
White Paper

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Untangling the net

Structuring the depository of the future

Depositories have evolved over time from carrying out simple safekeeping and custody activities to providing a fairly extensive set of post-trade services. Post-trade regulation and standards have provided some direction towards a recommended model when it comes to how different service areas would operate. However local nuances and practices are always be present in every market. This leads to increased complexity of operations, which in turn leads to complexities in the development and continuing progression of depository software.

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Monolithic CSD systems were initially built out to provide services such as clearing, settlement, custody asset servicing and reference data. Very often, such systems utilized popular mainframe or mid-range hardware options of the time, most notably IBM platforms such as the AS/400, and developed on COBOL or using stored database as provided on Oracle or DB2 platforms. Once a reliable and functionally adequate system was established, it tended to remain as the perceived risk and cost of changes to the existing core of the depository increased over time.

Changes typically took place through adding on or developing subsystems as new opportunities for automation and straight-through-processing (STP) were identified, or when CSDs launched additional services. Some of these satellite systems used newer technology, but were designed considering only local or immediate requirements. These subsystems often ended up internalizing the same operating models and limitations that were present in the original system - effectively becoming extensions of the inflexible central infrastructure.

In the midst of these limitations, CSDs in the modern era are being challenged in their traditional role. For instance, in the EU region the roll out of the Target-2-Securities (T2S) pan-European settlement system and harmonization initiatives have increased the flexibility of issuers and investors to move assets to the CSD of their choice. In response to increased competitive and financial pressure CSDs in the region look to expand the range of complementary services provided to market participants. This type of regional and global competition also exists outside of the EU, for instance, in the South East Asian region, where issuers increasingly look to list at alternative venues outside of their home countries.

In response CSDs have been forced to untangle the complex software ecosystem and operational processes that underlie their services.

What is needed in this process is a means to group and organize the activities of the CSD, towards adopting a more streamlined software and business design capable of launching new services and standardizing existing ones. Some categorizations such as that provided by the Bank of International Settlements (BIS) are already present (distinguishing between roles such as that of being a Securities Settlement Systems (SSSs), Central Securities Depository (CSDs) or a Collateral Management Service Providers (CMSPs). However, to be useful we need a more granular definition of post-trade activities that also recognizes the wider roles that CSDs play within market infrastructure.



An example of depository systems evolution – commencing from legacy operations to subsequent add-on systems

Finding the essence

Core services are fundamental – in that every other service provided by the CSD presupposes the existence of these and they are also common to any CSD operation.

Safekeeping and central account keeping is the service that is most universally associated with CSDs. Based on jurisdiction there are many nuances in terms of how assets are segregated as well as how accounts are organized. CSDs can vary in the level of account keeping – from omnibus models such as those offered by DTCC in the US and Euroclear in France, to those mandating investor segregation such as VPS in Norway and in developing/frontier markets such as Brazil and Sri Lanka. The control of accounts many also vary – while intermediated structures are the most common, you may also find direct registration as offered by Singapore or Malaysia. Direct registration may also take place with the CSD playing the role of the registrar in competition with other local agents, such as in Argentina and Ghana. Data keeping requirements stemming from regulatory or KYC needs may also be extensive especially in markets requiring end investor identification.

These needs also change over time - for instance the EU CSD regulation created the need to support segregation in the region, and market demand in Singapore led to a concept of broker-linked balances augmenting directly registered investor portfolios. Global Data Protection Regulations in Europe had direct impacts on the mechanisms on which client data was maintained and accessed. Given the central and vital role that CSDs play, the software supporting the accounting structures utilized has to be robust, but at the same time it must offer a high degree of structural flexibility to deal with such changes.

Reference data is another significant core service, as CSDs often act as the golden source for other parts of the financial market infrastructure in addition to maintaining data for their own operations. The specific set of information within reference data may also change over time, as the activities served by the CSD evolve and new rules and standards emerge. Especially for CSDs that play the role of a National Numbering Agency (NNA) adopting new standards such as the Financial Instrument Short Name (FISN) introduced in 2015, or being upto date to existing ones (e.g. ISIN standards which have gone through seven editions to date. While some guidance is provided by

messaging and data standards such as ISO20022, FIXML and the ESMA defined Financial Instruments Reference Data System (FIRDDS), given the wide scope of CSD operations, it is likely that many other non-standard or localized data elements may be required to be maintained. The instrument set under custody also evolves – with assets such as commodities being dematerialized in India and carbon emission rights being held in ICSDs such as Euroclear.

Asset movements form the third part of the essential core, Encompassing inward and outward relating to dematerialization/immobilization or new security issuances. This also includes internal movements – such as transfer of holdings between participants or subaccounts under the CSD, or intra-account movements such restrictions applied on shares of a client.

Together these three services constitute the essential core of the CSD. However, in order to serve its critical role in a financial market infrastructure a CSD will require other services that derive from this essential core.

The role of the **Settlement System** is treated as one separate from that of the CSD in the Principles of Financial Market Infrastructure (PFMI), as best exemplified by Target-2-Securities in Europe. However, even in this context connected CSDs may still retain a local settlement platform. In many other regions CSDs provide the primary and sole venue for settlement of local securities. Standards that have emerged around the larger harmonization processes in Europe provide guidance on how settlement and related activities such as pre-settlement processing and settlement fails handling should be carried out.

CSDs also facilitate a significant part of **corporate action processing** in many jurisdictions. Final responsibility for corporate actions may be owned by a Registrar or other agent of the Issuer, however the CSD still has a key role in providing the shareholding data, and collating investor instructions and tax information, and computing the benefits due to the dematerialized holders within the CSD. In some cases, the CSD may extend the service to carry out all activities required of a corporate action agent such as distribution and tracking of paid/unpaid cash, as done in Singapore. Similar to settlement,

harmonization of Corporate Actions in the EU region has led to standards set by the Corporate Actions Joint Working Group (CAJWG) that are universally applicable. These are augmented with best practices and data standards are defined through the Securities Market Practice Groups (SMPG) as well as some regional practices being elaborated through National Market Practice Groups (NMPG).

It is also fairly common for CSDs to act as the local **pledge register**. Variations in local laws and market practice also lead to differences in the workflow of pledges executed within the CSD, and the rights and entitlements of the parties (e.g. who receives corporate action benefits, disposal rights) that need to be supported in the CSD software.

Expanding your services

Value added services are often provided by other entities (e.g registrars, custodian banks) within the post-trade ecosystem. CSDs have a unique advantage here due to the central role it plays in a financial market infrastructure and its extensive relationships to the various stakeholders such as issuers, investors, participants, banks, and other CSDs. These represent an opportunity for differentiation in regions where CSDs compete for listings as well as new revenue opportunities for the CSD.

A useful catalogue of value-added services is contained within CSD.R, which include the areas of:

- a. Securities Borrowing and Lending
- b. Collateral Management – both in terms of supporting a settlement process as well as in an agent role for general collateral management
- c. Settlement Matching and trade confirmations
- d. Shareholder Registry Services
- e. General Meetings and proxy voting services
- f. Issuance and IPO services
- g. Cross-CSD communication

This is by no means an exhaustive list. Other services that we have seen CSDs provide include:

- a. Repo agent services – extending the role of a collateral agent to also include lifecycle management for repo transactions.
- b. Investor access – providing channels for end investors to directly access the services provided by the CSD such as details on their portfolios, corporate actions, settlements and declaration/management of their personal information.
- c. Issuer connectivity and information services – providing direct access channels for issuers or their agents (e.g. Registrars) to access and receive information on the shareholding as well as services around corporate actions and issuance processes.
- d. Fund services – can include both the provision of depository services for funds, such as those required for UCITS and AIMD compliance in the EU, as well providing the service for the routing and settlement of fund transactions.

Banking services (e.g. cash accounts, credit provision) have also been provided by some CSDs such as Euroclear, Clearstream (in Germany and Luxembourg), Keler (Hungary) and OEKB (Austria). CSDs operating such banking services face more stringent operating requirements under regulations such as CSD.R.

Value added services are, to a degree, independent of each other – though there can be relationships and synergies in certain cases, such as between Repo, Stock borrowing and lending, and credit provision services tied to a common collateral management service.

Getting it done– the role of technology

The conceptual structure of CSD services described above is logical organization of activities of the CSD, and, by itself is not a technical or software design. However we have found it very useful to guide the technical of CSD systems. Combined with processes organized in a distributed architecture with strictly controlled messaging interfaces between them, this allowed a clear segregation of responsibility, enabling the enhancement existing services independent of each other and simplified the design of new value added services.

We have also assessed this against distributed ledger technology (DLT). At first glance, this appears well suited for the safekeeping role of CSDs through the recording of balances and transactions and supporting movements in a reliable and secure manner. Similarly, many value added services can also be modelled using DLT – for instance, providing a common ledger for tracking AGM events and proxy votes, or collateral pledges. However CSD's which primarily support market infrastructure through the centralization of asset keeping and services, may not gain the full benefit from the use of DLT as would be the case in more decentralized and trustless models – such as those as used in the Cryptocurrency or identity management space.

CSD's may face a dilution of their role due to emergence of DL's that provide alternative assets for investors. CSDs with access to assets on DLT can still leverage their position as a trusted market intermediary to provide secondary core services such as corporate action processing, as well as certain value added services such as Collateral and Issuer services. There may also be new service opportunities for CSDs in areas such as safekeeping of credentials and management of wallets on behalf of investors. Regardless of the type of underlying asset or ledger, the conceptual model described is useful in identifying such potential services, and a modular architecture that follows these principles is instrumental to successfully isolate and deploy such services.



An all-round view of services: Value adding and core

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