8 March 2007

TARGET2-SECURITIES

OPERATIONAL FEASIBILITY

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1. EXECUTIVE SUMMARY

This study covers the operational feasibility of the TARGET2-Securities (T2S) project, focusing on its functional architecture, including the interfaces with the central securities depositories (CSDs) and the users.[1] In doing so, it provides the elements for assessing the feasibility of the proposed division of roles in the T2S environment: namely, that CSDs will maintain all their business functions and relationships vis-à-vis their participants and the issuers, while T2S will provide a common, centralised IT infrastructure for consolidating settlement services across its connected markets.

In reviewing the contents of this study, the following warning should be taken into consideration: this is a first draft of the current Eurosystem proposal regarding the functionality required for a pan-European settlement platform. An extensive public consultation is planned, and this is expected to provide feedback from the market, allowing the Eurosystem to further develop this documentation. At a later stage of the project, its content will take the form of General User Requirements, which will in turn eventually develop into Detailed User Specifications.

The remainder of this study is structured as follows. Sections 2 to 8 provide a high-level description of the functional architecture of T2S and its likely impact on operations in the post-trading industry. It describes how T2S is designed to function. Annexes 1 to 4 provide more detailed descriptions and lists of functionalities, interfaces, procedures and messages, although these are not meant to be exhaustive.

More specifically, the sections address the following aspects:

Section 2 introduces the different roles assigned to T2S and CSDs within the proposed future T2S environment. CSDs will maintain all their legal and business relationships with their participants and with the issuers, while T2S will provide a common centralised platform servicing all connected markets as if they were domestic ones. From an operational point of view, the aim of T2S is to make cross-border securities settlement as efficient as its local equivalent. This section also mentions the role of the national central banks (NCBs) as the operators of T2S and as providers of market participants' cash accounts.

Section 3 provides a high-level description of the two main functional blocks of T2S: the Lifecycle Management and the Settlement Engine. The associated functional modules and interfaces with CSDs and market participants are also presented. Box 1 depicts the high-level functional architecture, taking as an example the settlement procedure of a plain vanilla secondary market trade. Box 2 details the interactions of the various functional modules within the context of the same transaction. **Annex 1** lists all modules and interfaces, including a more detailed presentation of their functionalities. These details are however not exhaustive and will be further enriched following the forthcoming market-wide consultation.

Section 4 presents the procedures available for achieving efficient settlement in cross-CSD transactions. Although this section principally focuses on settlement within T2S-connected markets, some proposals

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[1] For reasons of consistency with the terminology used in the T2S Blueprint document, "users" are defined as the CSDs' participants.

are made concerning how to manage transactions where non-T2S-connected CSDs are part of the settlement chain. **Annex 2** provides more detailed examples of how this is to be achieved.

Section 5 presents the concept of a "uniform" or unique account structure to be implemented in T2S. The working assumption is that T2S will need a single account structure if it is to function as a centralised settlement platform for all connected markets. However, its codification should be open and flexible enough in order to allow, as a minimum, a one-to-one mapping of each current CSD account segregation and codification into the uniform T2S one. Harmonisation of local account structures across CSDs would be welcome, but will not be imposed by T2S. All that would be required from connected institutions is to instruct T2S using this mapping, i.e. by utilising the unique T2S codification, even if they choose to retain their local structures. This would require instruction "converters" to be built and utilised at the CSD level.

Section 6 presents the current and future market standards to be adopted by T2S. As part of its efforts to facilitate market harmonisation, T2S is expected to affect and be affected by the industry's efforts to agree on harmonised standards and procedures following the proposals for the removal of the Giovannini barriers. As an example, T2S will use as a minimum the ISO 15022 message type and will also adopt ISO 20022 XML messages, which are currently being discussed by the industry. These standards would of course have to be further elaborated in order to cover the specificities of a centralised settlement platform (for example in the area of instructing settlement regarding corporate actions, primary market settlement, etc.).

Section 7 outlines the planned support organisation for the users of T2S. Business support is expected to remain with CSDs, as users will remain their direct clients. Technical support will be provided by the T2S operator. The support organisation for cash accounts will remain, as it is today, within the scope of TARGET2.

Section 8 investigates the feasibility of separating the various services within CSDs as implied in the proposal of Section 2. It also provides a high-level assessment of the impact that this segregation may have on CSDs and their participants. **Annex 3** provides some concrete examples of how part of CSDs' business, such as the management of corporate actions, primary market activities and securities lending operations, will interact with the proposed operational framework of T2S.

Annex 4 lists the instruction types and statutes applicable to the functionalities described elsewhere. **Annex 5** provides an illustrative overview of the T2S daily timetable, based on the existing TARGET2 (cash) timetable. As is the case with the rest of the Operational Feasibility Study, both annexes will be open to consultation and do not constitute final proposals for the live T2S services.

Finally, the Eurosystem has identified considerable synergies to be exploited by operating T2S on the TARGET2 Single Shared Platform (T2S on T2). The Economic and Technical Feasibility Studies are designed to provide an insight into these synergies and functional enhancements expected from operating T2S on T2 and also from making use of the operational organisation of TARGET2.

Preliminary conclusions

This study seeks to provide a core understanding of *how* T2S will be organised in order to function as planned. It represents a first draft of the services to be offered and the functionalities required to achieve them. In doing so it also provides a first qualitative estimation of the impact T2S may have on its connected entities (mainly CSDs, but potentially also market participants). (For a quantitative estimation of this impact, see the Economic Feasibility Study of the project.)

As shown elsewhere in the Economic and Technical Feasibility Studies, operating T2S on the TARGET2 platform is feasible and will not affect the functionalities described in this study. What is more, the interaction of cash and securities accounts on the same platform will exploit synergies and achieve greater settlement efficiency across the connected markets.

The issues and ideas presented in this study should only be viewed as the basis for a high-level description of the system. The forthcoming market consultation should facilitate the translation of this functional description into the first draft of the T2S General User Requirements. We are confident, nevertheless, that in being able to provide a sound, though still high-level, description of how T2S will function within an environment of multiple connected markets, we have conducted a first positive test of its operational feasibility. In describing a coherent operational framework, we are effectively defining the basis for its development. It therefore comes as no surprise that the next chapter of the T2S Feasibility Study, the Technical Feasibility Study, is based on the business requirements defined here. As a consequence, some important aspects of the Economic Feasibility Study, such as the development and running costs, are based on the assumptions in this paper of the services and functionalities T2S is designed to provide, and moreover is expected to do so by the market.

The analysis presented here is based on the standard practices and procedures currently available in the EU markets, and has been updated in line with the harmonisation proposals currently being discussed by the industry. As a result, it is fully expected – and moreover welcomed – that the market will scrutinise the details of this presentation and will provide any missing details arising from the fact that heterogeneous local procedures are reconciled with the recognised need to provide a harmonised central settlement service.

The T2S architecture thus reflects both the settlement environment as it is today and as it will become, partially shaped by it, in the future.

2. OPERATIONAL ROLES FOR T2S STAKEHOLDERS

The T2S principles define the split of operations between T2S, CSDs and NCBs as follows:

- T2S will undertake the tasks associated with the securities settlement function, the management of flows, as instructed by the CSDs[2] and their participants. Only those settlement transactions with either a central bank money cash leg or no cash leg at all (delivery versus delivery (DvD), free of payment (FoP) etc.) will be part of the scope of business of T2S;

- CSDs will act as a helpdesk to their participants in relation to settlement processing. Furthermore, they will retain all their other tasks (also known as management of stocks), including their relationships with investors, issuers and intermediaries, as they do currently. Where relevant, securities settlement services in commercial bank money will remain with the CSDs;

- NCBs will undertake the task of operating T2S. They will also provide the authorisations and restrictions vis-à-vis the opening and management of cash accounts (via their current role in TARGET2).

CSDs' roles

All non-settlement business will remain with the CSDs:

- *Central registry*: The CSDs will maintain, where relevant, their function as central registrars (or equivalent) for each security, consistent with any relevant legislation.

- *Custody services*: The CSDs will provide all relevant services, comprising safekeeping, corporate action processing, tax processing, market claim compensation, vault services, proxy voting and all related reporting (when applicable). Cross-border custody services are also part of the CSDs' service to their participants when acting as investor CSDs for other markets.

- *Primary market*: With regard to the processing of new issues (i.e. the non-settlement part thereof), CSDs will maintain their relationships and procedures vis-à-vis the issuers, organised markets and primary dealers during primary market operations. At the final stages of issuance, these procedures will result in specific settlement instructions for T2S accounts.

- *Collateralisation and securities lending*: CSDs will process asset servicing functions such as securities lending and borrowing, general collateral or repo/pledge services other than self-collateralisation (automated repos or general pledges to NCBs in order to generate liquidity in the course of settlement).

With regard to settlement processing, CSDs have to provide the necessary static data on securities and participants' authorisations:

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[2] Two dimensions can be distinguished with regard to the organisation of the functioning of the securities market infrastructure, the management of flows, including the trading, clearing and settlement functions as a result of movement of securities (against or not cash); and the management of stocks, involving the custody or asset-servicing function as a result of the relationship between issuers and investors.

- they will authorise new International Securities Identification Numbers (ISINs) for settlement and terminate ISINs on maturity or if they become ineligible for settlement for any other reason;

- they will authorise users to participate in the T2S settlement procedures, independently of whether participants are instructing T2S directly or via the CSDs;

- they will configure all related admissions, restrictions and other rules that define what participants can perform which kind of settlement activity and on which account.[3] This also comprises admissions for cross-border settlement, i.e. the setting up of inter-CSD links, and the configuration of which kind of settlement activities and securities can be processed between the issuer in question and investor CSDs.

This has the following consequences for the non-settlement business of the CSDs: whenever their processing of non-settlement business requires final settlement, bookings or other balance changes, the CSDs will accordingly have to instruct T2S with settlement instructions. Thus CSDs will have to break down any corporate action (e.g. a stock split) into a series of cash and/or securities credits and/or debits, and instruct T2S with specific settlement instructions.[4] Similarly for primary market activity, i.e. the issuance of new securities that requires a new ISIN to be generated, balances on an issuance account will have to be transmitted to T2S with specific instruction types (redemptions are treated in similar fashion). T2S will prioritise these kinds of instructions if required by the CSDs, and will provide real-time feedback on the successful completion of final settlement. For more information on the feasibility of splitting settlement and non-settlement functions and its likely impact on the market, see **Section 8** and **Annex 3**.

The role of T2S

T2S is purely a settlement platform designed to provide core settlement services to connected CSDs and their participants. As a consequence, T2S is only concerned with the settlement instruction component of CSD processes. Certain CSD operations such as corporate actions, primary market operations and redemptions will have to be translated by the CSD into securities and cash settlement instructions in the T2S framework. T2S does not and cannot consider the economic or business significance of the settlement instructions it receives. This is, as currently, exclusively the responsibility of the CSDs.

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[3] Some examples of different settlement activities on accounts include the following:
- Some accounts might be exclusively used for pledges or for the settlement of repos;
- Other accounts are restricted to custody and new issue activities of the CSDs;
- Holdings on some accounts might not be used for self-collateralisation.

A detailed list of account types and permitted settlement activities will be defined in later project phases.

[4] These instructions could then be processed as "linked" settlement instructions, and probably prioritised by the CSD above other instructions.

The various functional blocks and modules necessary for providing the securities settlement services are presented in Box 2. In Annex 1, a more detailed proposal on the functionality of these modules is presented as a basis for market consultation.

NCBs' roles

Apart from owning and operating the T2S system, Eurosystem NCBs will also determine the "who" and "how" of the cash sub-accounts. These include the rules and authorisations of the settlement agents, that is, the entities eligible for maintaining a cash real-time gross settlement (RTGS) account in the framework of TARGET2 (cash). Since the cash sub-accounts in T2S are a substructure of the main RTGS account maintained in TARGET2, NCBs are by definition directly responsible for the static data of the Settlement Agent Database.

Connectivity[5]

CSDs will be directly connected to and communicate with T2S. Users (CSDs' participants) will normally connect to T2S via "their" CSD, i.e. the CSD with which they legally hold their accounts. This is particularly relevant for smaller local participants and within the first period of the live operation of T2S. It also allows users to continue instructing in their proprietary formats as they do currently. Their CSDs will be responsible for converting their instructions into the T2S harmonised standards (message formats, securities accounts codification, etc.).

However, some users may see the need to have direct technical connectivity to T2S. In particular, some major European custodians have already expressed their willingness to explore from day one of T2S operations the possibility of direct connectivity to the centralised infrastructure.[6] Whatever the strategy chosen by the market participants, the nature of their connectivity should be agreed and established in cooperation with their local CSD. Within this scenario, directly connected entities must be able to instruct T2S according to the harmonised messages and standards, since T2S will not offer converting and mapping services.

All stakeholders along the settlement chain are expected to cooperate on the basis of mutual interest and should not to seek to abuse their controlling positions. Any "restrictive" policies against the interests of the local settlement community will be counterbalanced by the open architecture of the T2S system and the expected improved competition in the depository market (i.e. more opportunities for CSD participants to open securities accounts in any T2S-connected CSD). The Code of Conduct works in similar fashion.

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[5] This sub-section only addresses the connectivity policy of T2S vis-à-vis CSDs and their participants. Details on technical connectivity, i.e. communication lines, etc., are to be found in the Technical Feasibility Study.

[6] Here connectivity is meant only in technical terms. Legally, market participants will only remain direct participants in their CSDs.

In principle, the T2S architecture should be open enough to accommodate both direct and indirect connectivity options for market participants. As shown in Box 1, whatever the connectivity model, settlement instructions will only be managed and processed in the T2S environment by a single entry point: the T2S Settlement Engine.

3.   OVERVIEW OF T2S FUNCTIONAL BLOCKS AND INTERFACES

Looking into T2S at a more detailed level, two main functional blocks, the Lifecycle Management and the core Settlement Engine, can be distinguished (see the figure in Box 1). The T2S Static Data constitutes a third functional block that supports the operations of the other two blocks, and includes the CSD-specific rules for settlement.

Box 1: A Functional Architecture Model of T2S
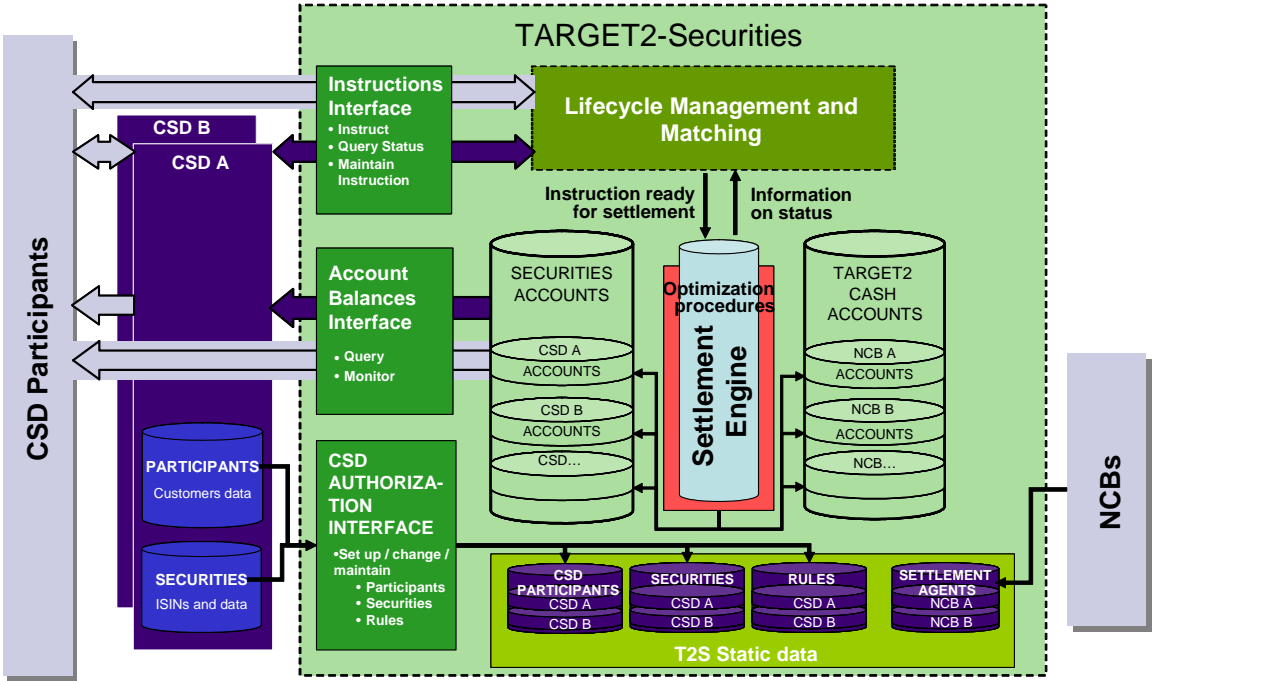
A typical daylight[7] settlement transaction (a plain vanilla delivery vs. payment (DvP) over-the-counter (OTC) trade) could follow this lifecycle. Instructions will enter the T2S system via the Instructions Interface. If not already validated and matched at the CSD level, these functions will be performed at the T2S level. The T2S Static Data will provide reference information for the validation of the instructions. The Lifecycle Management and Matching will provide the functionalities required for the lifecycle of a settlement transaction (validation, matching, settlement prioritisation, etc.). "Ready to settle" transactions will be forwarded to the Settlement Engine to check the availability of securities and cash balances. If the balance in question is sufficient, final and irrevocable transfers of cash and securities will be executed in an RTGS mode, where needed and possible supported by self-collateralisation mechanisms. If the balances are not sufficient (either in the cash or in the securities leg), pending

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[7]   Night-time settlement transactions will undergo the same steps in the settlement process, with one potential difference: in order to maximise settlement efficiency, optimisation on a global scale (i.e. for all transactions) could be envisaged.

transactions will be re-entered for settlement via pre-specified optimisation and recycling procedures. Instructing parties (CSDs and potentially users with direct access) will be notified accordingly via the Instructions Interface.

The Account Balances Interface will report on the securities holdings. The CSD Authorisation Interface will provide CSDs with the functionality of updating the static data necessary for the settlement process (e.g. authorised CSD participants, valid ISINs, market-specific rules for the Lifecycle Management, etc.).

A technical interface with TARGET2 will allow users to insert and withdraw central bank liquidity in and out of the T2S cash accounts. An updated version of TARGET2's Information and Control Module (ICM) could be used for this purpose. The same interface provides NCBs' static data on cash accounts (settlement agents).

The different functional blocks and modules are described below:

Lifecycle Management

The Lifecycle Management covers the lifecycle of an instruction, the different paths through the system that it can take, and the related lifecycle status attached to these paths (validated, matched, unmatched, settled, etc.). Depending on the current lifecycle status and on the underlying market rules, an instruction will be moved into the various modules.

The following functional modules will be included:

- **Validation** – where it is checked that incoming messages are correctly instructed. The rules against which instructions are validated are the ones maintained by the CSDs in the T2S Static Data databases (see Figure 2). For cash injections/withdrawals from TARGET2, the relevant TARGET2 rules in the TARGET2 database will be used;

- **Matching** – where instructions are matched (if not already done at CSD level. The target is to work with a single matching model and to leave national specific rules with the CSDs);

- **Settlement eligibility** – where it is verified whether an instruction is eligible for settlement (depending on settlement date, deadlines, market closing, etc.), and if so, then handed over for settlement, or returned as no longer eligible (e.g. due to a past deadline) by assigning it a non-eligible status;

- **Instruction Maintenance** – where the parameters of instructions are updated and changed (e.g. prioritisation, etc.);

- **Purging** – where settled instructions are removed from the system at the end of the day.

Settlement Engine

The following modules apply exclusively to instructions that are eligible for settlement and form the core of the Settlement Engine:

- **Sequencing:** where instructions are prioritised and forwarded to settlement – i.e. where the order in which matched instructions are forwarded to the Settlement Engine is defined;

- **Booking** – where instructions are broken down into movements in the cash and stock balances. This is the only place where account balances can be changed;

- **Optimisation** – where linked sets of (failed) instructions are identified which could be settled when applying "technical netting". Optimisation will forward these linked sets to the Sequencing Module;

- **Recycling** – where it is decided when instructions that failed at their first attempt will be put forward again for settlement. Recycling will forward these instructions to the Sequencing Module.

The **T2S Static Data** functional block can only be accessed by CSDs, and only via the Authorisation Interface. It includes only stocks of data relevant for the processing of settlement in T2S. These data include among other items updated information on valid participants' accounts, active ISINs and access and rights for CSD participants.
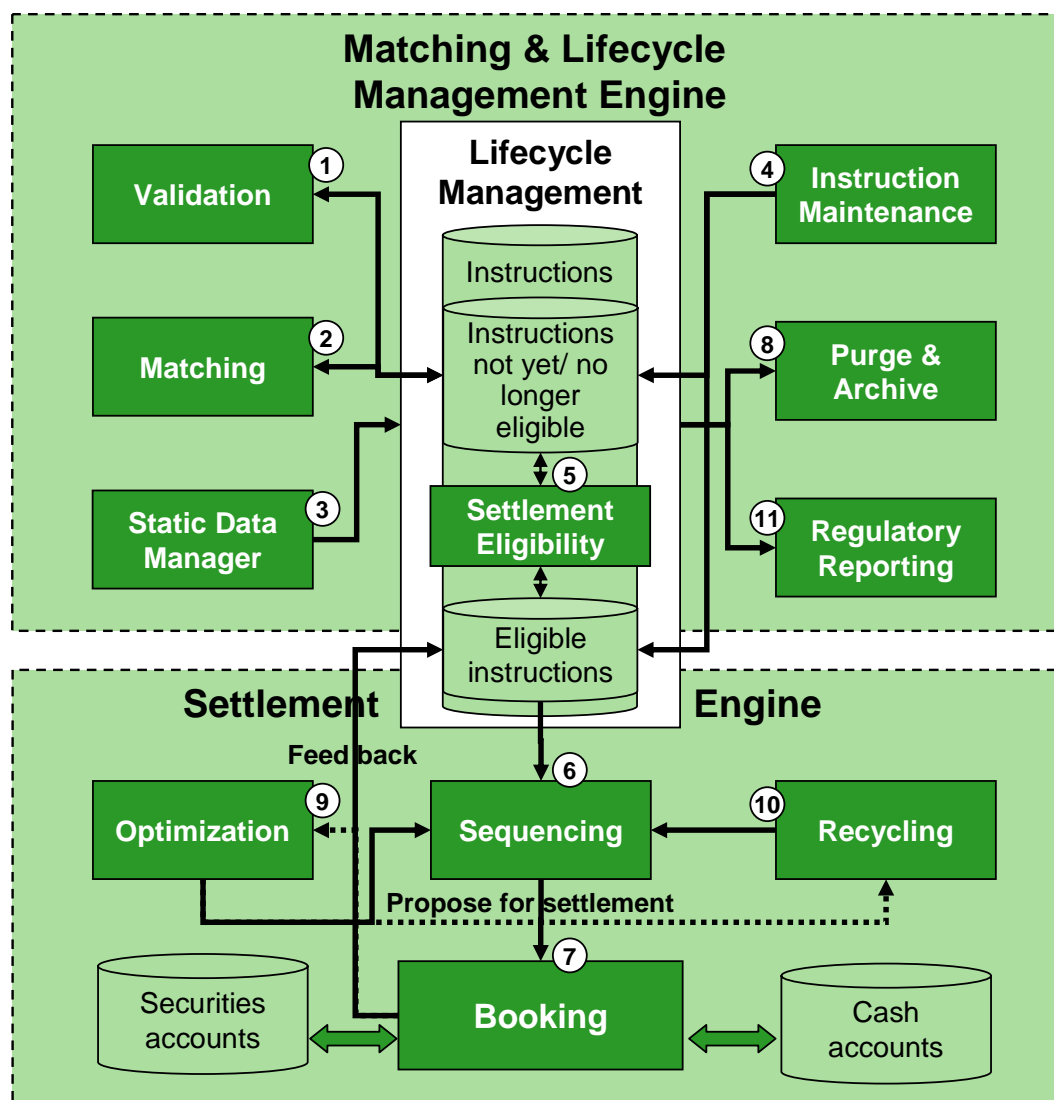
Other modules

These modules interact with both functional blocks described above:

- Static Data Manager (cash accounts static data maintained by NCBs, and securities accounts static data maintained by CSDs);

- Regulatory Reporting (optional).

The picture below shows how the different functional blocks and modules interact with each other. A few explanations need to be added:

- Real-time interfaces to the Static Data Databases are required, to accommodate any change in securities reference data, in customer authorisations, or in schedules and deadlines. Changes in static data eventually have to be applied to all modules; during settlement processing, however, they mainly affect the Lifecycle Management;

- In the picture instructions are split between eligible and non-eligible ones, whereas in reality they remain in a common database;

- Instruction maintenance can also be performed for eligible instructions, but only with a subset of potential activities.

Box 2: An overview of the main functional blocks of T2S

A typical data flow in a straight daylight[8] plain vanilla OTC trade would be the following: settlement instructions captured via the Instructions Interface (Annex 1.4) are processed in the Validation Module (1) according to the rules and restrictions stored in the T2S Static Data Module via the Static Data Manager (3). Once validated, instructions are matched in the Matching Module (2). Whatever the outcome of the matching process (i.e. irrespective of whether this is positive or negative), instructions may be affected by the Instruction Maintenance Module (4) via which the instructing parties, depending on the access rights and rules may further alter their instructions. Successfully matched transactions are

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8   The night-time settlement process would follow the same steps, with two potential differences: first, optimisation could be envisaged on a global scale (i.e. for all transactions). And secondly, if this were the case, instructions would move directly from the eligibility check to optimisation, without any prior attempt to settle. In fact, it could be necessary to freeze all balances during this global optimisation, i.e. effectively to stop the booking process for some time. The details of the procedure should be clarified during the drafting phase of the T2S User Requirements.

moved to the Settlement Eligibility Module (5) where they are checked for their eligibility to be settled (e.g. check settlement date, blocked instructions, etc.). Once the status of settlement eligibility has been assigned, instructions are prioritised in the Sequencing Module (6) and processed, in RTGS mode, for the final settlement (cash and securities) in the Booking Module (7). Assuming successful DvP settlement in both securities and cash accounts, transactions reach the final stage of their lifecycle management and are eventually purged and archived via the relevant module (8). In case of failed settlement, transactions are moved to the Optimisation Module to be optimised according to the T2S optimisation rules (9). In case of successful optimisation, the instructions are immediately put into the settlement queue via the Sequencing Module. In case of unsuccessful optimisation, instructions are stored and eventually recycled (10) and re-entered into the Sequencing and Booking Modules, according to the T2S recycling rules.

For reasons of simplicity, instruction reporting is not covered here. In some transaction lifecycle stages, immediate reporting to the instructing entities is required. (More information on the reporting interfaces, modes and frequencies is provided in Annex 1.4). This instruction reporting is not to be confused with the regulatory reporting facility for the CSDs (11).

T2S interfaces

Three kinds of data groups can be distinguished that are to be stored and processed in T2S: settlement instructions, balances stored on the securities and cash accounts and authorisations (i.e. the information on which kind of securities are admitted for which kind of settlement, as well as the account set-up information, and the connectivity set-up of each customer).

Box 1 provides an overview of how the relevant data (on instructions, balances/holdings and authorisations) relate to each other. Three different interfaces are required for the interaction between T2S, CSDs and the users:

- An **Instruction Interface** to instruct, query on the status of and maintain instructions;

- An **Authorisation Interface**, to authorise or maintain accounts, ISINs and user access rights;

- An **Accounts Balance Interface**, to query account information, and to monitor accounts.

Access to the cash accounts will be offered via a TARGET2 interface, probably an updated version of TARGET2's ICM.

The first three interfaces are primarily for the CSDs to use, but a CSD can give its participants direct access to the Instruction and Accounts Balance Interface. The ICM is only relevant for users that maintain a TARGET2 RTGS account.

4.   CROSS-CSD TRANSACTIONS

The full benefits of T2S in terms of cross-CSD settlement will materialise when all, or at least the great majority of T2S-connected CSDs, have opened inbound securities accounts with all T2S markets. This should be the medium and long-term expectation of the T2S project. Such connections imply that an investor CSD must be ready to provide custody services on foreign securities to its participants, including the related corporate actions management. In the short term, some CSDs may not be willing or ready to invest in the expertise required to service all T2S markets (or for that matter, all asset classes).

The EC Code of Conduct supports the long-term objective but only partially, i.e. there is the obligation not to refuse an outbound link, but no obligation to create an inbound link. In particular, regional CSDs cannot be forced to open inbound links to the markets for which they do not see an obvious business case. These CSDs can nevertheless buy such services from custodians to support them in servicing their participants.

Meeting the objectives of the Code of Conduct would also affect those EU CSDs that decide, for their own considerations, to remain outside T2S (external CSDs). Since the interoperability objective requires that CSDs "have the obligation to provide access [to their services] on demand", the outbound links to the T2S-connected CSDs would greatly influence the competitive conditions in which the external CSDs operate.

Transactions between participants of different T2S-connected CSDs

T2S aims at bringing cross-border settlement efficiency to its community of CSDs at the same level as domestic settlement. Thus T2S will provide a fully transparent and automated – straight-through-processing – settlement procedure for instructions regardless of the CSD of origin of the participants involved in the transactions.

Participants may hold their securities in the CSD where they have been issued ("issuer CSD") or with any other CSD ("investor CSD") that is not their issuer CSD, provided that the investor CSD accepts these securities for settlement. To allow for this possibility, the investor CSD must open an inter-CSD account at the issuer CSD.

From a technical point of view, securities will be transferred across national borders as a change of holdings in the Securities Accounts Database (see Box 1). T2S will automatically process such cross-CSD transactions as linked transactions (see Annex 2). Within a "simple" CSD link arrangement (opening of an inter-CSD account with another CSD), securities checking will take place directly at the level of the participants' accounts before being booked as *linked* transactions, without any need for the parties involved to instruct T2S further. This will allow real-time settlement and realignment across different CSDs, and will eliminate the current market issues of the sequencing of settlement and finality between different systems.

The transmission of a security from one participant in an investor CSD to another participant in another investor CSD, when a third CSD (the issuer CSD) is involved, requires a realignment at the level of the issuer CSD between the inter-CSD accounts of the investor CSDs involved. With T2S, such realignment between securities accounts at the issuer CSD level will take place in real time at the same time as the booking of the underlying securities transactions. The checking of balances implies checking the inter-CSD position of the selling participants as well, to ensure the integrity of the delivery mechanism. This functionality will exceed the minimum requirements set by the European Central Securities Depositories Association (ECSDA) standards (which specify as a minimum end of day realignment). For more details on how this procedure is foreseen to operate, see Annex 2.

Transactions between participants of T2S-connected CSD and external CSDs
T2S will also enable participants to settle securities issued in CSDs not connected directly to T2S (external CSDs). In this case, there are two main scenarios:

- Only one T2S-connected CSD has an account with an external CSD for a particular security. In this case, the T2S-connected CSD will manage that security as an issuer CSD for the T2S environment, and will be the single entry point. Deliveries in and out of the T2S environment will be processed through that CSD. It will activate the necessary procedures for settling securities in the external CSD (as agreed in the existing contract between the two CSDs). The level of automation of this process will be determined by that T2S-connected CSD, and T2S will interact exclusively with the T2S-connected CSD. For transactions settled within the T2S environment between participants, the process will be the same as for T2S securities (i.e. those issued in a T2S-connected CSD), independently of whether the transactions are taking place between two participants of the same CSD or not;

- Two or more T2S-connected CSDs have an account with an external CSD for the same "out" security (a security issued outside T2S). In this case, either of the T2S-connected CSDs might be the entry point when delivering a security in and out. However, the process remains under the control of the T2S-connected CSDs, which will be responsible for activating the settlement process. When such a transaction is settled in the T2S environment between participants of T2S-connected CSDs, then the settlement procedure will need to check not only the balances of the participants, but also make sure that the inter-CSD account with the external CSD has sufficient securities on the balance to settle. In case not enough securities are available, the transaction will fail until realignment has occurred. In this case, T2S will inform the involved CSDs of the size of the necessary realignment in order to trigger on their side with the external CSD. After the positions have been realigned, the settlement will take place. For more details on cross-CSD settlement when one CSD is an external CSD, see Annex 2.

Issues to consider:

- *Is a simple web-based interface in T2S required where the external CSDs can interact with T2S in order to communicate inter-CSD accounts? Even for an external issuer CSD, T2S could provide inter-CSD accounts that show in which in-CSD the holdings are after realignments. It should be noted, however, that each out-CSD will in any case be able to see the related holding by virtue of its own accounting system, where the investor CSDs will have an inter-CSD account.*

- *Is there a real need to consider and describe the case of how to settle cross CSD transactions via a relayed link within T2S? Is there a need for the use of a hub CSD within a relayed CSD arrangement? This would be relevant in the case where an investor CSD instructs on securities for which it maintains no direct link with the issuer CSD. The working assumption so far is that it would be much more efficient for CSDs to open direct links within the integrated settlement environment of T2S.*

5. ACCOUNT STRUCTURE

Securities accounts

The term "account" in itself can refer to two different aspects:

- First, the legal dimension of the account; where one account refers to a user's contractual agreement with its CSD; in this respect, one user (CSD participant) can operate more than one account in T2S (in particular to segregate securities which are held on behalf of third parties as opposed to proprietary holdings);

- Second, the operational nature of the account, which refers to the smallest division of the legal account which allows the settlement process to be carried out (i.e. the balance against which securities deliveries can be checked). This level can be considered as that of sub-accounts, and can enable securities to be identified according to their use (e.g. pledged securities, or ones available for self-collateralisation, etc.).[9]

For T2S to be efficient in offering settlement services across different markets, the account structure must be uniform at the central operational level, in order to provide efficient checking and booking of securities balances via the T2S Settlement Engine (see Chart 2 and Box 3).

T2S will establish such a uniform account structure under the following principles:

- The T2S account structure codification will be limited to the information necessary for carrying out the settlement process. It will not provide information which is not directly related to settlement, e.g. the account holder's address or similar customer-related information. CSDs will manage and update all relevant static information (e.g. ISIN, participants, rules, restrictions, authorisations, etc.) in relation to the securities accounts in T2S. This uniform account structure must allow T2S to detect all necessary automated processes that must be activated when settling securities in it. One example is whether an account is eligible for self-collateralisation, to obtain central bank liquidity by providing eligible collateral to a predefined NCB.

- The determination of a single uniform account structure refers to the *codification* and not to the *level of segregation* of the securities accounts. This codification should allow for, but not impose, a one-to-one mapping relationship between accounts legally opened at the CSDs, and the securities accounts technically operated in the T2S environment.

As mentioned above, the planned unification does not impose per se a common level of segregation on the accounts opened in T2S by each participating CSD. Each market can maintain its preferences and traditions regarding account segregation. The flexibility of this policy should, among other aspects, support the option of direct holding structures (end-investor accounts maintained in Scandinavian markets and the equity market in Greece), according the preference of the CSD. As a result, the terms "user" and

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[9] This section describes how the term "account" may be understood in different CSDs. CSDs and their participants are encouraged to reflect freely on how they would like to see their current account structure mapped into the "uniform account structure" and codification of T2S (see Chart 2 and Box 3).

"account holder" must be understood as applying to all CSD participants: monetary financial institutions (MFIs) and brokers in most markets, but also end-investors in others.

The uniform securities account codification will therefore be defined and developed in close collaboration with the CSDs that intend to participate in the T2S project. It is understood that not all CSDs will be able or willing to align their domestic account structure with the new uniform account structure from day one of T2S. CSDs will be able to retain their current account structure codification, provided that they can offer their users the necessary functionality for translating "domestic" account standards into the new uniform T2S ones.

Cash accounts

In the context of DvP transaction settlement, the T2S engine will make use of the dedicated T2S cash sub-accounts. The guiding principle is that all securities and cash accounts should be maintained and operated within the same infrastructure (and IT platform).

The dedicated cash sub-accounts are part of the RTGS account structure opened in TARGET2 (see Chart 1) and technically dedicated to the T2S functionality. TARGET2 will allow liquidity to be transferred between the dedicated cash sub-accounts and the main RTGS account. This functionality will facilitate the transfer of central bank money liquidity if and when required by the users. It will be possible to link multiple T2S securities accounts to a dedicated sub-cash account, but each T2S securities account can only be linked to a single dedicated sub-cash account. This means that a bank may centralise liquidity in a single RTGS account for multiple securities accounts either in a single CSD or in different CSDs.

Users (CSD participants) that are not eligible to maintain a TARGET2 cash account will be able to obtain indirect access via a designated payment agent (i.e. a settlement bank), according to the rules for indirect access as defined within TARGET2. This is already the case today, whereby CSD participants with no access to central bank money "link" their DvP instructions to the RTGS cash account of their settlement bank. The next phase of the project needs to clarify which additional functionalities might be required to cover the specificities of this relation (e.g. a functionality to set credit limits) as well as the greater variety of similar relationships that exist in the different domestic markets.

The open architecture will also allow T2S to connect to non-euro currencies if and when the respective markets and NCBs request this.

Chart 1: One TARGET2 dedicated sub-account
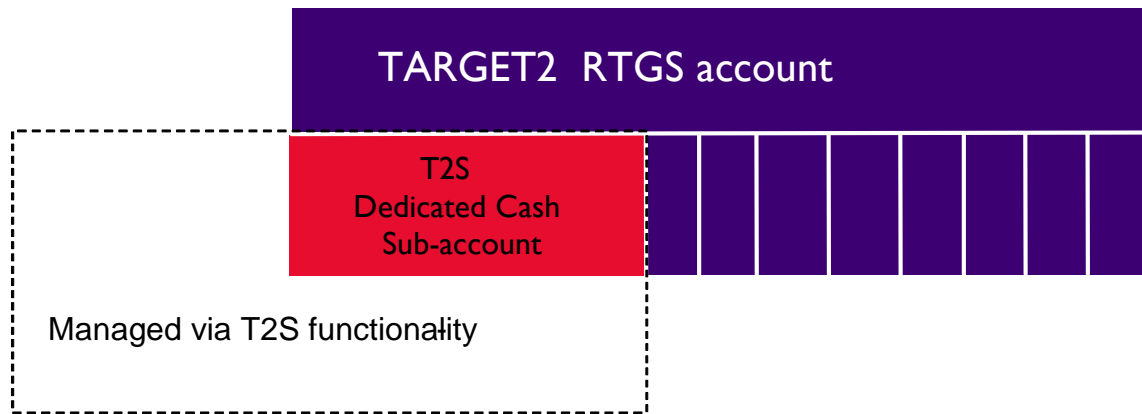
- The T2S Settlement Engine can only debit and credit the dedicated sub-accounts;

- The CSD participants can move liquidity in and out of these sub-accounts at any time;

- At the end of the day, all liquidity is pooled from the sub-accounts into the main TARGET2 RTGS account.

Chart 2: One-to-one relationship in the T2S account structure

The chart is purely designed to show the eligible relationships between securities and cash accounts. For explanations regarding the functional architecture, the reader should refer to Chart 1.

CSD A

TARGET2-Securities

Sec. Accounts

Securities Accounts

TARGET2 Cash (sub) Accounts

Participant B

Participant B

Participant B

Participant B

Participant B

Participant C

Participant C

Participant C

Participant D

Participant D

RTGS cash accounts

Permitted relationship

Not permitted relationship
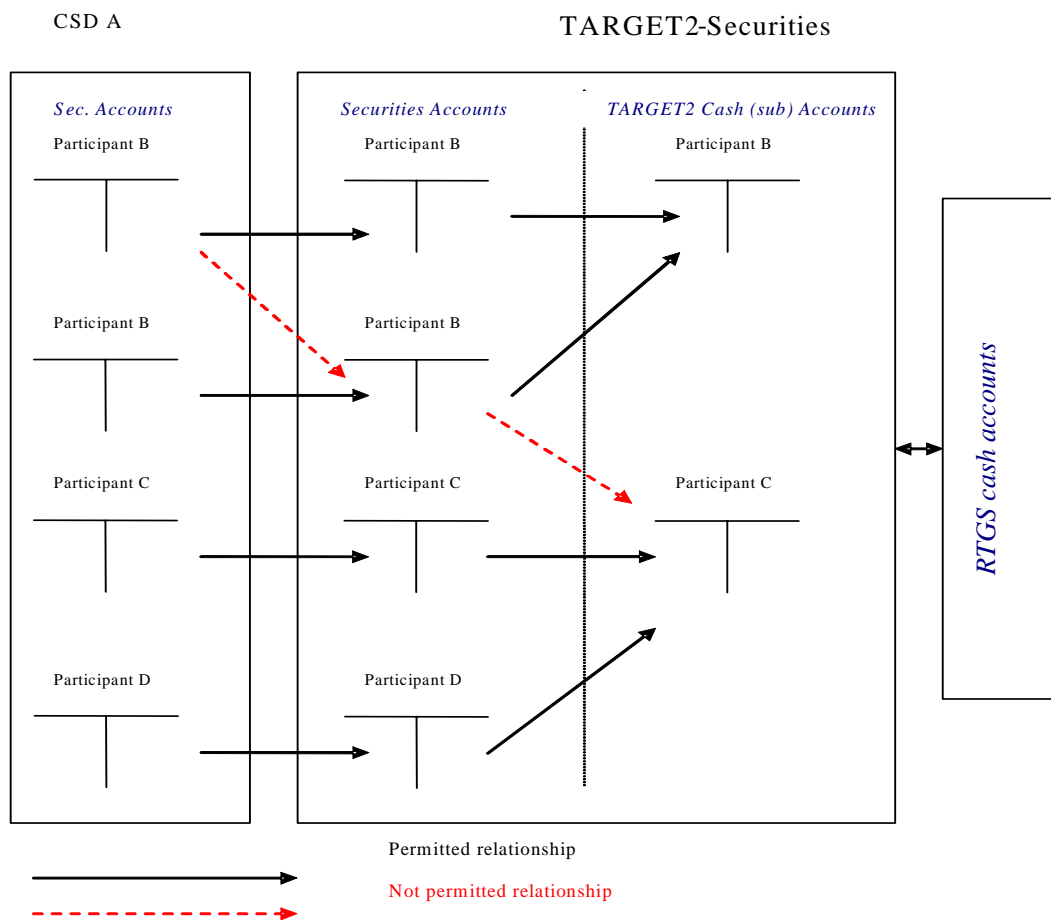
Today, participant B holds two securities accounts in CSD A and one RTGS cash account in TARGET2. In T2S, participant B may still hold two securities accounts (if it so wishes) and one cash sub-account (i.e. a sub-account of its RTGS account).

Participant C holds one securities account in CSD A and one RTGS cash account in TARGET2. In T2S, participant C will hold one securities account and one cash sub-account (i.e. a sub-account of its RTGS account).

Finally, participant D is a broker with one securities account in CSD A and no RTGS cash account in TARGET2. In T2S, participant D will hold one securities account and no cash sub-account (i.e. a sub-account of the RTGS account). The cash settlement of its DvP transactions will settle in the cash sub-account of its cash settlement agent (participant C in this case).

Of course, in all the above examples, users may have n number of accounts opened with their CSDs. In this case, exactly n number of accounts per user will be maintained in T2S. This number is defined in accordance with the CSDs' rules and procedures. The guiding principle is that CSDs and their participants can define in T2S the degree of their account segregation up to the point of their current account structure (one-to-one relationship).

Box 3: Uniform securities account segregation and codification in T2S

The picture below provides an indication of how the T2S securities account structure and the current securities account structures of the CSD will relate to each other:

- T2S will provide a detailed account structure, starting with the CSD that the account relates to, via the participant's accounts and sub-accounts, up to the finest level of differentiation where the different accounts can relate to different account usages (e.g. pledge accounts for collateral, issuance account for new issues) and to different balances held on the accounts (e.g. lent balance, or balance eligible for collateralisation of stock).

- CSDs have a structurally similar account set-up. However, different levels of segregation are used, and for some CSDs some levels provided by T2S may not be used at all. Furthermore, there are differences regarding the account types and the balance types held on the accounts.

- The T2S account structure will allow the CSDs to assign one T2S account to each of their CSD accounts (one-to-one relationship). The T2S account will reflect the settlement parameters of the current CSD accounts. T2S must provide the required flexibility in terms of account and balance types. This means that CSDs will be able to consolidate or aggregate some of their accounts into a single account in the T2S environment if they choose to do so.
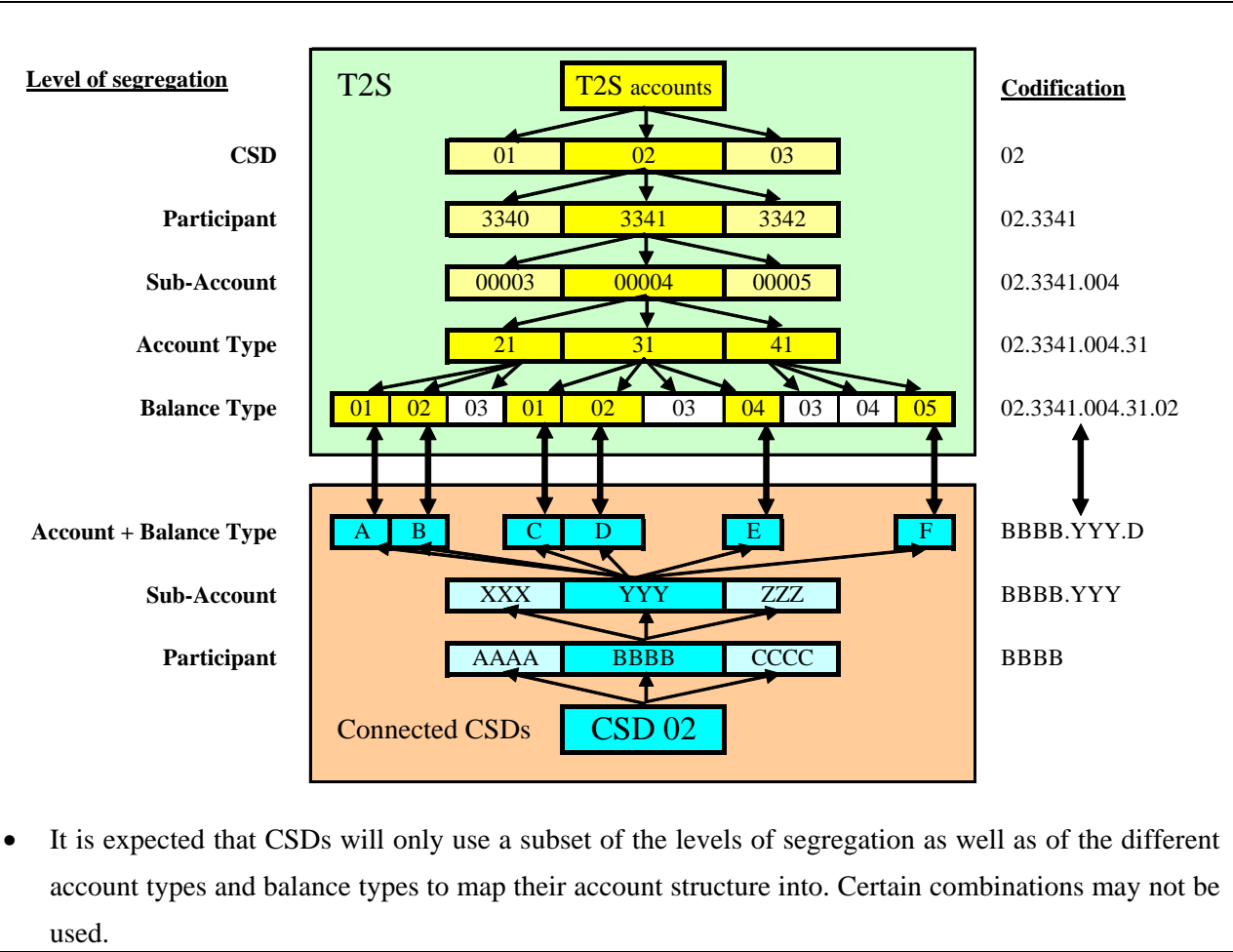
- It is expected that CSDs will only use a subset of the levels of segregation as well as of the different account types and balance types to map their account structure into. Certain combinations may not be used.

- Whatever the account-mapping CSDs choose (one to one, or many to one), it is important that the settlement instruction received by T2S clearly refers to the T2S account code against which the securities balances will be checked during the T2S final settlement process.

6. STANDARDS

In general, current market practices are expected to be used regarding instructing and reporting. There are three general principles governing how T2S will use standards and comply with them:

1. **Existing, well-established standards will be used**. For example, messaging will be based on the current ISO 15022 standard, and the ISIN will be used as an identifier for securities. How far these standards cover the required functionality will have to be assessed (e.g. the extent to which the different T2S instruction types can be mapped to ISO 15022). The industry is currently planning the introduction of the ISO 20022 XML standard and, given the T2S implementation horizon, this development will be taken into consideration accordingly. The development of messages under this standard is currently being undertaken by SWIFT and the market participants. It is expected that the prospect of T2S as a single pan-European platform will drive the harmonisation of these standards even further, by setting a de facto standard with regard to how the different fields in the SWIFT messages will be used when communicating with T2S.

2. **Anticipated and forthcoming standards** will be taken into consideration when specifying the system. Examples of this are recent recommendations issued by ECSDA, e.g. in the area of matching as well as for market claims processing, or ISO 19312 for securities reference data. It is acknowledged that these standards describe a potentially final state of harmonisation, whereas the current status comprises a greater variety of local processes and rules. As above, it is assumed that, by the time T2S is implemented, significant progress will have been made with regard to harmonisation. The proposed standards are assumed to provide a good approximation of the future situation;

3. **Proprietary and non-standard formats and processes** will continue to exist in some of the domestic markets and their CSDs. T2S, however, will be built as much as possible on a unified set of processes, formats and standards. In particular, it will provide standardised interfaces to all its participants (CSDs and users), and a standardised set (or at least a significantly reduced variety) of processes. As an example, the use of any CSD proprietary formats for messages sent to and received from the T2S interfaces should be excluded. In the case where the required and expected market harmonisation has not been concluded by the time T2S goes into production, appropriate converting mechanisms should be established at the CSD level in order to map the proprietary formats into the harmonised T2S ones. The work undertaken in various fora with reference to the removal of the Giovannini barriers should minimise the need for such converting functionalities.

7.   SUPPORT ORGANISATION

With regard to the support organisation **for settlement processing**, it is proposed that CSDs should be responsible for business operations whereas T2S should be responsible for IT operations, where:

- business operations comprise acting as a front-end to CSD participants, as a user helpdesk answering business-related questions;

- IT operation comprises responsibility for the system running properly, and according to its agreed service levels.

The responsibility for all business and IT operations that are not related to settlement processing will remain with the CSDs.

From the users' point of view, the split between business and IT operations can be mapped into first, second and third-level support:

- First-level support: this is the general interface to the users, capable of answering simple questions, and transferring users to second-level support for more complex ones. This is the responsibility of the CSDs;

- Second-level support: this layer refers to settlement operations where fails management, error corrections and similar interventions are made. Second-level support can help with more complex problems, can act on behalf of CSD participants if required, and can provide support in all types of business-related problems. Finally, it can transfer users to third-level support in the case of technical problems. Second-level support will also be the responsibility of the CSDs;

- Third-level support deals with all technical problems (e.g. no connection possible), bugs or other technical issues. It is responsible for everything that cannot be solved by the second-level support and that is of a technical nature. In this case, the CSDs will direct their participants to the T2S technical contact person. This role is taken by the operator of T2S.

Regarding support for cash accounts functionality, the current TARGET2 and NCB roles will be retained. Settlement agents (users with an RTGS cash account) will contact the TARGET2 operator and their NCBs according to the TARGET2 rules and procedures.

8. SEPARATION OF CSDS' SERVICES AND MARKET IMPACT

As presented in the previous sections, the creation of a pan-European, centralised settlement platform requires a restructuring of the roles of the CSDs regarding their traditional functions. It involves the separation of core securities settlement from all other services relevant at the post-trading infrastructure level. The latter include the notary function (i.e. record-keeping for issuers), asset-servicing, proxy voting and other custody services, securities lending and physical vault services.

The most complicated and varied services of CSDs are those related to custody processing. As it is proposed that these services should remain with the CSDs, their functionalities and interfaces should interact with the settlement part performed by T2S insofar as they have an impact on account balances (securities and cash).

It is clear that the processing of custody and corporate actions is one of the areas in which there is currently little harmonisation. Events are often processed differently in different countries, and some event types might not be used at all in some markets. Additionally, the issuers have enormous flexibility when it comes to defining corporate actions. T2S as a settlement system cannot resolve this underlying complexity; instead, it can only provide a standardised set of settlement processes to cover the processing of corporate actions. Nevertheless, the effect of this standardisation should not be underestimated. T2S only performs the settlement processing parts of all corporate actions, but these can be processed using components selected by the CSD from a single harmonised set of process steps.

Furthermore, the fact that both issuer and investor CSDs are on the same platform will allow them to process cross-border corporate actions much faster and more efficiently than today.

And finally, the standardisation of the settlement processing of corporate actions will already implement a level of harmonisation across the markets which will facilitate further developments in the same direction.

General steps when processing a corporate action

This section describes how the interaction will be structured. As a general rule, a corporate action can be broken down into the following high-level steps:

1.   collecting the corporate action information;

2.   announcing it to the holders of the related ISIN;

3.   receiving participants' instructions where relevant (optional events);

4.   calculating the entitlement;

5.   processing the settlement related to the corporate action;

6.   compensating market claims related to entitlement.

The first and third steps will remain fully with the CSDs. They relate to the functions of maintaining the event diaries for predictable events (e.g. interest payments), to collecting dynamic reference data related

to unpredictable events (e.g. mergers), and to gathering information on the exercise of various corporate event options.

In order to perform the second and fourth steps, the CSDs need the current balances of the event-related ISINs. In addition to end-of-day balances, T2S will send dedicated balance queries to them, e.g. to query all holders' balances of a specific ISIN.

The fifth step is where the main interaction between T2S and the CSDs occurs. The CSDs will have to instruct T2S to perform related settlement activities. For this purpose, T2S will provide specific instruction types.

Market claims processing will be calculated and triggered by the CSDs when the pending instruction that generated the market claim has settled. T2S will provide the required information to the CSDs through the Instruction Interface. The CSDs will then instruct T2S to compensate with a sub-type of a cash (or securities) FoP instruction (e.g. FoP sub-type "Compensation").

Furthermore, CSDs will perform transformations of pending instructions to adjust for the effects of corporate actions (e.g. to change the number of units in case of stock splits). T2S will provide functionality to identify and freeze all the relevant instructions. The CSDs will then instruct T2S to apply the changes to the instructions according to the effects produced by the corporate action, e.g. by the split ratio (see also Annex 3, Table 3.2).

More specific examples as well as the processing of corporate events will be treated in T2S are presented in Annex 3. Generally, it is assumed that the reporting of corporate action information (e.g. by MT564/566/568) will remain with the CSDs and does not lie within the scope of T2S.

Impact on CSDs and their participants

CSDs

The proposed separation of services implies some important adaptation costs for the CSDs. At this early stage the costs associated with an adequate level of interaction of CSDs' custody-related IT applications with T2S can be identified, along with the need to invest in instructing (or converting instructions) into new T2S standards.

Unbundling of applications

Adequate interaction means that CSDs may have to "unbundle" their custody processing from their settlement engines, which is relevant in systems where such services are built into a single joint application. Alternatively, CSDs have to ensure that their custody applications can pull data from the T2S reporting mechanism, process their custody activities and instruct back via the T2S interfaces. Whatever the architecture used currently, CSDs will incur some adaptation costs in order to ensure connectivity and compatibility with the T2S business model. Such costs should, nevertheless, be assessed over the long run in the context of depreciation of current IT investments and the typical industry need for a continuously high level of maintenance and development. T2S should obviate the need for any further high-value

development IT costs in the area of settlement unnecessary at the CSD level (except for settlement in commercial bank money or in foreign currencies).

Message standards

Similarly, CSDs will have to adapt to T2S new standards, particularly in the field of message formats and the harmonised accounts structure of T2S. CSDs must instruct T2S according to the harmonised standards by converting their participants' proprietary format instructions into the new harmonised format. As noted above, CSDs and market participants are expected to move to a single European standard (based on ISO 15022/20022) in the coming years, irrespective of the introduction of T2S. The market's effort in removing Giovannini barrier 1 should yield the expected harmonisation by the time T2S is envisaged to start live operations.

T2S account structure and codification

The convergence of the national markets towards a single accounts structure and codification is expected to be a lengthy process. During the first period of T2S production, local settlement communities will most probably continue to use and instruct according to the local account structure. At the same time, they will rely on local CSDs to map their instructions into the T2S accounts standards (as presented in Box 2). In the medium to long run, legal harmonisation and the impact of a T2S single standard should facilitate the convergence of local account structures.

Market participants

The Operational Feasibility Study focuses on the functional architecture of T2S and describes the services it offers regarding the settlement of securities. As a consequence it has a direct impact on the CSDs' own functional architecture, and only an indirect one on that of the market participants. As long as market participants continue to instruct T2S via their local CSDs, and as long as these CSDs support the current domestic messaging formats, they have the option of avoiding any adaptation costs since they rely on them for the mapping services to the T2S standards. It may very well be the case that for some small, locally oriented market participants, the change from local settlement to T2S settlement will, at least in the first period of T2S production, have no operational impact at all. They will continue instructing their CSDs and receive relevant reporting, just as they do today.

However, there may be considerable adaptation costs for those users (CSD participants) which are authorised to instruct T2S directly. These institutions must adapt to the T2S message and account structure standards prior to their direct connection. As already mentioned, message formats should have been harmonised by that time. The requirement to instruct T2S using the harmonised account structure (codification) may have a larger impact. As already mentioned, local settlement communities are initially expected to keep their local account structures and codifications, and only gradually to move to the adopting the T2S standard. Legal harmonisation and the mere existence of a single account structure in T2S will probably facilitate such a transition.

The following annexes include a number of boxes with "Issues to consider". Without prejudice to any comments received on the rest of the functionalities proposed here, the Eurosystem is particularly interested in receiving the market's feedback on these issues. They usually identify open questions where discrepancies occur in various markets. Their relevance and criticality would have an impact on the drafting of the more detailed User Requirements in the next phase of the project.

ANNEX 1: DESCRIPTION OF T2S FUNCTIONAL BLOCKS AND INTERFACES

This annex provides a first draft of the description of the T2S functional blocks (including their specific modules) and the interfaces to the various stakeholders. This proposal is based on a broad understanding of how the settlement business currently works. T2S aims at providing de facto European harmonisation at the settlement level. However, specific markets will need to highlight how their local practices will be translated into the new harmonised environment. As a consequence, this part of the Operational Feasibility Study is expected to be studied extensively and in detail by the market during the consultation procedure on T2S.

1.1 LIFECYCLE MANAGEMENT

Validation Module

Scope

- Checking that the instruction messages are filled according to the CSDs' required rules and T2S' messaging standards. In case of cash instructions/withdrawals from TARGET2, instructions are checked against TARGET2 rules.

Input/Trigger

- New instructions sent to the system (including instructions related to corporate actions and primary market operations).

- Existing instructions where any of the settlement-related fields has been changed. Lifecycle Management decides when to initiate validation checks in existing instructions.

- This includes instructions for countries with direct holdings and the associated need for enrichments, where instructions are validated once when entered into T2S, and a second time after enrichment (if not enriched before entering).

Activities

Formal checks:

- check that all required fields are filled;

- check that all fields are filled in the required format.

Consistency checks:

- check that the ISIN exists and that it is eligible for settlement in the CSD;

- check that the instructor exists and has an account in T2S (or is a CSD);

- check that the currency exists and is eligible for settlement in the CSD;

- check that the amount is a multiple of the minimum tradable amount[10];

- check that the trade date is today or earlier;

- check that the intended settlement date is a T2S working day, and not in the past, and before the maturity date of the security.

Authorisation checks:

Instructions that are not eligible owing to authorisations and restriction rules should be rejected:

- A user only instructs on its own securities account(s) (unless authorised by a Power of Attorney to instruct on other participants' securities accounts);

- A CSD only instructs on its own participants' accounts or its own accounts (unless authorised by Power of Attorney to instruct on other CSDs' accounts);

- An instruction type is allowed for the instructing party (i.e. some instruction types are only allowed for CSDs);

- An instruction type is allowed on the account (e.g. users are not allowed to remove securities from pledge accounts, *"create/destroy securities"* instructions are only allowed for CSDs/transfer agents, and only on specific "issuance" accounts, etc.);

- A check for duplicate instructions (e.g. ones received twice).

Output

- Instruction with lifecycle status "validated"/"rejected" or "duplicate";

- Feedback message to the participant (certainly for "rejected" and "duplicate", to be determined for "validated").

Harmonisation requirements:

- There is a low risk of different market practices that need to be replicated here*. T2S should define a standard to be used for instructions received by all connected markets.

<u>**Issues to consider:**</u>

- *Enrichments: Do all fields need to be filled in, or can participants define per standing instruction that certain default rules should be applied if some fields are empty (e.g. settlement account).*

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[10] Due to fractions in corporate actions, this check may need to be overruled.

Alternatives: all fields are required, with the option that CSDs perform enrichment or T2S does enrichment if the participant defined a standing rule (and the CSDs authorised its use).

- *Is it necessary to send feedback messages (and incur the associated message cost) on the validated instructions?*

<u>Matching</u>

Matching could be executed either in T2S or at the CSD level. Instructing parties would have the option to choose (limited by the fact that both instructing parties have to designate the same location of matching). It is expected that different instructing parties would choose different options depending on their business and operational models.

When matching takes place in T2S, this would be done in a harmonised way. The recent ECSDA report on matching would be the benchmark for establishing the T2S rules. Instructions already matched at CSD level, according to local CSD rules, should be converted into the harmonised standard before being sent to T2S (where validation checks will be applied).

Scope

- A mechanism to identify counterparty instructions and to match both instructions together.

Input/Trigger

- New arriving instructions which are not matched yet;

- Instructions that become un-matched (i.e. when one instructing party cancels its instruction).

Activities

- To decide whether matching is required, depending on the instruction type. Matching is mandatory for DvP and most FoP instructions, and they will not go to settlement if they are not matched.[11] For other instructions, e.g. FoP transfers and most custody-related instructions, no matching is required. For other instructions, it might depend on whether they have been instructed by a customer or by a CSD (e.g. "normal" lending vs. automated lending).

- In case matching is required, search all instructions which have the correct instruction type (i.e. receipt vs. payment (RvP) <-> DvP) and which are "not matched" or "un-matched" to find the appropriate counter-instruction and match both together. Each instruction can only be matched with one instruction, i.e. an instruction that is matched is no longer available for matching.

- Matching is a real-time process that runs 24 hours & 7 days a week[12]. Matching is attempted as soon as possible. Matching can occur from input date up to intended settlement date, and potentially beyond:

  - for the purging of unmatched instructions, see the Purging Module;

- Matching rules are not yet harmonised. It is proposed to use the recent ECSDA report on matching rules as a benchmark. The encompassing list of mandatory matching fields includes:

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[11] Instructions for FoP transfers within the accounts of the same participant are "single-leg" transactions where by nature matching is impossible. However, in some markets, FoP transactions between two distinct participants are not obligatory and transactions are processed successfully based on the securities debtor's instruction.

[12] Matching might not be available during some technical maintenance windows, e.g. during the weekend. Matching is required during the night to allow users to instruct on an intra-night basis.

- intended settlement date;

- the trade date where applicable (in portfolio transfer transactions, for example, this is usually not applicable);

- the cash amount including currency (should be left blank/0 amount for FoP transactions);

- the share quantity (for equities) or nominal amount (for fixed income instruments);

- buy/sell;

- ISIN;

- counterparty (CSD participant);

- second-layer market participant (sub-account/customer of counterparty). The field shall be optional and thus allowed to match to blank.

- In countries with direct holding structures, enrichments can be made before or after matching. In the case of the latter, T2S should be able to match even those instructions which are not yet enriched.

- When matching is preformed in T2S, the outcome of the process can be an instruction which is either matched or not matched. If matched, this can be revocable or irrevocable. If not matched, it may be necessary to generate a settlement "allegement" message type or not (this depends on the instruction type, the configuration of the related CSD and the customer).

Output

- If matching is not required: Instruction with status "Matching not applicable".

- If already matched: Instruction with status "Matched – revocable" or "Matched – irrevocably" or "Unmatched".

- For matching within T2S: Instruction with status "Matched – irrevocably" or "Matched – revocable", "Not matched – allegement generated" or "Not matched – no allegement generated".

- For matching outside of T2S: Instruction with status: "To be released for outside matching", "Released for outside matching – no feedback yet", "Matched outside – irrevocably" or "Matched outside – revocable", "Not matched outside – allegement generated" or "Not matched outside – no allegement generated", "Rejected outside".

- Feedback message to participant with matching status;

- For unmatched instructions, settlement allegements (MT578) are generated, if required according to market practice (this is configurable per CSD).

Harmonisation requirements

- Matching rules are not yet harmonised within the euro area. It is assumed that some harmonisation will take place before T2S is implemented.

- T2S will be based on the matching rules as recently proposed by ECSDA (See "*Proposals to harmonise and standardise pre-settlement date matching processes throughout Europe*", ECSDA, October 2006, accessible via the ECSDA home page).

- This implies that some of the markets that fall within the scope of T2S might need to change their matching procedures (no manual matching, matching independent from availability of cash or securities).

- T2S potentially needs to cover different tolerance amounts for matching, according to the customer, the securities instrument or the market.

Issues to consider:

- *"Hit and take" functionality: Are customers always required to individually instruct, or will there a "hit and take" functionality, whereby one side instructs and the other side accepts?*

- *Matching with split: Some markets allow instructions to be split unilaterally. Matching would be performed on the original instruction, and the split would only occur after matching. Is this still the case?*

- *Should matching be obligatory for all FoP transactions?*

- *Correction in case of incorrect matching: matching rules allow for a certain amount of tolerance between prices, usually EUR 20. Scenarios can appear where it might be preferable to un-match some instructions and match them in a different way (example: two DvP with same amount 100, prices on the sell side are S1 = 20, S2 = 60, and prices on the buy side are B1 = 40 and B2 = 80. In case the system first matches S2 and B1, the remaining instructions will never be matched. It would be possible, however, to match S1 with B1 and S2 with B2.). Is the related matching optimisation functionality required?*

- *In which order should instructions that arrive in bulk input be matched?*

- *How to treat instructions which are already matched at CSD (or other) level? Is there a need for "double-checking" in the Matching or (more probably) the Validation Module?*

- *Where will matching take place in case one counterparty instructs a CSD to match in another CSD, and the other* instructs T2S to match in T2S? Will there be a default rule that instructions that are not matched are transferred to T2S after some period of time? Or will both T2S and the CSD try to match in parallel, and inform the each other about successful results? How will SFD protection be achieved in this case?*

Settlement Eligibility

Scope

- Check eligibility of instructions for settlement.

- Functionality to change the eligibility status from "eligible for settlement" to "not eligible for settlement" if required.

Input/Trigger

- Instructions that have left the Matching Module with status "matched" (any sub-status) or "matching not applicable".

- Instructions that have been unblocked in the Instruction Maintenance Module.

- Any diary event during the day that could influence the eligibility of instructions, such as:

  - A change of day/start of day, when instructions become eligible;

  - A change from a mandatory to an optional settlement period (if applicable) – instructions which are purely flagged for the mandatory period become ineligible, i.e. they will not settle in the optional period;

  - Any missed settlement deadline (e.g. a DvP deadline), as well as domestic market deadlines for settlement in markets outside T2S which are connected via inter-CSD links – instructions become ineligible;

  - Any market opening and/or closing (note: non-T2S markets can open later than the start of the day);

  - A change of deadline in case of contingency or emergency situations.

- Settled instructions – they should be removed from the eligible instructions.

Activities

- Assess the eligibility of instructions according to the intended settlement date, settlement status, and according to all market rules, as well as any other schedules that have to be taken into account. The cut-off deadline for inserting intraday DvP transactions should be the same for all T2S-connected markets, as well as in line with the liquidity management timetable of TARGET2 (cash).

- The module needs to consider all rules and schedules that define eligibility. Given the T2S harmonised opening times and deadlines, the module will mainly be active when the market opens, after the DvP deadline and after the market closes.

- There might be different deadlines for various instructions types in addition to DvP, FoP and transfers. In particular, there might be deadlines for CSD instructions coming from custody, for new issues instructions, for realignments, etc.

- Additionally, it should be foreseen that markets that are connected to T2S via inter-CSD links might not yet be harmonised. Therefore, there might be additional deadlines for each non-T2S market that is connected to T2S for cross-border settlement.

- For linked instructions (that should be settled all together or not at all), all instructions must be eligible for settlement.

Output

- If eligible, instructions will receive the status "Eligible for settlement".

- If non-eligible, instructions will retain their former status.

- If non-eligible due to deadline or market closing, instructions will receive the status "No longer eligible".

- If non-eligible owing to successful settlement, instructions will retain the status "settled".

Harmonisation requirements

- T2S will in effect harmonise DvP intraday settlement cut-off times.

Issues to consider:

- *The common deadline/cut-off time for DvP settlement instructions should be technically applied simultaneously across all connected markets to ensure a level playing-field for connected CSDs. Is there a need for an earlier DvP cut-off time for some specific markets/CSDs due to the need for running end-of-day securities lending mechanisms?*

Instruction maintenance

Scope

- Allows changes to be made to pending, matched and eligible instructions.

Input/Trigger

- All changes are triggered by the Instructions Interface, where the acting parties are either the participants or the settlement operations of the CSDs. Mainly, the activities relate to error correction.

Activities

- Instruction maintenance can be done via replacements (where an existing instruction is replaced by an updated ones (SWIFT: REPL), or via the direct update of the instructions via an online interface.

- Users and CSDs can perform the following activities:

  - **enrich instructions**: with end-investor account-related instructions for countries with direct holdings;

  - **cancel instructions**. The rules differ in each CSD as to which instructions can be cancelled and how. The following rules apply:

    - They only apply to instructions that are not matched;

    - They are allowed for matched instructions, but both parties must cancel;

    - They are allowed for matched but not yet eligible instructions, where one single party can cancel one leg. The second leg would then receive the status "unmatched";

    - They are allowed for eligible instructions which are currently pending, but only if both parties agree.

- **PREA->NEWM:** Move status from pre-advise to binding settlement instruction (normally with a replacement message, although this could be done as well directly in the instruction);

  - This is already used in some markets; however, ECSDA has proposed to make this an automated step.

  - **Delivery management: block/unblock** eligible instructions: In some markets it is possible to block even eligible instructions from settlement, unless they are released by the customer. Some users use this feature to prioritise their instructions and to steer their cash liquidity to specific settlement activities:

    - Instructions can be blocked from settlement;

    - Instructions can be unblocked;

    - Blocked instructions are sometimes automatically unblocked at a specific point in time;

- It remains to be discussed whether **conditional blocking** is required (i.e. to block B until block A has settled). This functionality could be used, e.g. for market claims processing (by compensating the claim only when the pending instruction has settled).

- **Link/unlink instructions**: Linked instructions can only settle together. If one instruction does not settle, all will be rejected by the Settlement Engine. Users have recourse to this functionality to steer their liquidity usage;

- **Re-prioritise instructions**: Assign a higher or lower customer priority:

  - Some priorities are reserved for CSDs only.

- **Change fields**: For instructions which are not yet matched, it is possible to change fields which are relevant for matching. It needs to be clarified whether this should be possible directly on the instruction, or whether a cancel->resubmit is required;

- **Split**: It is to be discussed whether it should be allowed to split instructions into smaller ones with the same parameters (this would not impact matching, but would allow partial settlement);

- **Force**: It is to be discussed whether a "force settlement" activity is required for the CSDs, e.g. to act in case of an emergency scenario;

- To be completed.

Output

- Instruction with changed parameters. If the instruction is changed directly (e.g. via an online interface), the change should be validated via the Validation Module (is the change valid?), the Matching Module (does the change affects matching?) and the Eligibility Module (does the change affects eligibility?).

Harmonisation requirements

- Different activities are allowed in different CSDs. Harmonisation would simplify the set of rules.

Purging

Scope

- Remove instructions from the system.

Input/Trigger

- This is an end-of-day activity.

Activities

- Remove all instructions which have the status "settled" from the instruction database and transfer them to the historical queries database.

- Do the same for all instructions which are "cancelled".

- Additional rules apply to many CSDs that instructions which are eligible for settlement but are still pending should be removed after a certain number of days (30, 60, 180, or a different number, depending on the CSD).

- Additional rules apply to many CSDs that instructions which are eligible for matching, but still remain unmatched after a certain number of days, should be removed from the system.

Output

- Instructions are moved into the historical queries database. The status of the instructions will then be "end of life". To simplify historical queries or inquiries, the "last status before purging" will be stored with the instructions.

Harmonisation requirements

- CSDs differ in terms of the rules that they apply. This is not considered to be a problem, but can be configured.

- The rules for treating cross-border instructions need to be harmonised.

Issue to consider:

- *Historical databases: should T2S provide long-term data storage facilities to support the archiving requirements of the CSDs (e.g. balance and transaction data storage up to x number of years), or should this task remain with the CSDs?*

1.2 SETTLEMENT ENGINE

For reasons of efficiency and risk mitigation, the settlement model to be used in the Settlement Engine will be a combination of RTGS DvP Model 1 with continuous optimisation procedures (technical netting cycles) throughout the day and night. The continuous optimisation process is designed to identify transactions that, although they would fail if proposed on a gross mode (i.e. one by one), could nevertheless settle if proposed as linked transactions (technical netting). These are still RTGS securities settlements but, for the purpose of users' liquidity obligations, they simulate more the netting cycle environment.[13] As a consequence, the DvP model proposed here could be defined as *optimised continuous DvP settlement* rather than a standard DvP Model 1, 2 or 3 settlement.

Sequencing

Scope

- Queue eligible instructions for settlement in a way that optimises settlement results while taking into account the different priorities of instructions.

Input/Trigger

- Instructions that become eligible (can be single instructions or in bulk).

- Instructions that are recycled.

- Linked instructions from the optimisation process.

Activities

- Put the instructions into the queue for settlement, where different priorities are taken into account.

- Normally, the following features define the priority of an instruction:

  - Market activity: primary market instructions have higher priority than secondary market instructions. Custody instructions (such as blockings) have higher priority than customer settlement instructions, etc. The following rule could be used: primary market > custody > money market > secondary market;

  - Eurosystem collateral operations: These should have higher priority over other commercial transactions;

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[13] Using optimisation of a "more global" nature during night-time processing could be envisaged. Global optimisation is to be understood as applying to all instructions of a single ISIN during specific time intervals. The potential need to use more global optimisation even during daytime settlement should be analysed with a specific view to markets that currently do not have a central counterparty (CCP) (e.g. Spain). T2S should be neutral towards these alternative approaches, in case the analysis shows that there are aspects that cannot be covered by the more extended technical netting stages of the optimised continuous DvP settlement. See the section referring to the Booking Module.

- Type of instruction: DvP instructions can have different priority than FoP ones. Securities transfers have low priority. In addition, the priority has to reflect the business background of the settlement. To reflect this, instructions will be assigned to specific subtypes, e.g. FoP "Custody distribution", FoP "Pledge" or FoP "Close loan", whereby most of the subtypes will be reserved for CSDs only, to perform custody and value-added processing. Instructions required for new issues processing should be given the highest priority. Custody instructions should be given very high priority as well. For instructions issued by other systems (e.g. for pledging, general collateral, collateral management, lending and borrowing), the priority to be assigned needs to be defined. For example, a loan closing could have a higher priority than a normal DvP instruction, whereas a loan opening would have a lower priority;

- Expected settlement date: oldest instructions first (i.e. the ones that are already delayed);

- Nominal amount: higher amounts first;

- Cash amount (for DvP only, and only in some markets): higher amounts first;

- Input time of instructions: earlier has higher priority;

- Customer-defined priority: customers can normally assign instructions their own priority, e.g. low, medium and high. In case two customers have different priorities for matched transactions, the security leg overrules the cash leg (securities are less fungible);

- ISIN: when opening a market for night-time processing, many instructions become eligible. In case the above criteria are insufficient, additional criteria could be used, such as a priority which is randomly assigned to an ISIN (although no specific ISINs should be preferred).

- Different markets have different prioritisation practices, i.e. they might apply only a subset of all prioritisation criteria, or they might apply them in a different order. In some markets, the customer has some choice as to the order.

- Many of the above rules are mainly used for night-time settlement, in particular when night-time settlement starts and suddenly a large number of instructions become eligible, as well as in the context of recycling and optimisation, in order to decide which instructions to recycle first.[14] During daytime settlement they are less important. However, to keep the system consistent, it is proposed to use the same set of rules during night-time and daytime processing.

Output

- Instructions queued for settlement.

- Two cases can be differentiated:

  - Add new instructions to the end of the queue, whereby the order in which they are added is defined by the prioritisation rules;

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[14] In other words, the recycling and the optimisation module will use a part of the prioritisation functionality.

- Add new instructions somewhere in the middle or even at the start of the queue. This should be restricted to high-priority instructions only.

- Lifecycle status: "queued for settlement".

Harmonisation requirements

- Market practices differ. Generally, the criteria are all the same (where some CSDs only use a subset), but the order in which they are applied might differ.

- Harmonisation is vital, since in the end all instructions can refer to the same cash account. Therefore, different rules in different CSDs would create inequality between different markets, and this must be avoided in T2S:

    - Different prioritisation rules in different markets could mean that one market has (if its instructions are given higher priority) preferred access to liquidity. In extreme cases, one market could use major parts of the available liquidity due to its higher priority, putting all other markets at a disadvantage. This could become a major issue if is not possible to impose harmonised rules.

Booking

Scope

- This is the heart of the Settlement Engine, where the final bookings of the movements related to the instructions on the securities and cash accounts are performed.

- Booking is the only place where securities accounts balances can be changed.

- The so-called optimised DvP model will be used for settlement. This involves RTGS securities and cash settlement combined with self-collateralisation, continuous optimisation (technical netting) and recycling. The aim is to use a single DvP model throughout daytime and night-time settlement in order to control costs in the development phase. However, the proposal to use slightly different optimisation algorithms during night-time settlement is not ruled out. These algorithms could attempt to apply technical netting on a global scale (rather than on a few transactions) in order to simulate the settlement conditions currently available in some markets during the night. These optimisation cycles could be performed at the start and/or the end of the night-time period.

- The self-collateralisation functionality (on flows and stocks) of eligible assets is also provided here.

Input/Trigger

- Instructions that have been queued for settlement by the Sequencing Module.

- Linked instructions that have been queued for settlement by the Sequencing Module.

Activities

- Break down the single-leg instruction/matched instructions/linked set of instructions into a series of bookings.

- Check availability of securities and cash (if required) that should be exchanged in the settlement:

  - For linked instructions: only the net flow of all linked instructions needs to be covered – this is called "technical netting".

- If all the required securities and the cash are available, then the movements should be processed, the accounts updated, and settlement confirmations for all involved instructions sent (one for single leg, two for matched, many for linked) to the Lifecycle Management. This is when finality occurs.

- If not all securities or some cash transactions are not available, the instructions should be sent back to the Lifecycle Management, together with the appropriate failure reason:

  - Linked sets of transactions that cannot settle should be sent back with their original failure reasons, and should be reported to the users.

- Settlement can be processed with or without self-collateralisation. This depends on the ISIN, the customer, the account and on whether the instruction is flagged for self-collateralisation[15]:

  - In case of linked sets of instructions, instructions can be flagged by instructing parties for self-collateralisation or not. The Settlement Engine will process the instructions accordingly;

  - An appropriate haircut is to be applied for self-collateralisation on each asset class/ISIN according to the NCBs' static data rules;

  - An "auto-substitution" mechanism within self-collateralisation should be managed and applied by T2S, based on predefined rules. These include eligibility of counterparties, assets and appropriate haircuts/margins (defined by the NCBs), and the designation of balances eligible for self-collateralisation procedures This mechanism should allow participants to reuse collateralised securities in an efficient way, provided that they are firstly substituted by other adequate collateral.

- Additional bookings need to be processed for cross-border settlement within T2S: in addition to the "normal" settlement between counterparties' accounts, one or two additional realignment instructions need to be generated and settled. It still needs to be technically defined whether the realignment instructions are to be generated in the Settlement Engine, or within the Lifecycle Management.

- Additional functionalities in order to allow CSDs to perform specific settlement instructions would be available with regard to the following business activities:

  - Register new securities on an issuance account/remove them after maturity (primary market settlement and redemption);

  - Block an amount of securities on a user account (e.g. for corporate actions) – this can be implemented as a transfer to a "block" account, or via earmarking;

  - Open a loan/close a loan (this can be implemented as an FoP instruction into a specific "loan" account, or via earmarking);

  - Pledge securities, release from pledge, and transfer back from pledge account (this can be implemented as a transfer to a "pledge" account, or via earmarking");

  - To be completed.

Output

- Instruction(s) with status "settled", or

- Instruction(s) with status "Pending – lack of cash", "Pending – lack of securities", "Pending – lack of counterparty cash", "Pending – lack of counterparty securities", whatever is appropriate:

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[15] The details of the self-collateralisation procedure, e.g. the application of haircuts, assets and counterparties, are to be performed in accordance with the rules set by the Eurosystem and the relevant NCB providing the credit. The exact rules and procedures will be further analysed in the next phase of the project.

- In fact, the securities side will be checked first, and the cash will only be checked subsequently in case there is no problem on the securities side. Instructing parties will be notified accordingly regarding their own shortcomings (either on the securities or on the cash side).

- Specific feedback reporting could be required for specific instructions, e.g.:

  - Loan opened/closed;

  - Blocked/unblocked;

  - Pledged/released/unpledged;

  - To be completed.

- It needs to be decided whether these activities are to be described using specific status types, or whether the general statement "settled" is appropriate. Combined status information could also be used, such as "settled – blocked".

Harmonisation requirements

- None in the booking area

Harmonisation in the process of self-collateralisation would greatly facilitate simplicity in the design of T2S. Currently, this is not the case in all markets. As a result, some differences may be inevitable when applying self-collateralisation procedures in each market. The T2S system could be designed to support different self-collateralisation processes (e.g. repos and pledges), but this would be at the expense of additional complexity and cost.

Optimisation

Scope

- The main objective of optimisation is to maximise settlement efficiency through "technical netting", i.e. by combining instructions into appropriate sets which are then settled together as a group of linked transactions. This procedure does not affect the RTGS character of the final bookings. The technical netting only identifies groups of transactions that can be successfully settled together in the so-called optimised DvP model mode.

- More specifically, optimisation selects sets of instructions that could settle by applying technical netting (i.e. with decreased net obligation), and proposes these transactions as a linked set of transactions for settlement (i.e. via the Sequencing Module, which then reintroduces them into the settlement queue).

- Different levels of optimisation can be envisaged, ranging from the technical netting of a few instructions (e.g. in the case of back-to-backs) up to optimisation on a global scale (i.e. on all transactions of a single ISIN).[16] The latter ones could be used during night-time settlement (with the potential to block even the balances while the global optimisation algorithm is running), whereas the former are more relevant to daytime operations.

Input/Trigger

- Instructions that failed securities or cash settlement.

- Scheduled times (time intervals) when optimisation is periodically run.

Activities

- T2S could try to identify groups of instructions that could settle via technical netting, i.e. that could settle if they were all settled simultaneously, so that only the net obligation of the instructions would need to be provisioned.

- The detailed algorithm will be formulated at a later stage, following the market consultation. In general, the optimisation algorithm:

  - is designed to find groups of instructions that could resolve blocked settlement chains and circles;

  - checks whether the current balances of all involved accounts are sufficient to settle the group of transactions; and if so

  - links the instructions and hands them over to the Sequencing Module, to reintroduce them into the settlement queue. During daytime continuous settlement and while instructions remain in the queue, the balances could change again, in which case the proposed settlement could fail, and the

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[16] It should be noted that the final booking after an optimisation performed on a global scale is equivalent to the booking of multilateral balances, even if technically individual trades are settled.

process would have to be initiated again. In night-time optimisation, some blocking of the affected ISINs could be foreseen by the system architecture (since the requirements for continuous RTGS settlement may not be as critical as the daytime ones).

- A series of different optimisation algorithms of increasing complexity are possible, starting with simple cases where only instructions in the same ISIN are involved, up to highly complex trees of dependencies. Here are some examples of what the algorithms could look like:

  - Circle of two: Attempt to link pending DvP (lack of securities) and pending RvP (lack of counterparty securities) instructions in the same ISIN, on the same account, with the same counterparty. Preferably, both instructions should have identical securities amounts, or at least minimum differences. It is straightforward to identify the counter-instruction that fits each instruction best.

  - Back-to-back: Link a pending DvP (lack of securities) with a pending RvP (lack of cash) in the same ISIN, on the same account, if possible with the same amount, but with two different counterparties.

  - Circle of three: Link three pending DvP instructions with the same ISIN with status "lack of securities", where the receiving account of each instruction refers to the delivering account of the next one. Preferably, the differences in amounts should be minimised (i.e. the maximum difference between receipt and delivery should be minimised). In case there are more combinations with identical differences, the net cash amount should be minimised. In case there are still various combinations, one should be randomly selected.

  - Another possibility is to attempt optimisation on a global scale (all transactions of a single ISIN, all transactions of a single market, etc.) during night-time settlement, as proposed by some markets currently using netting cycles for this settlement period. This would simulate the netting cycles currently used by some CSDs. It remains to be assessed whether this optimisation technique is required on top of the optimisation algorithms proposed above.

  - More sophisticated combinations are also possible, e.g.:

    - Longer chains (multiple back-to-back): many DvP with "lack of securities", linked via accounts, with only the last one having a "lack of cash";

    - Longer circles (which are in the end closed chains);

    - Branching and un-branching: a party can deliver to two parties; two parties can deliver to one party, or combinations thereof.

  - The most complex optimisation is the case where instructions for different ISINs are linked, to resolve pending instructions due to lack of cash.

- Regarding timing and periodicity, two modes of optimisation could be envisaged – real-time or continuous functionality, or a batch mode (triggered at fixed intervals):

- In a real-time solution, each instruction that failed would be directly moved into optimisation, and an effort made to find potential counter-instructions. The current technical architecture considerations and the processing capacity of T2S would then take this factor into consideration:

  - The outcome would then be that an optimisation result is proposed, or the instruction would move to the next level of complexity for optimisation.

- In a batch mode, the instructions for optimisation would need to be sequenced;

- The real-time mode is therefore preferable as it optimises much earlier.

Output

- Linked instruction where, according to current balances, settlement via technical netting could be successful. These instructions are handed over to the Sequencing Module.

Harmonisation requirements

- There are no harmonisation requirements, and since T2S is expected to be a state-of-the-art system, the best possible optimisation algorithm should therefore be applied.

Issues to consider:

- *Should instructions that are already queued for settlement be linked? In this case, this would mean that the instruction would be queued a second time (where successful settlement would require the instruction to be taken out of the queue).*

- *How the different algorithms should be deployed needs to be determined. One option is to check whether it is possible for a pending instruction to find a closed circle. Then the algorithm would attempt to identify back-to-back transactions, as the next step circles of three, etc.*

- *Can linked instructions be recycled (in case of related event triggers)? Again, a situation could be imagined whereby one instruction needs to be removed from the queue.*

- *Would it be advantageous that during the night-time optimisation processes, securities accounts or specific ISIN balances are blocked while the Optimisation Module proposes linked settlement transactions? (The underlying principle here is that continuous RTGS may be interrupted during the night, while this would not in principle be possible during daytime settlement, when intraday liquidity operations are very critical).*

- *The question of whether "shaping" or partial settlement should be part of the optimisation process is still an open issue that has to be carefully examined by the T2S project team. In particular, certain legal considerations have to be analysed and assessed within the connected markets and jurisdictions.*

Recycling

Scope

- The point when eligible instructions that failed in a previous attempt to settle are re-proposed for settlement could be determined.

- Single, matched or linked instructions can be recycled.

Input/Trigger

- Two different options are possible:

  - Timing-based: Pending instructions are re-proposed after a predefined time frame;

  - Event-driven: e.g. changes in balances on accounts.

Activities

- Timing-based:

  - Each pending instruction is re-proposed for sequencing after a predefined time frame. This time frame depends on the overall priority of the instruction, i.e. instructions with higher priority are re-proposed more frequently. The frequency should be defined within T2S, without the option for CSDs or customers to change it (except by reprioritising instructions);

  - Linked instructions could be recycled according to the priority of the most urgent one (or whatever rules are agreed);

  - The main advantage of this method is that it is straightforward. However, it also has the disadvantage that it is not the fastest way of recycling, and it generates considerable unnecessary traffic in the settlement queue.

- Event-driven:

  - Events that could trigger the recycling of instructions should be monitored and, if such events happen, the instructions should be recycled;

  - The simplest event that can trigger recycling is the successful settlement of an instruction:

    - In case the settlement increases the security position in one ISIN on one account, all pending sell instructions could be considered for recycling (more generally: all instructions pending for lack of securities) from this account in the same ISIN. Normally, each event would recycle only a few pending instructions, since it is restricted to the same ISIN (where additional logic can be imposed to restrict further the set of recycled instructions);

    - In case the settlement increases the cash position on one account, all pending buy instructions could be reconsidered for recycling (more generally: all instructions pending for lack of cash) from this account. The number of instructions recycled by this mechanism can be large (in case a lack of cash is resolved by a cash injection).

- The advantage of the event-driven algorithm is that it only recycles the instructions where recycling makes sense. Thus, it reduces the traffic generated in the settlement queue. On the other hand, the algorithm is more sophisticated;

- It needs to be clarified whether additional events are required, or whether the two events mentioned are sufficient (e.g. price updates, or changes in haircuts which could affect the collateral value of securities, and which could therefore allow successful settlement with self-collateralisation);

- Linked instructions could be recycled in case one of the linked instructions fulfils the conditions for recycling.

- Preference should be given to the more sophisticated and more efficient recycling mechanism. It needs to be verified whether this has to be combined with the timing-based one, to make sure that pending instructions are recycled at least with a minimum frequency (although it would not make sense in most cases where no change in securities or cash has occurred).

- Recycling should be a real-time mechanism which constantly assesses pending instructions while settlement is running. The requirements regarding implementation speed are high.

Output

- Pending eligible instructions are sent to the Sequencing Module for queuing for settlement. Their status is unchanged, but they will be queued for settlement after sequencing.

Harmonisation requirements

- Harmonisation is a precondition for this mechanism to work. Otherwise, scenarios could appear where instructions in one CSD are more frequently recycled, and would therefore more frequently make use of available liquidity, which would create inequality between CSDs.

- Harmonisation is estimated to be feasible.

Issues to consider:

- *How should T2S deal with situations where an instruction with a lower priority can settle but the one with higher priority cannot? By strict prioritisation (which means that the instruction with lower priority is not queued at all), or by weak prioritisation, whereby lower priority instructions use the liquidity designated for higher prioritised ones?*

1.3 OTHER MODULES

These modules apply to and interact with both functional blocks as described above.

Static Data Manager

Scope

- Interface to the static data, to transfer changes in relevant static data directly to the Lifecycle Management and the Settlement Engine, and to all their related modules.

Input/Trigger

- Event-driven, triggered by a change in static data (CSD participants, ISINs, account rules).

Activities

- Changes in static data can relate to either the securities (e.g. through corporate actions), the participant set-up, market rules, or deadlines.

- Depending on the nature of the change, the Static Data Manager will have to ensure that the change is properly reflected in all related modules.

- The following changes can appear owing to an ISIN:

  - Newly opened ISINs can impact the validation result and the account structure (=> update Validation Module, Eligibility Module, Booking Module);

  - A blocked ISIN impacts all pending instructions in this ISIN (=> Validation Module, Booking Module, Sequencing Module, Lifecycle Management);

  - A change in the settlement parameters of an ISIN (e.g. minimum tradable amount);

  - A change in the haircut of a security (this can impact collateral value, and therefore result in self-collateralisation);

  - A change in the parameters of an ISIN through corporate actions, e.g. name changes;

- The following changes can appear owing to an account:

  - A newly opened account can impact the validation result and the account structure (=> update Validation Module, Booking Module, Recycling Module, Optimisation Module);

  - Blocked accounts (e.g. for bankruptcy reasons);

  - To be completed.

- The following changes can appear on general access rights:

- A CSD customer subscribes to additional interfaces, and the CSD instructs its admission to access these interfaces;

- A CSD customer de-subscribes to some interfaces, and the CSD withdraws its admission to access these interfaces;

- A new member in a CSD's business operations team;

- A new member in the user's settlement operations team;

- To be completed.

- The following changes can appear in the general market set-up:

  - Change of market deadline;

  - Introduction of new currency;

  - Manual stop of processing;

  - Manual start of processing;

  - To be completed.

Output

- Feedback that the change has been properly reflected (for intraday changes: in real time).

Harmonisation requirements

- To be checked.

Issues to consider:

- *Which changes need to be applied in real time? Which ones are applied only during end-of-day or start-of-day processing?*

Optional: <u>regulatory reporting</u>

Scope

- Store data on instructions and on settlements.

- Provide CSDs with the relevant data in order to facilitate their statistical purposes and regulatory obligations.

Input / Trigger

- Diary-based. Most reports are due monthly or even less frequently. They should be prepared as part of the end-of-day processing.

Activities

- Some standard queries can be run in the historical databases (for instructions as well as for balances), and some standard reports prepared for the CSDs on the information collected.

- Some reports can be standardised for all CSDs, e.g. ISIN and holders' reporting in the area of the balance of payments.

- Some reports will be highly specific for CSDs (e.g. for stamp duty reasons), or reports on client set-ups.

- The exact scope needs to be defined.

Output

- Standard reports.

- User-defined reports.

Harmonisation requirements

- None.

1.4 T2S INTERFACES FOR CSDS AND OTHER USERS

The split of roles and responsibilities creates certain requirements for the CSDs and their participants to interact with T2S: T2S must make available to them any securities and cash accounts balances and instruction information that is required for non-settlement processing. T2S must provide certain types of instructions for CSDs to instruct according to their specific business need, e.g. for custody or the processing of new issues, and it must provide real-time feedback on the processing status of these instructions. In addition, T2S must allow all authorisations and restrictions necessary for the settlement process to be established (securities and participants' static data).

As a consequence of the option available to certain users to instruct securities settlement directly, T2S will have to provide the instruction interface to them directly, as well as the related feedback and query functionality.

As Box 1 shows, three types of interfaces can be defined between T2S and the connected entities, according to the different business objects involved (instructions, balances and authorisations).[17]

- **Instructions Interface**: access availability to CSDs as well as some users. This will provide a bi-directional functionality in order to instruct settlement, to receive settlement status and feedback, to query the status of instructions, and to maintain and manage instructions.

- **Account Balance Interface**: access availability to CSDs as well as some users, unidirectional, to query balance information, and to monitor accounts.

- **Authorisation Interface**: access availability to CSDs only. This provides the latter with the functionality to authorise securities and participants relevant for settlement. In case of an emergency, the operator of T2S will be able to access this interface.

Each of the interfaces mentioned above can have different access channel and different embodiments, e.g. batch, single message-based, online, pull or push, as listed below.

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[17] These are the various interface functionalities available to CSDs and users, and not the number of available workstations or "screens" required by the connected entity. At present, the analysis does not describe how the information transmitted from T2S will finally be presented to the operational units of the connected institutions, i.e. whether T2S, user in-house or third-party software should or could be used.

Authorisation Interface

Authorisation and maintenance of static data

The Authorisation Interface is restricted to CSDs only (in case of emergency, the operator of T2S has additional access). As described above, CSDs will have ownership over the admission processes to settlement, for securities as well as for participants. In addition, they have to configure all access rights, for their internal business units as well as for their participants. The Authorisation and Maintenance Interface therefore contains three functional blocks, namely the Participant Account Maintenance, the Securities Maintenance, and the Rules Maintenance. These interfaces are described below.

Participant Account Maintenance

- **Scope**: This sets up new accounts (including inter-CSD accounts), closes accounts, defines settlement authorisation and restrictions per account (e.g. restrictions for pledge accounts), authorises and restricts certain types of settlement on accounts. The Account Maintenance relates mainly to participants' accounts, although CSDs' internal accounts are covered as well (e.g. for custody or new issues processing).

- **Connected entities:** For CSDs' use only. Each CSD can maintain only its internal and participants' accounts.

- **Standards**: As each CSD has its own account structure codification standard, a procedure is foreseen whereby CSDs notify on a new account opened with them and T2S assigns an account code according to the harmonised T2S codification rules (see also sub-section 4.4 on account structure).

- **Criticality/timing of connectivity**: A batch as well as an online interface is required.

  - *Batch Interface*: For normal business operations, a batch interface is sufficient. The CSD stores locally (until the end of the day) changes to be applied to the securities accounts. After T2S end-of-day closure, the CSD transfers them to the Participant Account Maintenance via the authorisation interface. Then T2S applies them (normally as part of the end-of-day or start-of-day procedures). Normally, one or two transfers per day should be sufficient.

  - *Online Interface*: This is required for emergency procedures when it might be required to perform certain business actions in real time (e.g. to lock accounts in case of bankruptcy). The real-time interactions can be restricted to a subset of all interactions. Presumably, most of the changes can be temporary and are written back at the end of the settlement day. Additionally, it might be required to provide an online interaction for the maintenance of direct holding countries.

Securities Data Maintenance

- **Scope**: This sets up or activates new ISINs, deactivates existing ISINs, defines and changes settlement-relevant securities master data, authorises ISINs for cross-border settlement in investor CSDs, etc.

- **Connected entities:** For CSDs' use only. Each CSD acts only on its "home" ISINs (ISINs for which it acts as the issuer CSD).

- **Standards**: There is not yet a market standard for securities static data maintenance. Information should be restricted to settlement-relevant details (i.e. required for matching or settlement). ECSDA has recently proposed a set of required fields that will be used as a working basis. Furthermore, ISO 19312 is currently being developed.

- **Criticality/timing of connectivity**: Two types of interface are required: a batch and an online one:

  - *Batch Interface*: For normal business operations, a batch interface is sufficient. The CSD stores locally (until end of day) changes to be applied to the securities accounts. After T2S end-of-day closure, the CSD transfers them to the Participant Account Maintenance via the authorisation interface. Then T2S applies them (normally as part of the end-of-day or start-of-day procedures). Normally, one or two transfers per day should be sufficient;

  - *Online Interface*: This is for emergency procedures (e.g. to block ISINs), for activating new codes to be available for settlement during the day (e.g. for intraday primary market activities) and for changes related to corporate actions. These changes should take immediate effect, and should not be reversed at the end of the day (unless marked as a temporary change).

Rules Maintenance (Access Rights Maintenance)

- **Scope**: This maintains all kind of access rights of participants as well as for CSDs' internal business units on accounts, instruction types including connectivity, i.e. the different users' rights in the instructions and the Account Balance Interface.

- **Connected entities:** This is just for CSDs. Each CSD defines the access rights for its own participants and internal units only (investor CSDs that access an issuer CSD are treated as participants). In case of an emergency, the operator of T2S will have access to this interface.

- **Standards**: There are no market standards for access rights maintenance data. The granularity of access rights needs to be defined according to the actions required during the different settlement services.

- **Criticality/timing of connectivity**: A batch interface with one (or a few) interactions per day is sufficient to manage this kind of information. An online interaction should be foreseen to cover emergency situations.

Issues to consider:

- *In case of emergency situations, should the operator of T2S or indeed other actors have access to the Authorisation Interface? And if yes, for what purposes? This issue was raised by some markets during the preparation of the Operational Feasibility Study.*

- *It needs to be defined whether the opening of new ISINs in an issuer CSD will automatically enable their settlement in all related investor CSDs, or whether each investor CSD needs to authorise these ISINs for settlement separately (this is the same for deactivating existing ISINs)*

- *It should be noted that situations could arise where users participating in more than one CSD may have access rights for one market via an interface whereas for other markets they may not (in this case, different CSDs provide different access rights).*

Instructions Interface

Inbound into T2S

- **Scope**: This is for sending settlement instruction into T2S, either for pre-matching or ready for settlement (already matched at the CSD level). The interface also cancels instructions, replaces them with new ones, adds trade enrichments (for end-investor accounts in direct holding countries, etc.). Settlement instructions (MT540-MT543) as well as cash instructions (MT202) need to be covered. In addition, single-leg FoP transfers and specific instruction types for the purpose of CSD business operations (e.g. to support corporate actions and new issues businesses) will be included in the scope.

- **Connected entities:**

  - *CSDs* for settlement operations, for their internal processing (e.g. instructions coming from corporate actions, new issues and value added processing), as well as for routing their user instructions. Access rights for CSD are restricted to instructions for the accounts opened with them;

  - For *CSDs' participants* that directly want to access T2S, for instructing settlement (access rights to be set by their CSD). The access rights of participants will be restricted to their own instructions and accounts.

- **Standards**: Only the ISO 15022 standard (and ISO 20022) will be used in the Instructions Interface. Settlement instructions (MT540-MT543) as well as cash instructions (MT202) need to be covered. The work undertaken by SWIFT and the market in reference to the removal of Giovannini barrier 1 will be adopted by T2S. Additional non-standard instruction types might be required for CSD-specific processing (e.g. primary market distribution, redemptions, etc.).

- **Criticality/timing of connectivity:** Batch, real-time message-based and online interfaces are required. Participants and CSD should be able to choose which operating mode they want to connect to. The configuration is maintained via the CSDs' Authorisation Interface (see Box 1). This interface will operate continuously, allowing users to instruct and query on an intra-night basis.

  - *Batch interfaces* for bulk processing and for participants that do not want to switch to message-based interfaces, as well as for CSDs, e.g. when proposing custody bookings as part of the end-of-day processing. Presumably, FileAct or an equivalent mechanism could be used.

  - *Real-time message*-based interfaces for participants connecting via SWIFTNet, as well as for CSDs routing their users' instructions, and instructing settlement related to internal value-added services (e.g. lending). SWIFT FIN or an equivalent mechanism could be used here.

  - *Online*: This is designed for CSDs as well as for participants, for instructing urgent settlement transactions (e.g. for CSDs to trigger intraday primary market activities) and for checking the

settlement status of urgent instructions. Additionally, it addresses CSDs and participants' business operations (e.g. repair, error handling, manual interactions, etc.). This interface will have to provide a much wider functionality than the other interfaces (e.g. additional queries on the lifecycle status of the instructions, or the additional possibility to act on instructions, e.g. to prioritise them).

Outbound feedback from T2S and queries

- **Scope**: Matching and settlement status information, settlement feedback, lifecycle information on settlement instructions. In addition, settlement "allegement" type messages[18] should be distributed if required (e.g. for cross-border settlement):

  - **Connected entities:**

  - *CSDs*. Information required on CSDs' own and on their participants' settlement instructions (message-based or batch). In addition, this information is required by CSDs for settlement operations: for queries on the status of instructions ("lifecycle information") and for fails management, error correction and other repair activities. In turn, this kind of interaction requires an online interface. CSDs also need information on pending securities to process market claims (here it is possible to select all pending instructions in a specific ISIN which fulfils certain conditions);

  - *CSDs' participants* with direct T2S access rights: information is required on their own settlement instructions (message-based or batch). Additionally, information is required for these participants vis-à-vis their own settlement operations: queries on the status of instructions ("lifecycle information"), management of fails, error correction and other repair activities. As above, this kind of interaction also requires an online interface.

- **Standards**: MT544-MT547 for settlement confirmations, MT548 for status advice, MT578 for settlement allegements, as well as feedback on cash instructions (MT9X0). Furthermore, MT536 and MT537 (statement of transactions/pending transactions) should be delivered. Additional functionality is only required in the online interface (e.g. special queries), as well as for special instruction types required for the CSDs' business operations.

- **Criticality/timing of connectivity:** Batch, real-time message-based, real-time queries as well as real-time queries on historical instructions are required. This interface will operate continuously, allowing intraday as well as intra-night reporting:

  - A *batch interface* to provide feedback on batch instructions (for participants and CSDs that instruct in batch mode);

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[18] *MT 578 Settlement Allegement:* This message is used to advise the account owner that a counterparty has alleged an instruction against the account owner's account at the account service provider, and that the account service provider could not find the corresponding instruction from the account owner (the function of the message is NEWM).

- A *message-based interface* to provide feedback on message-based instructions (for participants and CSDs that instruct in a message-based mode);

- An *online interface* for status queries on instructions, settlement operations, and error handling or inquiries. This interface will be combined with the interface for inbound instructions into a common interface (similar to the ICM in TARGET2);

- An *online interface for historical instructions* (even after the end of their lives). This is mainly required for the business operations of the CSDs, in order to inquire the lifecycle of an instruction, e.g. in case of claims.

Securities Account Balance Interface

Outbound from T2S and queries:

- **Scope**: query holdings (per account, per ISIN).

- **Connected entities:** CSDs and their participants. For CSDs restricted to their "home" accounts, and for participants restricted to their accounts (which can, however, be spread over different CSDs).

- **Standards**: MT535 statement of holdings. Additional "non-standard" information can be required for CSD queries (but as well for participant queries).

- **Criticality/timing of connectivity:** Three levels of interaction are required: real-time queries, historical queries, and end-of-day batch download. This interface will operate continuously, providing intra-night balance queries and reports:

  - Real-time queries checking balances, for both users as well as CSDs (e.g. before blocking positions for voluntary corporate actions);

  - Historical queries (presumably in a "historical" database), which should be possible in real time, but with much less restrictive requirements concerning the turnaround time (*see the open issue above*);

  - A batch interface, which is mainly required for CSDs to get a view on end of day balances which are required as input for custody processing (entitlement bookings).

Issues to consider:

It has been assumed that a "pull" mechanism is sufficient where CSDs and participants can query information in real time. However, for monitoring purposes, it might be necessary to implement a "push" mechanism that automatically distributes changes to the CSDs and/or users. The kind of account monitoring activities that CSDs are required to perform has to be verified, and whether this requires a push mechanism to be implemented that distributes changes in balances directly to the CSDs (and potentially as well to participants).

For monitoring purposes, monitoring mechanisms could of course be directly implemented within the T2S account database, and the information pushed to the CSD/participant only in case certain conditions are met.

The related requirements from CSDs and participants need to be verified.

Box 4: Communication protocols and relationships used in TARGET2 (cash)

Based on the information presented in the introductory chapter of the TARGET2 User-detailed Functional Specification (UDFS), Book 4, three communication protocols and relationships used in SWIFT may be differentiated:

Pull mode (real-time protocol)

SSP is a service provider that processes simple requests sent by an application (customer client) and returns responses to it. The responses are either messages or files (*in this case the client application initiates the process by sending a request to the platform. The platform responds to this request*).

Standard application-to-application (A2A) message exchange

Download of the TARGET2 directory (full version)

Download of the TARGET2 directory (delta version)

Download of the "raw data file" (only for central users).

File upload (store-and-forward)

SSP is a service provider which accepts and processes files that are pushed by the customer client application.

Ancillary System Interface (ASI).

Push mode (store-and-forward) The customer processes requests pushed by SSP. The request is either a SWIFTNet InterAct message or a SWIFTNet FileAct file. (*In this case, the platform sends <u>any</u> new information emerging in the system, while the client-application that receives them manages them locally*)

Depending on the store-and-forward mode, the customer could be a service provider or a client application.

Applied for ASI

Provisioning of the TARGET2 directory (delta version)

Provisioning of the general ledger file.

## ANNEX 2: CROSS-CSD TRANSACTIONS IN T2S

Regarding cross-border settlement within T2S (both CSDs are T2S-connected), two main cases have to be differentiated:

- cross-border settlement between the issuer and an investor CSD;

- cross-border settlement between two investor CSDs, both of which are not the issuer CSD.

Cross-CSD settlement between an issuer and an investor CSD

The figure below describes the set-up, whereby both CSDs are assumed to be within T2S (for reasons of simplicity, only the securities leg is covered here. The settlement of the cash leg will take place in the T2S cash accounts).

- The investor CSD opens an inter-CSD account with the issuer CSD. This is an omnibus account in which the holdings on this account equal all holdings held with the investor CSD

- Internally, the investor CSD has a mirror account of its holdings on the inter-CSD account in the issuer CSD.
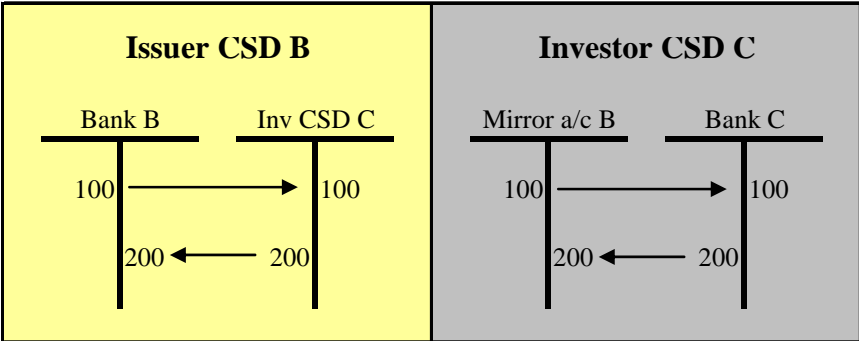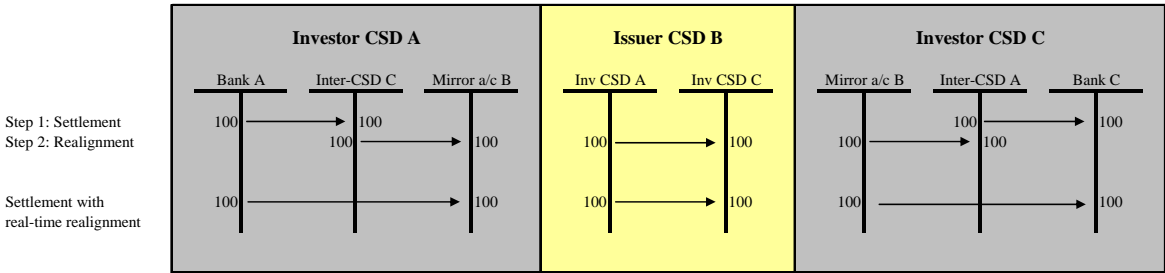

- Cross-border settlement is processed as follows:

  - When the investor CSD is a buyer CSD, the securities are transferred from the account of the issuer CSD onto the inter-CSD account of the investor CSD, provided that the seller (i.e. a participant in the issuer CSD) has the securities in question. In the investor CSD, the securities are credited to the buyer (i.e. a participant in the investor CSD). All bookings take place simultaneously as linked transactions;

  - When the investor CSD is a seller CSD, the process works in the opposite direction. The main difference is that two provisioning checks now have to be performed – one on the accounts of the seller in the investor CSD, and the other one on the omnibus account of the investor CSD in the issuer CSD. Again, all bookings take place simultaneously.

Cross-CSD settlement between two investor CSDs

The situation becomes slightly more complex in case both involved CSDs are acting as investor CSDs, i.e. when neither of them is the related issuer CSD. The picture below describes the set-up, and how cross-border settlement would work. Again, it is assumed that all involved CSDs are within T2S:

- Both investor CSDs open inter-CSD accounts with the issuer CSD.

- Internally, they maintain mirror accounts of these accounts.

- Additionally, they both have inter-CSD accounts with each other.

	Investor CSD A			Issuer CSD B		Investor CSD C		
	Bank A	Inter-CSD C	Mirror a/c B	Inv CSD A	Inv CSD C	Mirror a/c B	Inter-CSD A	Bank C
Step 1: Settlement	100 →	100		100 →	100	100	100 →	100
Step 2: Realignment		100 →	100			→	100	
Settlement with real-time realignment	100 →		100	100 →	100	100 →		100

The current settlement process is described in the first two lines. It consists of a settlement transaction (step 1), and the corresponding realignment (step 2).

- Settlement takes place between the participants' account in the investor CSDs and the inter-CSD accounts of the investor CSDs. Thus, in the seller CSD, the securities are debited from the seller and credited to the inter-CSD account. Accordingly, in the buyer CSD, the securities are debited from the inter-CSD account of the seller CSD (which can then have a negative position), and credited to the buyer account.

- When settling the transaction, two provisioning checks must be performed, one on the account of the seller, and an additional one for the seller CSD. Namely, the combined position of a seller CSD on its inter-CSD account in the buyer CSD and on its omnibus account in the issuer CSD must always be greater than zero. If this is not the case, then settlement cannot take place.

- The issuer CSD is not involved in the actual settlement process, and positions on the omnibus accounts of the investor CSDs do not properly reflect their current holdings until the next realignment takes place (Step 2). Then the positions on the inter-CSD accounts are brought to zero by an FoP transaction between the omnibus accounts of the investor CSDs in the issuer CSD. The minimum standard as proposed by ECSDA is that a net realignment should occur at least at the end of the day.

In the future, T2S will permit settlement with simultaneous real-time realignment. Technically speaking, the two steps are converged into one settlement transaction which simultaneously updates all involved accounts. This is described in the last line of the figure.

Cross-CSD settlement between T2S CSDs and external CSDs

In case of settlement between an issuer and an investor CSD, where one is inside and the other outside T2S, there is no change from the process described above. The only difference is that bookings are no longer processed simultaneously, but rather subsequently, with all related consequences such as the requirement to segregate assets and temporarily to block them until feedback from the settling CSD has been received.

Regarding the settlement process between two investor CSDs, the following cases can be differentiated with regard to how the realignment is handled:

#	Participation in T2S			Realignment process
	Seller CSD	**Issuer CSD**	**Buyer CSD**	
1	Yes	Yes	Yes	Settlement with simultaneous real-time realignment
2	Yes	Yes	No	Settlement with simultaneous real-time realignment (triggered by seller CSD)
3	Yes	No	Yes	Settlement with subsequent gross realignment[19] (ASAP) (triggered by seller CSD)
4	No	Yes	Yes	Settlement with subsequent gross realignment (ASAP) (requested by buyer CSD, then triggered by seller CSD)
5	Yes	No	No	As per current process
6	No	Yes	No	As per current process
7	No	No	Yes	As per current process

The following principles are behind this set-up:

- The aim is to achieve real-time realignment wherever feasible.

- When both the seller CSD and the issuer CSD are in T2S, the realignment is processed together with the settlement. From the perspective of the outside buyer CSD, this looks like it would settle directly* with the issuer CSD.

- When the issuer CSD is also an external CSD, then a simultaneous real-time realignment cannot be performed. Nevertheless, there is a rule that the buyer CSD can request a gross realignment. The seller CSD has then to initiate the FoP transfer in the issuer CSD ASAP.

- In case the seller CSD is external, the seller CSD could settle directly against the inter-CSD account of the buyer CSD in T2S. In this case, real-time realignment would be possible.

When two or more involved CSDs are outside T2S, then the current processes will remain.

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[19] Realignment on one-by-one cross-CSD transactions.

ANNEX 3: CORPORATE ACTIONS, PRIMARY MARKETS AND SECURITIES LENDING PROCESSING

Generic settlement groups of corporate actions

When describing how settlement related to a corporate action is processed in T2S, it is helpful to group the different types of corporate actions according to the settlement activity which they generate. The following grouping and the associated processes described below are draft proposals based on the different roles of CSDs and T2S within the post-trading chain. As such, they are expected to be the subject of extensive market consultation. An initial list of these groups of events would include the following:

1. No settlement involved, i.e. all corporate actions which do not result in settlement activity. Examples are Ordinary Annual General Meetings (OMET)[20] or Extraordinary Annual Meetings (XMET).

2. Cash distributions (FOD), i.e. all corporate actions which result in the distribution of cash. Examples are Capital Gains (CAPG), Cash Dividends (DVCA), Interest Payments (INTR) or Share Premium Dividends (SHPR).

3. Securities distributions (FOP), i.e. all corporate actions which result in the distribution of securities. Examples are Bonus Issues (BONU), Scrip Dividends (DVSC), Stock Dividends (DVSE), Intermediate Securities Distributions (RHDI), Rights Distributions (RHTS) or Spin-offs (SOFF).

4. Redemptions (DVP), i.e. all corporate actions where securities are redeemed in exchange for cash, i.e. mainly Final Maturity (REDM), as well as Drawings (DRAW) and Full Calls (MCAL).

5. Exchanges, i.e. all corporate actions where securities (and potentially cash) are exchanged into other securities (and potentially cash). Examples are Conversions (CONV), Coupon-stripping (CPST), Detachments (DETI), Exchanges (EXOF), Mergers (MRGR), Partial Calls (PCAL), Re-denominations (REDO), Stock Splits (SPLF) or Reverse Splits (SPLR).

6. Booking out, i.e. all events where securities are booked out without receiving something in exchange. This group mainly relates to Worthless Events (WRTH).

It should be noted that it is not possible to assign these corporate actions exclusively to one group. For example, cash redemptions are listed in the area of redemptions, whereas share redemptions fall into the category of exchanges (alternatively, one could combine groups 4 and 5).

To describe the interaction between the CSDs and T2S, one example from the Securities Distribution and Exchange groups is described in more detail. The other groups are structurally covered by this choice (cash distributions are structurally similar to securities distributions, and redemption are specific DvP settlement against a "redemption account" of the paying agent).

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[20] This section uses the standard ISO message acronyms.

Example 1: Processing of a stock dividend

To describe how the CSDs will interact with T2S regarding the processing of corporate actions, the table below describes how a stock dividend could be processed in T2S. In reality, all related processes will be subject to extensive market consultation, so this example should be seen merely as an indication of how it could work. The example refers to a distribution account, i.e. the account from which the entitlement is to be distributed.

Table 3.1: Processing of a stock dividend

Time	Step	CSD activity	T2S Activity
Record date (end of day)	1		• Send end-of-day positions to the CSD
	2	• Query all holders in the ISIN and their positions (CSDs may query their own databases or T2S directly)	
	3	• Calculate all entitlements	
	4	• For each entitled holder: Generate FoP instruction from the "distribution account" onto the holder's account with the correct entitlement and intended settlement date = payment date	
	5	• Link all FoP instruction together and mark as FoP sub-type, "securities distribution"	
	6	• Send the linked instructions to T2S for settlement	
	7	• Identify market claims (via queries on pending instructions)	
	8	• For each market claim, generate a compensation instruction (FoP subtype "compensation") with intended settlement date = payment date	
	9	• Send the compensation instructions to T2S, and: • Link them to the pending instruction which generated the market claim as conditional settlement (settle B only if A has settled)	
	10	• Block all compensation instructions	
Payment date (night-time)	11	It is assumed that the paying agent has already delivered the stock to be distributed to the "distribution account"	At the start of night-time settlement: • Try to settle the linked instructions with a high priority (note: "securities distribution" has high priority). • T2S will settle "all or nothing"
	12		• Report the settlement result to the CSD in real time • Failed instructions will not be optimised, recycled or pending. There is only one attempt: if these instructions fail, this also marks the end of their life
	13	• In case of settlement failure: assess failure reason, correct, and instruct again (following step 4).	

Time	Step	CSD activity	T2S Activity
	14	• If the corporate action has successfully settled, unblock all compensation instructions in T2S • End of corporate action	
	15		• Settle compensation instructions as the pending instructions settle (even after payment date)

Example 2: Processing of a stock split

Generally, a stock split will be processed in three main steps:

- All old securities will be transferred to an "exchange account";

- The securities will be split, i.e. exchange of old vs. new securities (and cash) on the exchange account;

- Distribution of the new securities (and the cash) to the holders.

The exchange account refers to the account to which the old securities have to be delivered, and from which the new securities are to be distributed to the entitled holders.

In more detail, the following activities could be performed:

Table 3.2: Processing of a stock split

Time	Step	CSD activity	T2S Activity
Record date (end of day)	1		• Send end-of-day positions to the CSD
	2	• Block the ISINs for all settlement activity except for the split in T2S securities accounts	
	3	• Query all holders in the ISIN and their positions • Block these positions and assign a status "blocked for entitlement", in order to freeze the positions up to the effective date	
	4	• Calculate all entitlements, i.e. how many new securities the holder will receive for the old ones (according to the split ratio), and how much cash s/he will receive to compensate for fractions	
	5	Generate the instructions to transfer the old securities to the "Exchange account": • For each entitled holder: generate an FoP instruction in excess of the entire amount in the old securities from the holder's account onto the exchange account with intended settlement date = effective date • Link all these FoP instructions together and mark as FoP subtypes "exchange – submission" ("exchange – submissions" can settle on positions "blocked for entitlement")	

Time	Step	CSD activity	T2S Activity
	6	Generate instructions to exchange the old for the new securities (on the exchange account): • Create a linked set of instructions which simultaneously exchange the full amount of old securities into new securities and cash, according to the combined entitlement of all holders • Mark these linked instructions as "exchange – transformation" (details of this transformation settlement still have to be worked out, e.g. whether this instruction settles against the issuance account)	
	7	Generate the instructions to distribute the new securities: • For each entitled holder, generate an FoP instruction above the amount in the new securities which was exchanged against the old one, from the exchange account to the holder's account with intended settlement date (= effective date) • For each entitled holder, generate a cash instruction above the amount of cash which is to be distributed to compensate for fractions, from the cash exchange account to the holder's account with intended settlement date = effective date (if applicable) • Link all these FoP and cash instructions together and mark as FoP subtype "exchange – distribution"	
	8	• Send the three sets of linked instructions to T2S for settlement, and • Link them together as conditional settlement in the order "submission -> transformation -> distribution"	
	9	• Identify all pending instructions for the old securities (via query in T2S)	
	10	• Block all pending instructions for the old securities	
Effective date (night-time)	11		At the start of night-time settlement: • Try to settle the linked instructions with a high priority (note: "exchanges" already have high priority) • T2S will settle all linked sets in an "all or nothing" processing
	12		• Report the settlement result to the CSD in real time • Failed instructions will not be optimised or recycled: there is only one attempt
	13	• In case of settlement failure, assess failure reason, correct, and instruct again (following step 5)	

Time	Step	CSD activity	T2S Activity
	14	• If the stock split has successfully settled, adjust all pending instructions in the old securities to reflect the split (e.g. nominally adapt), then: • Unblock all the blocked pending instructions	
	15	• Unblock the ISIN for settlement	
	16		• Settle the adapted pending instructions in the new securities

Processing of voluntary corporate actions

Voluntary corporate actions, which are typically settled intraday, will be processed along the same lines as described above. They differ in three main ways:

- Blocking functionality: T2S will provide blocking instructions which allows T2S to block further settlement on all balances on which a customer has already instructed which option it wants to choose. These blocking instructions are given priority. They settle immediately or not at all, i.e. they are not recycled;

- Treatment of options: CSDs can instruct on the settlement related to each option separately, and then link all related instructions together, processing the corporate action in one step. This procedure mainly relates to voluntary corporate actions, which are processed on a fixed effective date;

- Gross processing for current date events: In case the corporate actions are processed as current date events, the CSD can process them on a gross basis, i.e. for each participant separately, according to the choice taken and the time and date when instructed. After the instruction deadline, the default option can then be applied for all yet uninstructed balances.

Cross-border custody

Cross-border custody processing is conducted in similar fashion to domestic custody processing, as described above. The main difference is that this is a form of secondary processing, after the primary processing has taken place in the issuer CSD. This might require some additional process steps, additional blockings, and/or slightly different timings.

Regarding the different process steps, the interaction between the issuer and the investor CSD is described below. ECSDA recommendations on cross-border custody processing[21] are taken as a guideline.

1. **Collecting the corporate action information**: The ECSDA recommendation states that "The issuer CSD is initiating/leading the process of any event and shall notify the investor CSD of any

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[21] Report of Working Group 5 On Cross-border Corporate Actions and Events Processing, ECSDA, November 2002 (issue 6.0), available at www.ecsda.com.

event affecting its holdings immediately upon official announcement." Thus, the issuer CSD will inform the investor CSD that a corporate action is planned, but only when the investor CSD has holdings in the related security. Issuer and investor CSDs might, however, enter into additional agreements to inform each other about all corporate actions.

2. **Announcing this to the holders of the related ISIN**: The issuer CSD sends a corporate action notification (e.g. an MT564) to all the holders of the related security. The investor CSD will also receive such a notification, since it has holdings on its inter-CSD (omnibus) account with the issuer CSD. The investor CSD can then capture the information, and further distribute it to the security holders within its books. The investor CSD can also make use of the information available in parallel with the commercial data providers and liaise with the issuer CSD in case of any data discrepancies and delays. However, final validation of information is only to be achieved against data sent by the issuer CSD.

3. **Calculating the entitlement**: The issuer CSD will calculate the entitlement of the investor CSD based on the position on the latter's inter-CSD account. The investor CSD will calculate the entitlement of all its holders based on their positions within its books (which are not disclosed to the issuer CSD). The basis of the calculation will be the record date position, and the corporate action details as announced in the announcement.

4. **Processing the settlement related to the corporate action:** The processes are straightforward with regard to the distribution of cash and securities. The issuer CSD informs the investor CSD about the expected entitlement, and on payment date distributes the entitlement to the investor CSD, based on the position on its inter-CSD account. The investor CSD can already prepare the further distribution of the entitlement, based on the preliminary information received from the issuer CSD. Once it has received the entitlement, it can then further distribute it to its participants.

   For exchanges, the process steps could be performed in the following order:

   1. the investor CSD segregates the positions, e.g. by moving them onto an internal "technical exchange account".

   2. The issuer CSD moves all positions onto its "exchange account".

   3. The issuer CSD exchanges the old securities for new ones, and distributes them.

   4. Once the investor CSD has received the new securities, it processes the exchange of the old vs. the new securities on its "technical exchange account", and distributes the new securities to its participants.

5. **Compensation of market claims related to entitlement**: Generally, each CSD will generate cash and FoP compensation instructions according to the pending instructions which relate to their accounts. For example, for a stock distribution where a DvP settlement was pending, the seller CSD will generate a delivery free of payment (DFoP) compensation instruction, and the buyer CSD will generate a receipt free of payment (RfoP) compensation instruction. Both will be

sent to T2S, where they will be matched and settled. This means that whenever both counterparties are in the same CSD, the CSD will have the compensation process under control. Whenever two CSDs are involved, the compensation will be a cross-border FoP settlement. When the two CSDs are both investor CSDs, the compensation will generate additional realignment in the issuer CSD.

Generic process steps in primary market activities

CSDs should be able to execute primary market operations in the T2S environment by using special instruction types sent to the centralised platform via the Instructions Interface. The section below describes a potential set-up. In fact, all related processes will be subject to extensive market consultation, so this example should be seen as a proposal of how the processes could be structured.

Generally, the following steps can be differentiated when performing primary market activities:

1. Legally admitting the security;

2. Opening the new ISIN for settlement and setting up the securities master data;

3. Creating the securities in the securities accounts;

4. Distributing the securities to their primary holders;

5. Settling grey and secondary market activities.

As per the distribution of roles between T2S and the CSDs, the CSDs will be fully responsible for the first step, i.e. for the legal admission of a security to trading. In the other areas, there will be some interactions between the CSDs and T2S. The case presented below describes the roles played by CSDs and T2S when processing primary market activities in relation to steps 2 to 4.

It should be noted that the process is almost identical for intraday and start-of-day primary market activities. The only difference is the time frame over which the activities extend. In the latter case, steps 1 to 3 would be extended over a few days (or even weeks), whereas steps 3 and 4 would be processed at the beginning of night-time settlement of the effective date. For intraday activities, all steps are processed in real time by T2S, as instructed by the CSDs. Thus, in the following section, the "start of day" case will no longer be explicitly mentioned. Within the process described, all steps will be processed in real time during the operating hours of T2S.

Example: Intraday primary market activity

It is assumed that the admission process has already been finalised. The definition of the requirements for admission fall under the responsibility of the CSD, and T2S will not impose any restrictions on how this process should be structured. Additionally, it is assumed that the CSD has all relevant securities master data available, in particular the ISIN and all settlement-related fields.

Table 3.3: Processing of intraday primary market activity

Step	CSD activity	T2S Activity
1	• Send a real-time request to T2S to open a new ISIN (or execute a "re-opening" issuance) for settlement in T2S via the securities data maintenance part of the Authorisation Interface • Define or update all settlement-relevant securities master data via the security data maintenance part of the Authorisation Interface	
2		• Open the new ISIN in T2S in real time • Distribute the information to all modules in real time • Open a technical issuance account for the ISIN • Send confirmation of request to the CSD **Note: CSDs will have to provide all relevant T2S securities master data, otherwise the request will be rejected**
3	• Instruct T2S to create the new securities on the issuer agents' issuance account, by means of an "add/create" instruction with the amount to be issued	
4		• Process the "add/create" instruction with the highest priority Technically, this will be an FoP transfer from the technical issuance account to the issuer agents' issuance account
5	• Instruct T2S to distribute the securities from the issuer agents' issuance account to the primary holders, i.e. generate a DvP instruction for each primary holder with the appropriate amount • Potentially link all these instructions • Instruct T2S to settle the (linked) set of instructions	
6		• Try to settle the instructions in real time with very high priority • Settle all linked instructions simultaneously If successful: • Send settlement confirmation to the CSD If not successful: • Send a status advice to the CSD • Recycle the instruction only in case of lack of cash on the buyer's side • No recycling in case of a lack of securities, when the instructions will be rejected by T2S
7	If settlement confirmation received: • End of activity In case of failure due to a lack of securities, return to step 5	

Settlement of grey and secondary market activity

Practices in the CSDs may differ regarding how to deal with "grey market" trading activities. The CSDs will have to set the related restrictions and admissions.

Generally, this could be done by opening the new ISIN before its effective date, so that related instructions can be accepted by the T2S Lifecycle Management. These instructions would then, however, only settle at the effective date, and only after primary distribution has taken place.

Settlement of secondary market trades will then occur as part of the normal settlement processing.

Generic securities lending set-up

In the present context, securities lending refers to the special procedures/mechanism managed by some CSDs at the end of the settlement cycles (or day) in order to facilitate settlement of failed transactions. These mechanisms are not to be confused with the self-collateralisation procedures used in the Settlement Engine. The basic principles on how to process securities lending in T2S can be formulated as follows:

- T2S will not provide an automated securities lending functionality.

- CSDs will instruct T2S to process securities lending transactions. T2S provides two specific FoP instruction types (DFoP "open loan" and DFoP "close loan") for this purpose. Alternatively, in case collateral is to be delivered in exchange, an "open loan" or "close loan" DvD instruction can be used or, in case of cash collateral, a similar DvP instruction type. The responsibility for ensuring the adequacy of collateral will rest with the CSD.

- The legal set-up of the lending/borrowing business, i.e. the definition of who can act as a lender/borrower and which balances can be lent, falls under the responsibility of the CSDs. T2S will provide the functionality for the CSDs to set related authorisations and restrictions on their participants via the Authorisation Interface.

- The T2S account structure will allow the designation of balances eligible for lending through appropriate combinations of account and balance types. Similarly, it will reflect lent balances with other combinations of account and balance types.

Generally, two types of lending activities can be differentiated:

- Real-time lending, which takes place in parallel to the ongoing RTGS settlement process of T2S;

- Batch lending, which could be processed at specific points during the day, and where some settlement activity might be blocked while the CSD prepares the related settlement instructions.

Examples 1 and 2 below illustrate how these two kinds of lending and borrowing activities could appear. It should be noted that bilateral lending activities can be supported along the same lines of activities, whereby the actors are different, and only a subset of the steps below would be used.

Example 1: Real-time opening of a securities loan

The table below describes how the CSDs will interact with T2S regarding the opening of a single loan while the settlement process continues in parallel. As all related processes will be subject to extensive market consultation, this example should serve as an indication of how the process could work.

Table 3.4: Real-time opening of a securities loan

Step	CSD activity	T2S Activity
1	• Query instructions pending for "lack of securities" with instruction query ("get pending for lack of securities")	
2	For one specific instruction pending for "lack of securities": • Query for balance in the related ISIN with balance query ("get eligible for lending balance in ISIN XX")	
3	In case there is at least one lender with eligible balance: • Generate FoP instruction of type "open loan" from the lender to the borrower account for immediate settlement	
4	• Send FoP "open loan" to T2S • Link with the original pending instruction	
5		In case the original instruction has already settled: • Reject FoP "open loan" and send feedback to the CSD Otherwise: • Put linked FoP "open loan' into the settlement queue (low priority)
6		• Try to provision the FoP "open loan". If successful, simultaneously: • Increase "lent balance" on the lender's account by the appropriate amount • Transfer securities to the borrower's account • Increase "borrowed balance" on the borrower's account by the appropriate amount • Settle the original pending instruction If not successful: • The instruction has failed and will not be recycled. Unlink with the original pending instruction
7		• Send settlement confirmation of status advice to the CSD
8	If loan has been successfully opened and original instruction has settled: • Generate FoP instruction of type "close loan" from the borrower back to the lender account. • Send FoP "close loan" instruction to T2S If loan has not been opened, return to Step 2	
9		• Put FoP "close loan" into the settlement queue (high priority)
10		• Try to provision the FoP "close loan" If successful, simultaneously: • Decrease "borrowed balance" on the borrower's account by the appropriate amount • Transfer securities back to the lender's account • Decrease "lent balance" on the lender's account by the appropriate amount If unsuccessful: • Send status feedback and recycle the

Step	CSD activity	T2S Activity
		instruction continuously
11		• Send settlement confirmation or status advice to the CSD

Example 2: Batch lending facilities

This example refers to a scenario where a CSD might first want to perform a lending batch in its internal systems and consequently instruct T2S after the batch to process all lending transactions. The basic steps would be the same as before; however, some additional blocking activity is required in order to decrease the risk that the settlement process could remove eligible for lending balances while the batch process prepares the lending (the additional steps are marked in bold). In fact, there is a possibility of introducing similar blocking steps even into the real-time lending process described above.

In more detail, the following activities could be performed:

Table 3.5: Processing batch lending facilities

Step	CSD activity	T2S Activity
1	• Query instructions pending for "lack of securities" with instruction query ("get pending for lack of securities")	
2	• **Block all eligible for lending balances.To avoid large message traffic, the CSD will** • **generate one blocking instruction "block eligible for lending balance", and** • **send it to T2S**	
3		• **Block the eligible for lending balances and send confirmation to the CSD**
4	For each instruction pending for "lack of securities": • Query eligible for lending balance in the related ISIN with balance query ("get eligible for lending balance in ISINXX")	
5	In case there is at least one lender with available balances eligible for lending: • Generate FoP "open loan" instruction from the lender to the borrower account	
6	When the process of generating loan openings is finished: • Send all FoP "open loan" instructions to T2S • Link each of them with the related original pending instruction	
7		In case the original instruction has already been settled: • Reject FoP "open loan" and send feedback to the CSD Otherwise: • Put linked FoP "open loan" into the settlement queue (low priority)
8	• **Send instruction to T2S to unblock all eligible for lending balances**	
9		• **Unblock the eligible balances and send confirmation to the CSD**
10		• Try to provision the FoP "open loan" instructions. If successful, simultaneously: • Increase "lent balance" on the lender's account by the appropriate amount

Step	CSD activity	T2S Activity
		• Transfer securities to the borrower's account • Increase "borrowed balance" on the borrower's account by the appropriate amount, and • Settle the original pending instruction If not successful: • Instruction has failed and will not be recycled. Unlink with the original pending instruction
11		• Send settlement confirmations or status advice to the CSD
12	If loans were successfully opened and the original instructions have settled: • Generate FoP "close loan" instruction from the borrower's back to the lender's account. • Send FoP "close loan" instruction to T2S If loan not opened, try to open a loan via the real-time process	
13		• Put FoP "close loan" into the settlement queue (high priority)
14		• Try to provision the FoP "close loan" If successful, simultaneously: • Decrease "borrowed balance" on the borrower's account by the appropriate amount • Transfer securities back to the lender's account • Decrease "lent balance" on the lender's account by the appropriate amount If not successful: • Send status feedback and recycle the instructions continuously
15		• Send settlement confirmation or status advice to the CSD

Lender substitution

It is possible to envisage a scenario in which the lender wants to sell part or all of the securities that are currently lent.

In this case, the CSD would need to replace the lent balance with an equivalent loan from another lender. This process can be supported in exactly the same way that a loan is opened. The CSD would open another loan and link it to the pending instruction to close the previous loan, in line with the process described above.

Issues to consider:

• T2S will primarily support domestic lending activities. It needs to be further investigated whether it is required to support cross-border lending, and how this could be set up.

ANNEX 4: LIST OF INSTRUCTION TYPES & STATUSES

Instruction types

Most settlement activities can be covered by eight generic instruction types:

- Receipt vs. payment (RvP);
- Delivery vs. payment (DvP);
- Receipt free of payment (RFoP);
- Delivery free of payment (DFoP);
- Delivery vs. delivery (DvD). This instruction is mainly used for collateral substitution;
- "Remove", to book securities out of the system;
- "Add", to add new securities to the system. The last two activities are restricted to CSDs, to support their new issues and custody processing;
- Cash instructions, to cover the cash part of corporate actions. These do not cover cash instructions to move liquidity between the TARGET2 RTGS accounts and the T2S sub-accounts; these have to be triggered within TARGET2.

Each instruction type has subtypes, which differ in the business context in which the instruction is to be settled. An FoP instruction, for example, can be part of normal settlement activity, but can also be used by a CSD to pledge securities, to open a loan, or to distribute custody entitlements. These subtypes are listed below in addition.

No	Type	Subtype	MT	To be matched	To be recycled	Restrictions	Priority	Remark
1	RvP	Domestic	541	Yes	Yes	None	Medium	
2	RvP	Cross-border	541	Yes	Yes	None	Medium	
3	RvP	With outside CSD	541	Yes	Yes	None	Medium	
4	DvP	Domestic	543	Yes	Yes	None	Medium	
5	DvP	Cross-border	543	Yes	Yes	None	Medium	
6	DvP	With outside CSD	543	Yes	Yes	None	Medium	
7	DvP	Custody redemption	543	No	No	CSDs only, onto specific custody accounts	High	
8	RFoP	Domestic	540	Yes	Yes	None	Medium	
9	RFoP	Cross-border	540	Yes	Yes	None	Medium	
10	RFoP	With outside CSD	540	Yes	Yes	None	Medium	

No	Type	Subtype	MT	To be matched	To be recycled	Restrictions	Priority	Remark
11	RFoP	Administered DvP	540	Yes	Yes	CSDs only	Low	Securities leg of foreign currency or commercial bank money (CoBM) DvP
12	RFoP	Cross-border custody compensation	540	Yes	Yes	CSDs only	High	For compensation between two investor CSDs
13	DFoP	Domestic	542	Yes	Yes	None	Medium	
14	DFoP	Cross-border	542	Yes	Yes	None	Medium	
15	DFoP	With outside CSD	542	Yes	Yes	None	Medium	
16	DFoP	Administered DvP	542	Yes	Yes	CSDs only	Low	Securities leg of foreign currency or CoBM DvP
17	DFoP	Transfer domestic	542	No	Yes	Participants: only between own accounts	Medium	
18	DFoP	Realignment cross-border	542	No	Yes	CSDs only	High	
19	DFoP	Realignment with outside CSD	542	No	Yes	CSDs only	High	
20	DFoP	Custody submission	542	No	No	CSDs only, onto specific custody accounts	High	

No	Type	Subtype	MT	To be matched	To be recycled	Restrictions	Priority	Remark
21	DFoP	Custody distribution	542	No	No	CSDs only, from specific custody accounts	High	
22	DFoP	Custody compensation	542	No	Yes	CSDs only	Low	
23	DFoP	Cross-border custody compensation	542	Yes	Yes	CSDs only	Low	For compensation between two investor CSDs
24	DFoP	Block balance	542	No	No	CSDs only	High	
25	DFoP	Unblock balance	542	No	No	CSDs only	High	
26	DFoP	Open loan	542	No	No	CSDs only	Low	
27	DFoP	Close loan	542	No	Yes	CSDs only	High	
28	DFoP	Pledge	542	No	No	CSDs only, in case triggered by a CMS	High	If for monetary policy purposes
29	tbd	Release from pledge		No	No	Depends on kind of pledge	Medium	
30	DFoP	Unpledge	542	No	No	CSDs only, in case triggered by a CMS	Medium	
31	DFoP	Custody book-out		No	No	CSDs only	High	To process worthless events
32	DFoP	New issues – unregistered/ remove		No	No	CSDs only, purely from issuance accounts onto technical issuance	High	To remove securities from the system at the end of

No	Type	Subtype	MT	To be matched	To be recycled	Restrictions	Priority	Remark
						accounts		their life
33	DFoP	Custody – remove		No	No	CSDs only, for the processing of "exchanges"		
34	DFoP	UCITS redemptions		No	No	"Transfer agents" only, only from issuance accounts onto technical issuance accounts	Low	
35	DFoP	New issues - register/add		No	No	CSDs only, from technical issuance accounts only onto issuance accounts	High	
36	DFoP	Custody – add		No	No	CSD only, for the processing of "Exchanges"		
37	DFoP	UCITS subscriptions		No	No	"Transfer agents" only, only from technical issuance accounts onto issuance accounts	Low	
38	DvD	Domestic		Yes	Yes	None	Medium	Could be implemented as two linked FoP
39	DvD	Cross-border		Yes	Yes	None	Medium	Could be

No	Type	Subtype	MT	To be matched	To be recycled	Restrictions	Priority	Remark
								implemented as two linked FoP
40	DvD	Collateral substitution domestic		No	Yes	CSDs only	High	Could be implemented as two linked FoP
41	DvD	Collateral substitution cross-border		No	Yes	CSDs only	High	Could be implemented as two linked FoP
42	Cash	Transfer	202	No	Yes	CSD only	Medium	
43	Cash	Custody distribution	202	No	No	CSD only, on specific custody accounts	High	
44	Cash	Compensation	202	No	Yes	CSD only	Medium	

List of instruction statuses

The list of instruction statuses provided below gives an indication as to which different instruction statuses could arise in T2S. Three additional remarks should be added:

- Firstly, the list is not complete, and will be extended in the course of the market consultation;

- Secondly, some instruction status might be removed, in case processes such as matching will become more harmonised;

- Thirdly, a substructure could be imposed, e.g. two possible statuses could be assigned to instructions after validation: "valid" or "invalid", where "invalid" could have the sub-status of "rejected" or "duplicate". This will be subject to consultation in later phases of the project as well

Finally, not all of these instruction statuses need to be presented to the user, as many are only relevant for the CSDs' business operations.

The different statuses are grouped according to the different modules described above:

1. Before validation, i.e. after arriving in the system:

    a. "accepted"

2. Related to validation:

    a. Validated

    b. To be enriched

    c. Rejected (plus reason)

    d. Duplicate (instruction already exists).

3. Related to Matching

    a. Matching not applicable

    b. Matched – irrevocable

    c. Matched – revocable

    d. Not matched – allegement generated

    e. Not matched – no allegement generated

    f. Unmatched (in case of cancellations)

    g. To be released for matching (into a non-T2S market which currently does not accept new instructions for matching)

    h. Released for matching (into a non-T2S market, awaiting feedback)

    i. Matched outside – irrevocably

    j. Matched outside – revocable

    k. Not matched outside – allegement generated

    l. Not matched outside – no allegement generated

    m. Unmatched outside

    n. Refused outside (plus reason).

4. Related to settlement eligibility

    a. Eligible for settlement

    b. No longer eligible for settlement.

5. Related to sequencing

    a. Queued for settlement.

6. Related to Booking

    a. Settled

    b. Pending – lack of cash

    c. Pending – lack of securities

d. Pending – lack of counterparty cash

e. Pending – lack of counterparty securities

f. Pending – lack of depository provision (when realignment cannot take place due to insufficient positions in the seller CSD omnibus account)

g. Settled for special instruction types (to be discussed)

    i. Blocked (= "settled" for blockings)

    ii. Unblocked (= "settled" for unblockings)

    iii. Loan opened (= "settled" for loan openings)

    iv. Loan closed (= "settled" for loan closings)

    v. Pledged

    vi. Unpledged

    vii. Registered

    viii. Removed

    ix. To be completed.

h. Rejected (for "fill or kill" instructions with reduced lifecycle such as corporate actions or new issues-related settlement instructions which are not recycled – see the list of instruction types):

    i. Lack of securities

    ii. Lack of cash.

7. Related to recycling:

    a. Recycled.

8. Related to instruction maintenance:

    a. Enriched

    b. Cancelled.

**ANNEX 5: STRUCTURE OF T2S SETTLEMENT DAY**

General principles:

- The processing times of T2S reflect the processing times of TARGET2 when related to the availability of central bank money in the settlement process. In this way, TARGET2 imposes certain deadlines and, in addition, differentiates between night-time and daytime processing. Given these constraints, the T2S processing time has been maximised as much as possible.

- Currently, CSDs might have different opening and closing times. With T2S, all these times will be harmonised. The detailed timings will be fixed once the information on the different processing times and on different market demands has been gathered in the consultation phase, to allow a decision which, if possible, balances majority practice with the more specific demands of some markets.

- Keeping this in mind, all timings are to be seen as indicative. It is foreseen that adjustments will be made after the consultation phase.

- Similar to the timings, settlement processing will be identical for all CSDs. Settlement runs specifically processed for the benefit of specific CSDs are not foreseen.

High-level T2S schedule

The T2S settlement day will be divided into two main parts: night-time settlement and the daytime settlement.

- The night-time period is mainly used for T+N settlement processing (where $N = 1, 2, 3…$), i.e. for the processing of instructions which have been input over the previous days, but with the intention to settle today. With the change of business date, these instructions become eligible for settlement. Processing is therefore performed on existing instructions which are, at the start of the process, collected, prioritised and then put into a settlement queue to propose them to the Settlement Engine. In other words, night-time processing is actually a form of DvP model 1 batch processing, where the Settlement Engine works down the instruction queue, and tries to settle the instructions using DvP model 1, either gross or using technical netting as per the optimisation procedure applied.

- The daytime period is mainly used for T+0 settlement, i.e. same-day settlement. Additionally, this period can be used to resolve failures which are left over from the night-time processing.

The timing of the different periods of the day reflects the TARGET2 schedule, since this defines the availability of central bank money for the DvP settlement activities within T2S. The picture below gives a rough overview of the different day phases:
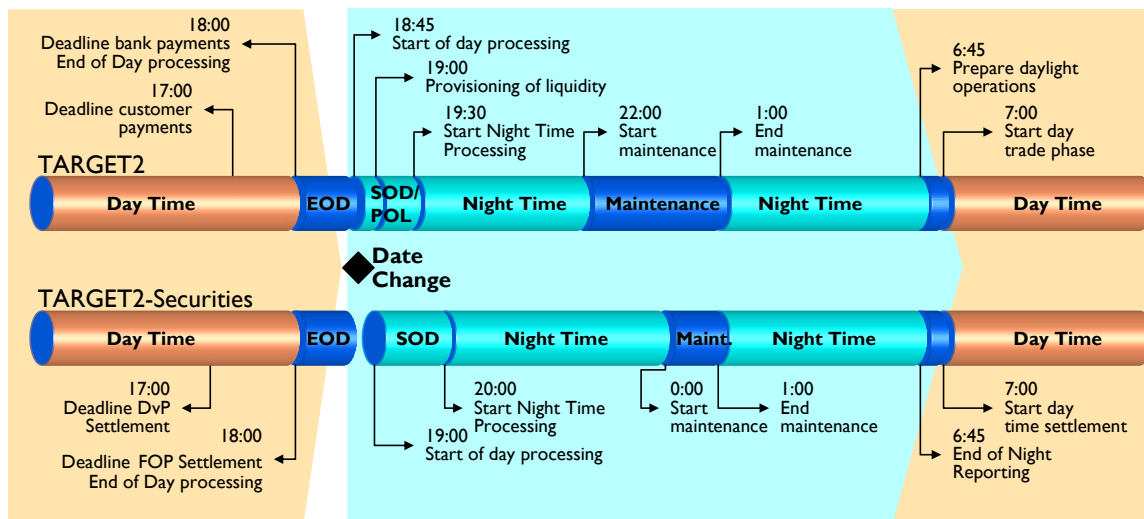
(Abbreviations: EOD – end of day, SOD – start of day, POL – provisioning of liquidity)

A day in the life of T2S

The T2S day starts with the change of business date which occurs, in line with TARGET2 practice, at 18:45 on the previous day (i.e. d-1). The main constituents of the T2S schedule are listed below:

- **Start of day (SOD) processing**: This relates to the opening of new accounts and of new ISINs, as well as to other preparatory activities required before settlement can start:

    - It is proposed to trigger the SOD processing when TARGET2 is available for night-time processing, e.g. at 19:30. There may be some flexibility with regard to starting the processing earlier.

- **T2S Night-time batch settlement processing**: The night batch can start after the start of day processing is finished. This relates to the processing of all T+*N* settlements, as well as to the processing of corporate actions or new issues. Night-time settlement will be DvP model 1 with optimisation and recycling:

    - At the beginning of the processing, instructions relating to new issues and corporate actions processing are settled. This can be achieved by appropriate prioritisation, or by reserving this part for specific CSD-related instruction types only. Corporate actions processing of the issuer CSD as well as subsequent processing in the investor CSDs will be covered;

    - Normal (customer) DvP and FoP instructions are then settled after the corporate actions and new issues processing is finished;

    - The night-time batch will provide the same settlement functionality as the daytime process. In particular, it will provide self-collateralisation, and will use optimisation and recycling to increase settlement efficiency;

    - At the end of night-time processing, all eligible instructions which have not settled yet will be carried over into the daytime processing.

- **Maintenance period**: To maximise the time available for settlement processing, a similar maintenance period to the one for TARGET2 is foreseen, but with a period shorter than the three hours used in TARGET2 (it should be noted that T2S can process settlements using dedicated liquidity without the requiring TARGET2 to be available. The unavailability of TARGET2 only limits the option to transfer additional liquidity to the T2S cash sub-accounts from the TARGET2 RTGS accounts, and vice versa).

- **End-of-night reporting**: At the end of night-time processing, all results of the night settlement process are reported to the CSDs in a night-time reporting batch. It is proposed to end the night-time processing around the time which is foreseen in TARGET2, to prepare the daylight operations.

- **Daytime processing**: Daytime processing starts when TARGET2 has opened for the day, i.e. at 7:00 (or briefly after). During the daytime, T2S will provide real-time gross settlement with DvP model 1, and with additional optimisation and recycling. This process will run continuously until the end-of-day deadline at 18:00.

- **17:00 deadline for DvP settlement**: DvP instructions that arrive up to this deadline are processed as T+0 settlements. DvP instructions that arrive later are moved to night-time settlement for the next business day:

  - It is proposed to align this deadline with the 17:00 TARGET2 deadline for customer processing (or potentially briefly before). This is deemed an appropriate balance between the requirement for late deadlines, and the requirement for the Treasury to have some time period after the DvP deadline and before the TARGET2 cut-off. This deadline can be moved earlier if there is market demand (see open issue below);

  - There is the option to mark the period up to the DvP deadline as a "mandatory DvP period", and to introduce an additional "voluntary DvP period" up to the FoP deadline. In this period, same-day settlement would only take place if both parties agree explicitly to it. This could allow for late settlement in exceptional circumstances and for specific business activities (such as the additional TARGET2 period for bank-to-bank payments).

- **18:00 deadline for FoP settlement**: FoP instructions which arrive up to this deadline are processed as T+0 settlements. FoP instructions that arrive later are moved to night-time settlement for the next business day:

  - The deadline is valid for customers as well as for CSDs. There is the option to allow a slightly later deadline for specific CSD-related instructions, e.g. for realignments;

  - Settlement processing will not stop immediately after the deadline. Instead, optimisation algorithms will run for some time until the settlement activity is eventually finished. Thus, end-of-day positions will be available a few (e.g. 15) minutes after the deadline;

- All eligible instructions which have not settled yet at the end of daytime processing will be carried over into the night-time processing for value date next day. Instructions which have been pending for a longer period of time (which might vary for different CSDs) might be purged.

- **End of day (EOD) processing**: This relates to the closing of accounts and of ISINs, as well as to other end-of-day cleansing activities.

The table below provides a comparison of the different main blocks on the TARGET2 schedule and the related ones in T2S.

TARGET2 Activity	TARGET2 Timing	T2S Timing	T2S Activity
Change of business date	d-1, 18:45	d-1, 18:45	Change of business date
TARGET2 start of day processing:	d-1, 18:45-19:00		
Provisioning of liquidity	d-1, 19:00 - 19:30		
Setting aside of liquidity and settlement of AS night-time processing	d-1, 19:30 – d-1, 22:00	d-1, 19:30 - 20:00	T2S start of day processing
		d-1, 20:00 – d, 0:00	Night-time batch settlement processing (I)
TARGET2 maintenance window	d, 22:00 – 1:00	d, 00:00 – 1:00	T2S maintenance window
Setting aside of liquidity and settlement of AS night-time processing	d, 1:00 – 6:45	d, 1:00 – 6:45	Night-time batch settlement processing (II)
Prepare daylight operations	d, 6:45 – 7:00	d, 6:45 – 7:00	T2S end-of-night reporting
Day trade phase (I)	d, 7:00 – 17:00	d, 7:00 – 17:00	Same-day settlement phase (I)
Cut-off for customer payments	d, 17:00	d, 17:00	Deadline for DvP settlement
Day trade phase (II)	d, 17:00 – 18:00	d, 7:00 – 17:00	Same-day settlement phase (II)
Cut-off for bank-to-bank payments	d, 18:00	d, 18:00	Deadline for FoP settlement
End-of-day processing	d, 18:00 – 18:45	d, 18:00 – 18:45	End-of-day processing
End of day	d, 18:45	d, 18:45	End of day

Issues to consider:

Is the intraday DvP cut-off time of 17:00 in line with the liquidity management market that participants face within the timetable of TARGET2? Would an earlier DvP cut-off time of 16:00 be more appropriate?