ Highly secure, trusted modern cryptographic mechanisms; not easily counterfeited
	✓ Generated in a secure, supervised activity; not mining operation
Transactional usage	✓ Limit setting on transaction value to implement graduated regulation
	✓ Immediate, final, irrefutable transfer of value
	✓ Operable face to face, online and in the absence of connectivity
	✓ Interoperability at all levels throughout the payment system
	✓ Scalable to country or region-wide use

Auditability and traceability	✓ Parameterized to balance between anonymity and traceability of transactions and parties
Scalability and reliability	✓ Solid base which can gradually be extended in different stages
	✓ Can be integrated with new modules and functions via open, standardised interfaces;
	✓ Have the best available protection against cyber-attacks and different types of fraud
	✓ Robust and good performance and transaction speed
	✓ Accessible 24 hours x 365 days
Interoperability	✓ Portable and functions equally well across different payment systems
	✓ Based on generally accepted standards and frameworks

Emerging Architectures

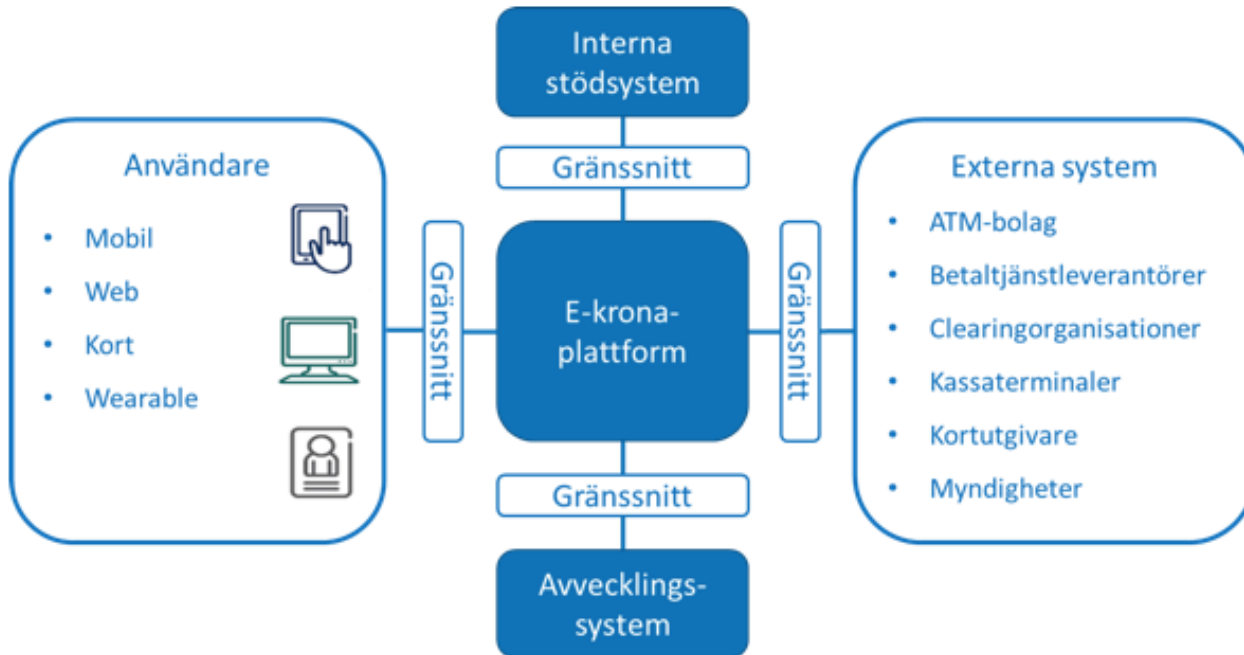
- Architectures are reflections of properties sought by the central banks and evolve as the understanding of the needs evolve and maturity of the subject increases
- Architectures today appear to have three main dimensions:
 1. Value carrier:
 - a. **Token:** a.k.a. value, a standalone digital object representing value and participating in transactions
 - b. **Ledger:** a.k.a. register, a record of transactions
 2. Topology:
 - a. **Centralized:** the central bank controls the entire infrastructure (including wallets) through which and end-to-end DFC solution is delivered to the public
 - b. **As-a-service:** the central authority controls the components necessary to deliver DFC capabilities through APIs available to banks and other financial institutions
 - c. **Distributed:** the central bank controls the source of DFC including its security and amount to be created and distributed, but the distribution and transaction chain closely matches that of physical cash
 3. Implementation technology:
 - a. **DLT**
 - b. **non-DLT**

Architecture Examples

- Ecuador eDinar (defunct): centralized, register
- Uruguay pilot (completed): centralized, token (Roberto Giori money) – use case contributed to this group by IMF

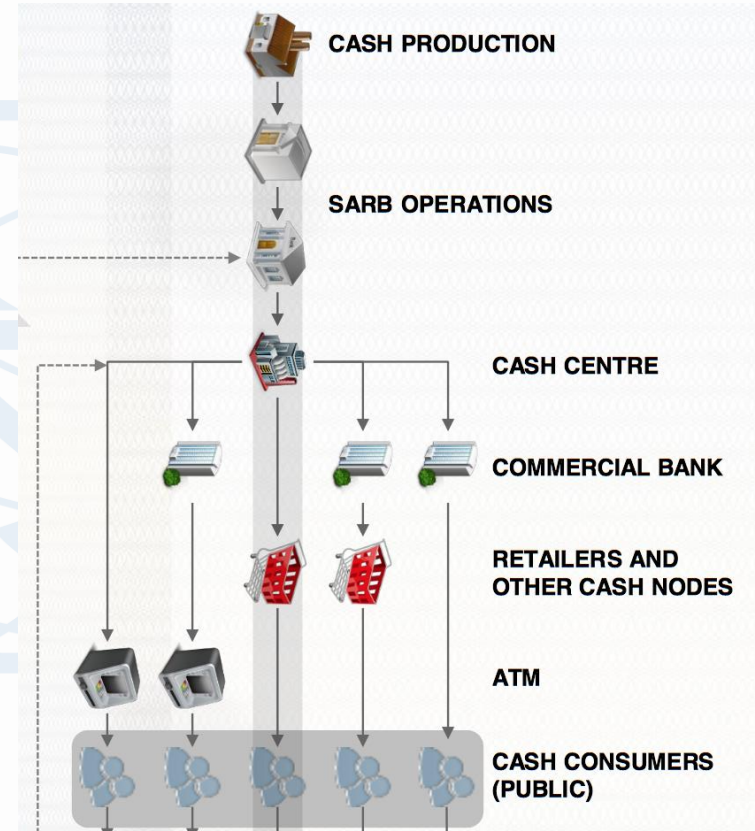
Architecture Examples

- SR (RFP): as-a-service, register or token

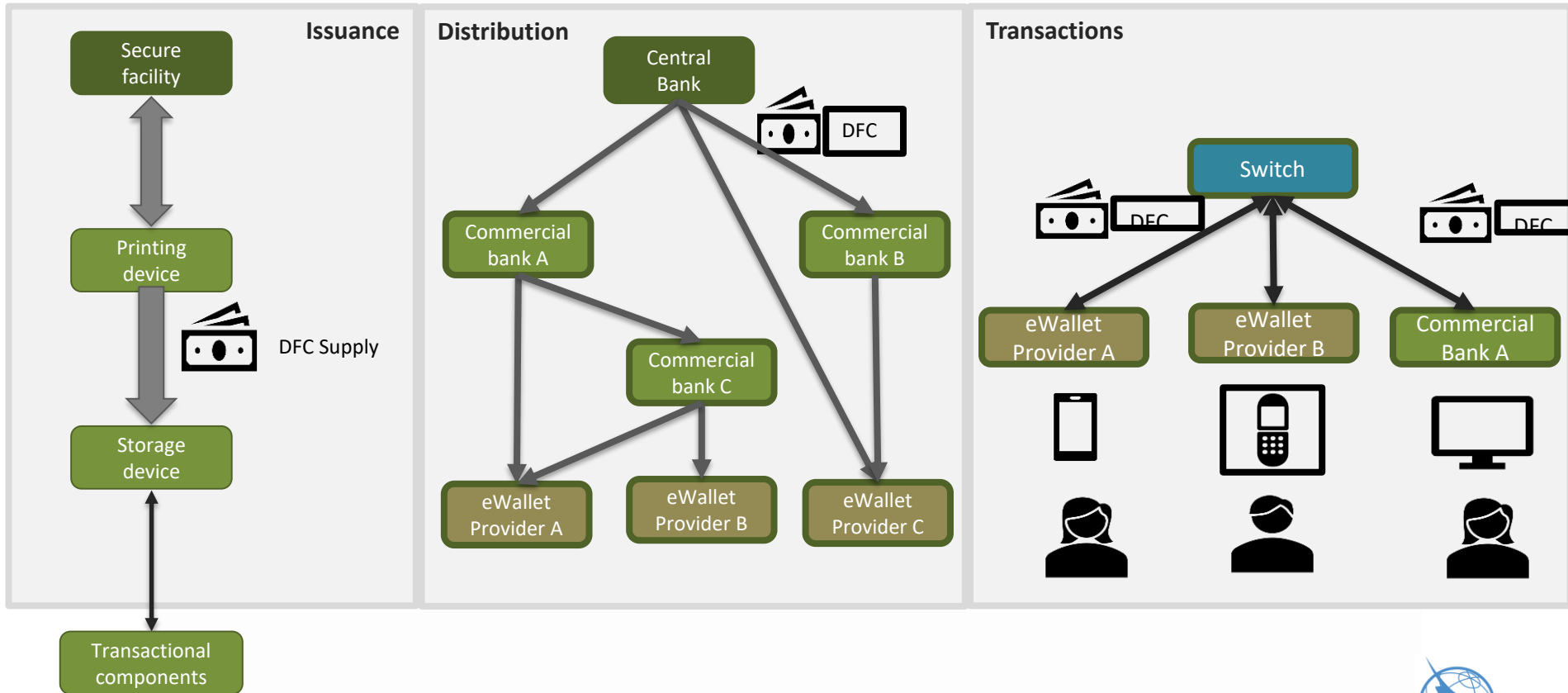


Architecture Examples

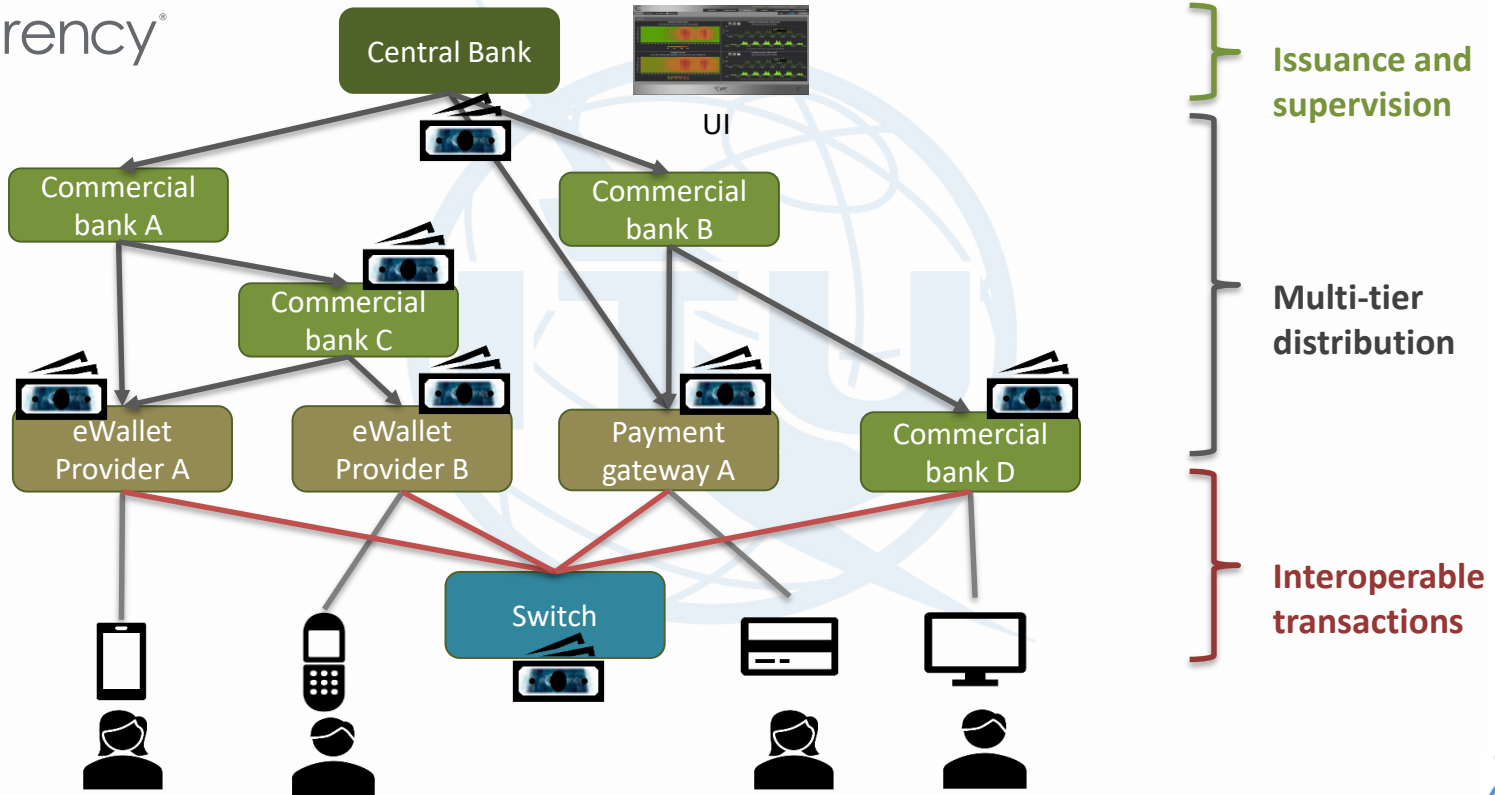
- SARB (EOI): distributed, token, mimicking physical cash production and distribution
- Production and the first-tier distribution controlled by the central bank
- Transactions performed in multiple “cash-nodes”, regulated but not directly controlled by SARB



Three essential DFC use cases mirror cash usage



eCurrency Hierarchical, Distributed Architecture



What next?

- The momentum is building
- Much work remains to be done
- Learn by doing
- Steps and stages
 - Proofs of Concept or Pilots (e.g. Tunisia, SARB)
 - Commercial implementations (e.g. SR)

Tunisia Project Example

- Three stage implementation with Arab ICT and Central Bank of Tunisia
 1. Simulation: lab environment, DFC issuance, wallets, interoperability
 2. Proof of concept: limited deployment in full production mode
 3. Wide rollout



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