T2-T2S Consolidation

T2 Service Migration of Balances

Version: 1.2 Baseline for Approval

Date: January 15 2021

Contents

1 Background

With the implementation of Common Reference Data Management (CRDM) through the T2-T2S Consolidation project, the T2 Service will use a new party and cash account reference data model as well as a new transactional data model. This requires the migration of data from old TARGET2 database to the new database that the CLM Component of the new TARGET2 Service will use. The 4CB will provide an automated migration for balances to Central Liquidity Management (CLM) of the T2 Service in order

- to ensure the efficient migration of a substantial volume of data;
- to minimise human intervention in order to reduce the migration risk and the potential to manipulate data accidentally;
- to automate the reconciliation of the migrated data as a control measure.

The 4CB will provide an automated migration of

- Payments Module (PM) accounts balances;
- Home Accounting Module (HAM) accounts balances;
- Standing Facilities Module (SFM) accounts balances[1];
- The minimum reserve requirement and all Reserve Management Module (RMM) end-of-day balances from the start of the minimum reserve maintenance period that is running on the T2-T2S Consolidation go-live date;
- TARGET2 fixed credit lines in place at the end of the business day prior the go-live of the T2-T2S Consolidation.

4CB will also support the migration of the end-of-day balances for minimum reserve management for the current minimum reserve maintenance period that each National Central Bank (NCB) still maintains locally without the use of the RMM.

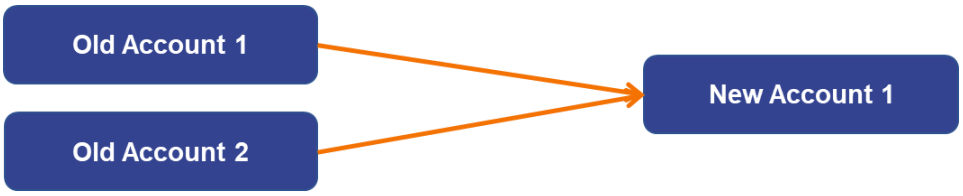
[1] These are the possible overnight deposits (OD) and marginal lending (ML – both automatic and on request) that are set up on the business day prior to the go-live date of the new T2 Service and must be reimbursed on go-live date of the T2 Service.

2 Account mapping

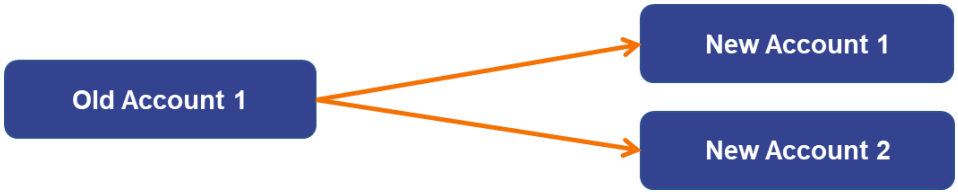
The transfer of balances and the migration of fixed credit lines from TARGET2 modules requires a mapping between the old cash account in TARGET2 to the new cash account in the CLM component of the new T2 Service. Within the new T2 Service, account structure for a party can differ from its current one in TARGET2. Consequently, four scenarios exist for the mapping of cash accounts between TARGET2 and the CLM component of the T2 Service, but the migration tool will only support two scenarios.

- One-to-one conversion scenario – transfer of full balance from old account to new account (supported by the automated migration)

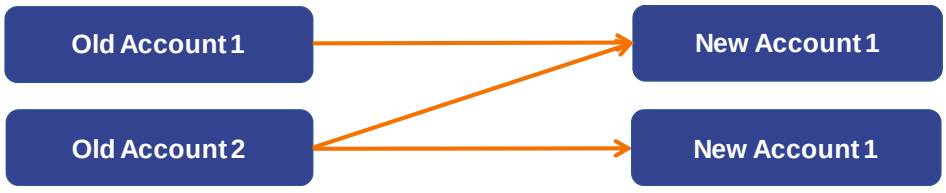
- Many-to-one conversion scenario – transfer of balances from two or more old accounts held in one or more TARGET2 modules to a new account (supported by the automated migration)



- One-to-many conversion scenario – transfer of balance from old account to two or more new accounts (not supported by the automated migration)



- A many-to-many conversion scenario materialises through a combination of a one-to-many or one-to-one conversion scenario and a many-to-one conversion scenario that affects the same accounts (not supported by the automated migration).



The automated migration will support

- a one-to-one conversion scenario for the migration of an account balance;
- a many-to-one conversion scenario for the migration of multiple account balances.

Only full balances will be migrated in order to avoid additional manual steps during the migration that may be prone to error. Therefore, the automated migration will not support a one-to-many conversion scenario and a many-to-many conversion for the migration of account balances that would result in the splitting of an existing balance on the old TARGET2 cash account. Nevertheless, a CLM account holder may need to undertake a one-to-many conversion or a many-to-many conversion to split the balance in an old cash account into multiple cash accounts. The migration procedure would support this as follows:

- The balance of the old cash account is transferred through a one-to-one conversion into a new default CLM Main Cash Account (MCA).
- Once the automated migration of balances and their subsequent reconciliation has been completed, the user can transfer the required balance(s) from the "targeted" CLM MCA to one or more other cash accounts.

The automated migration of account balances requires mapping from the old cash account(s) to the new cash account(s). In the context of the migration, each NCB will be provided with standardised csv file for the mapping of cash accounts. It is the responsibility of the respective NCB to distribute these spreadsheets to their respective communities to obtain and consolidate the mapping from their users. Each NCB will be responsible for providing the account mapping for the cash accounts within its remit. The migration will not support the transfer of a balance on a cash account in one NCB to a cash account in another NCB. A validation is foreseen that verifies that the old and new account belong to the same NCB. A single csv file is required for

- CLM cash account balances;
- Outstanding standing facilities;
- Fixed credit lines;
- Daily relevant balances for the calculation of the minimum reserve fulfilment from the start of the minimum reserve maintenance period running on the go-live date of the new T2 Service, as well as information on the minimum reserve requirement.

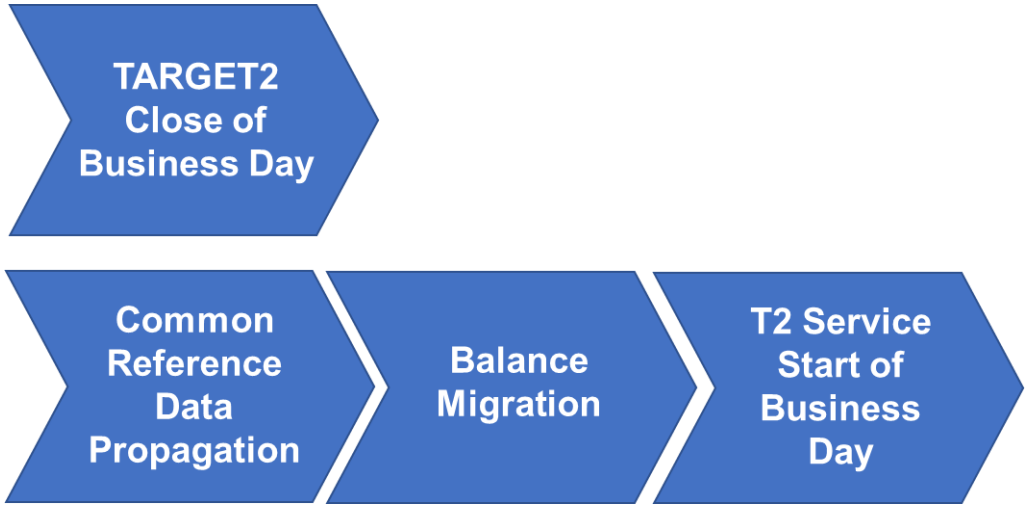
The migration of credit lines will use the same mapping table as the one for balances. If two old accounts, each having a credit line, are mapped to a single new account, then the migration will create a credit line for the new account that is the sum of the credit lines of the two old accounts. Should a party not want to migrate the balance and the fixed credit line from an old account to the same new account, then the central bank must update the credit line manually after the completion of the migration.

The csv file template for the migration of balances from TARGET2 modules and fixed credit lines will consist of two columns. The old account ID is the TARGET/SSP Account Number and the new account ID is the T2 Account Number.

Old Account ID	New Account ID
Input Placeholder	Input Placeholder

3 High-level migration sequence

The migration weekend for T2-T2S Consolidation requires a specific sequence of processes, as the migration of balances will take place between the reference data propagation and the T2 Service start of business day.



Step 1a – TARGET2 Close of Business Day

The prerequisite for initiating the migration for the T2-T2S Consolidation go-live is the successful completion of the TARGET2 end-of-day processing. However, the TARGET2 close of business day can run in parallel to the reference data propagation.

Step 1b - Common Reference Data Propagation

The propagation of common reference data to the local reference data management of the T2 Service is prerequisite for the migration of balances, as the migration of balances requires the party and cash account reference data in CLM as well as the propagation of the new business day for the T2 Service. The initialisation of the local reference data of the T2 Service also sets the business day of the T2 Service to the go-live date, i.e. the next business day after the final TARGET2 business day. There is no change of business day, as there is no previous business in the T2 Service.

Step 2 – Migration of balances

The migration of balances takes place after the successful completion of the data propagation from Common Reference Data Management (CRDM). This step includes the technical validation of balances to verify that the sum of balances is zero. After the successful completion of the technical balance validation done after the successful migration of balances, central bank users will be able to access CLM in U2A and A2A to verify the outcome of the balance migration. Each central bank will also be provided with a file containing the migrated balances in order to facilitate their reconciliation.

Step 3 – T2 Service Start of Business Day

The final step of the migration process is to execute the start of business day in order for NCBs and their respective communities to access CLM to view the results of the balance migration. After the start of business day, CLM account holders can send liquidity transfer orders for their CLM MCAs.

4 General balance migration principles

- The Pre-Migration Schedule and a Migration Weekend Playbook for the T2-T2S Consolidation go-live will define the sequencing and timing of the migration processes that this document describes. The documents will detail all processing steps, deadlines and exception handling procedures.

- The migration process will generate account balances as opening balances without requiring a debit and credit posting. After the completion of the migration, a validation process will check whether the difference between the sums of all opening debit and credit balances in CLM equals zero. This validation does not apply for credit lines and end-of-day balances for minimum reserve management.

- The migration process for account balances includes all types of cash accounts, such as ECB mirror accounts, transit accounts, etc.

- The validation process of the mapping tables will reject any cash account mapping that predicates a cross-border migration of cash accounts, i.e. the old account and the new account must belong to the same NCB. The validation process will report an error if the old account and the new account belong to different NCBs. The NCB of the old account will receive the error report so that it can provide the correct new account.

5 Validation of account mapping

Validations are a prerequisite for ensuring a successful migration to allow corrective measures to be taken before the actual migration weekend. Validation scripts will verify compliance of the source data with the target data model and the conversion rules.

- The execution of validation scripts prior to the data migration on the migration weekend enables verification that source data are/remain consistent for migration.
- Validation scripts will output the source data that fails to comply with the target data model and the conversion rules.
- Non-compliant source data is analysed to determine corrective measures, such as the modification or enhancement of conversion rules.
- Validation scripts can be executed repeatedly against the source data until all source data are compliant with the target data model and conversion rules.
- Data are ready for migration when validation scripts produce no exceptions.

5.1 Pre-Migration validation

NCBs will be able to set-up their reference data in Common Reference Data Management (CRDM) in the pre-migration phase for T2-T2S Consolidation go-live. A pre-migration validation of all National Mapping Tables is foreseen to take place at still to be agreed intervals during the pre-migration phase in order to ensure the validity of the specified accounts and completeness of each mapping table. It allows each NCB to verify whether it has set up all required parties and cash accounts in CRDM that are the prerequisite for green-lighting the start of the migration on the migration weekend.

CRDM will only propagate reference data to CLM and RTGS for the start of the T2-T2S Consolidation migration. Consequently, the pre-migration validation of the account mapping will extract the CLM cash accounts from CRDM for the validation, as the local reference data is not yet available. The pre-migration validation will provide the three types of output in order to allow the NCB to take corrective action.

- Cash accounts of CLM which exist in CRDM for which no mapping exists in the mapping table;
- Current TARGET2 cash accounts for which no mapping exists in the mapping table to a CLM cash account in CRDM;
- Cash account mappings that do not comply with the migration rules.

If the validation script identifies a CLM cash account in CRDM for which no mapping exists in the mapping table, then the NCB can take one of two actions. The NCB either can add in the spreadsheet a mapping for the new cash account or can flag it in the spreadsheet as a new CLM cash account for which no mapping to a TARGET2 cash account exists. When an NCBflags the CLM cash account as a cash account without a mapping to TARGET2, then the validation no longer outputs CLM cash account as an error.

If the validation script identifies a TARGET2 cash account for which no mapping exists in the mapping table, then the NCB needs to add in the spreadsheet a mapping to a new cash account in CLM.

If the validation script identifies a mapping that is not compliant with the migration rules, then the validation process outputs a descriptive error and NCB must take the corrective measures.

No errors should persist one calendar day prior to the start of the migration weekend in order to minimise the risks for the migration weekend. Therefore, the execution of the pre-migration validation without errors is a prerequisite for initiating the T2-T2S Consolidation migration.

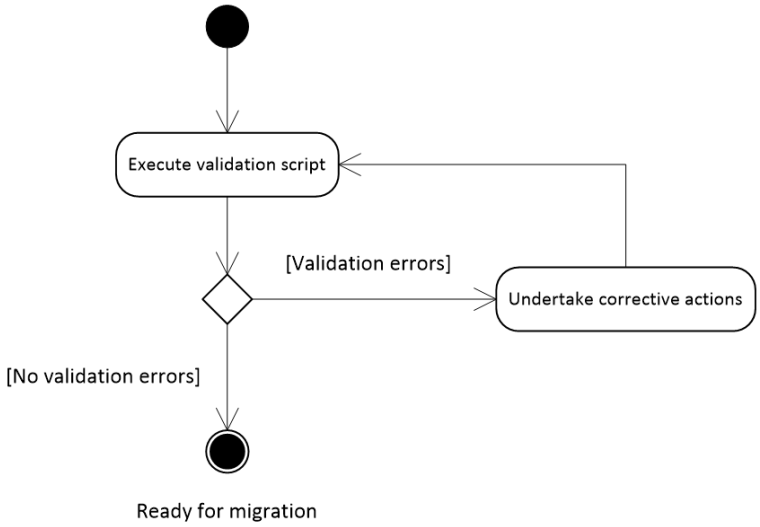


Figure 1 - Pre-migration validation process description

Step 1 NCBs receive an csv file template in order to provide the account mapping that constitutes the National Mapping table.

Old Account ID	New Account ID
Input Placeholder	Input Placeholder

Step 2 – NCBs distribute the template within their respective communities, if they need to obtain information from their banking community on which accounts to migrate which balances, as the account numbering will change and as a party may open multiple accounts in T2. Alternatively, NCBs can undertake the mapping and provide the mapping for its community (step 4). It is a decision for the respective NCB.

Old Account ID	New Account ID
Input Placeholder	Input Placeholder

Step 3 – NCBs receive and aggregate the mappings from their communities in the case that they request their respective community to provide the mapping.

Old Account ID	New Account ID
Old Account 1	New Account 1
Old Account 2	New Account 2
Old Account 3	New Account 3
Old Account 4	New Account 3
…	…
n	n

Step 4 – NCBs return the aggregated account mapping spreadsheets for validation.

Old Account ID	New Account ID
Old Account 1	New Account 1
Old Account 2	New Account 2
Old Account 3	New Account 3
Old Account 4	New Account 3
…	…
n	n

Step 5 –The mapping spreadsheets from the NCBs is loaded in to a database table in order to aggregate the data and to validate the aggregated data, i.e. the execution of the pre-migration validation script.

The validation of the account mapping verifies

- completeness;
- that no one-to-many mapping exists;
- CLM accounts belong to the same NCB.

No verification of the balance takes place in the pre-migration validation, as the purpose of the pre-migration is to ensure the completeness and validity of the account mapping. Each NCB receives the outcome from the validation of the account mapping in a (csv) file, and when the validation identifies errors then these are all included in the error report.

5.2 Validation on migration weekend

A validation of all National Mapping Tables will take place prior to initiating the migration of account balances to verify the validity of the specified accounts and completeness of the mapping table. The validation process checks that all new accounts that the mapping spreadsheets contain have been propagated to local reference data of CLM.

Step 1 – The National Mapping Table validation is run in an initial step of the migration weekend.

The validation process verifies the account mapping and each NCB validates and confirms the validation result in order to ensure that no errors persist from the migration preparation. The confirmation will require the definition and implementation of a process in which the NCBs confirm to the 4CB Migration Team the

successful completion of the validation. NCBs receive any identified errors so that they are resolved prior to the start of the actual data migration.

Step 2 - The migration calculates and stores checksums for balances in the old accounts in a database table. Furthermore, this step verifies that the sum of the extracted account balances is zero for each component of TARGET2. This means that

- The sum of the extracted account balances from the standing facilities module must be zero;
- The sum of the extracted account balances from the payments module must be zero;
- The sum of the extracted account balances from the home accounting module must be zero.

ID	Old Account ID	Balance
1	Old Account 1	45.6
2	Old Account 2	36.8
3	Old Account 3	2495.5
4	Old Account 4	5.0
...		
n		

↑ Checksum

Step 3 – The execution of the balance migration takes place

The migration executes the scripts to copy and convert the balances using the consolidated National Mapping Tables from the source to the target. The National Mapping Tables are loaded into a database table for processing. This processing step combines the data from the source data table(s) and the mapping table to create the balances with the new account numbers in the production database.

Source Data Table

ID	Old Account ID	Balance
1	Old Account 1	45.6
2	Old Account 2	36.8
3	Old Account 3	2495.5
4	Old Account 4	5.0
N		

Mapping Table

Old Account ID	New Account ID
Old Account 1	New Account 1
Old Account 2	New Account 2
Old Account 3	New Account 3
Old Account 4	New Account 3
...	...
n	n

Target Data Table

ID	New Account ID	Balance
1	New Account 1	45.6
2	New Account 2	36.8
3	New Account 3	2500.5
...		
n		

Step 4 - Once the migration of balances to the production database has taken place, a further script reads the migrated balances from the production database to create and store the checksum.

ID	New Account ID	Balance
1	New Account 1	45.6
2	New Account 2	36.8
3	New Account 3	2500.5
…		
n		

Checksum

Step 5 – 4CB verifies the technical outcome of the balance migration

The checksums from the production database and those that step 2 generated from the TARGET2 data are compared as an initial check to verify the correct migration of the balances. If there is a mismatch in the checksums, then the 4CB migration team will check the processing logs for errors in order to identify and correct the discrepancy. A mismatch of sums should only occur at this stage if a technical error materialised in step 3. Furthermore, after the migration of balances, the 4CB migration team runs a further script to verify that the sum of the debit and credit balances is zero. In both cases, the 4CB migration team needs to identify and remedy the error before continuing with the next migration step. After remedying the error, the 4CB migration team reruns the checksum validation and the balance check from this process step.

ID	Old Account ID	Balance
1	Old Account 1	45.6
2	Old Account 2	36.8
3	Old Account 3	2495.5
4	Old Account 4	5.0
…		
n		

ID	New Account ID	Balance
1	New Account 1	45.6
2	New Account 2	36.8
3	New Account 3	2500.5
…		
n		

Step 6 — NCBs and their respective communities verify the outcome of the balance migration.

The NCB receives a list of balances with the new account identifiers after the migration to verify and to confirm the result of the account balance migration. Furthermore, they can query the balances through the graphical user interface and the application-to-application interface that will only be available after a successful technical validation and 4CB reconciliation (Step 5). At this stage of the process, the likelihood of an error materialising would be low. If an NCB or its respective community identifies an incorrect balance, then the NCB reports to the relevant body monitoring the migration. When reported, the 4CB migration team identifies the root cause and remedies the error.

Account Balance Report

6 Migration of balances from TARGET2 modules

The section provides further descriptions for the migration from TARGET2 modules.

- Payments Module (PM) accounts balances
- Home Accounting Module (HAM) accounts balances
- Standing Facilities Module (SFM) accounts balances
- TARGET2 fix credit lines in place at cut-off for bank-to-bank transfers on the business day prior the go-live (currently 18 November 2022)
- Minimum reserve requirement and end-of-day balances for minimum reserve requirement fulfilment

6.1 Credit lines and cash account balances

The migration of credit lines will take place before the migration of cash account balances to ensure that the migration of negative cash account balances is possible when they are covered by credit lines. After successful migration of credit lines, the migration of cash account balances will take place.

6.2 Standing facilities

The migration of standing facilities module will encompass the following types of balances:

- Total account balance;
- Balance pertaining to marginal lending on request;
- Balance pertaining to automatic marginal lending;
- Overnight deposit balance.

The interest calculation will occur on the migrated balances in the start-of-day processing that takes place after the successful completion of the balance migration.

A specific procedure will be executed during the migration weekend to calculate the interest accruals out-NCBs after migration of balances from the standing facilities module has been completed.

6.3 Reserve management migration

6.3.1 Minimum reserve requirement

The migration from the Reserve Management Module (RMM) to CLM will include the minimum reserve requirement.

6.3.2 End-of-day balances for minimum reserve

The 4CB will provide an automated migration of end-of-day balances from the RMM to CLM. The prerequisite for migration of balances for minimum reserve management is the set-up and configuration of the required cash accounts and minimum reserve management groups in CRDM, such as pools and MFI leader groups. Consequently, the migration of minimum reserve management will be on the account level balances at the close of each business day from the start of the minimum reserve maintenance period running as of close of business day prior to the T2-T2S Consolidation go-live (as of 18 November 2022). The migration of the individual end-of-day balances from the RMM provides for the recalculation of the minimum reserve requirement fulfilment based on the new reference data set-up in CRDM. A migration of the running average is not feasible, as the migration of the running average would not take a change in the reference data set-up for minimum reserve management.

The calculation for the fulfilment of the minimum reserve requirement will take place for each past business day in the ongoing minimum reserve maintenance period using the reference data for minimum reserve management that CRDM propagated to CLM at the end of the first business day in CLM.

In the context of minimum reserve management migration, one or more accounts could be closed between the start of the minimum reserve period and the migration weekend, i.e. the migration would include the migration of end-of-day balances for closed cash accounts. In order to migrate end-of-day balances for closed account, the closed account would only need to be mapped to a new account in CLM.

The minimum reserve management migration will cater for two migration scenarios.

- Migration of TARGET2 cash account balances;
- Migration of balances from non-TARGET2 cash accounts, i.e. balances from cash accounts in the in-house systems of the NCBs.

If an NCB does not use the RMM, then the NCB can provide a comma-separated values (csv) file. The 4CB migration team will then load these balances into the reserve management function of CLM. The NCB can also insert such balances for the current reserve management period using the camt.998 message once T2-T2S Consolidation is in operations.

If an NCB uses the RMM, but has not inserted into RMM all externally maintained balances required for the calculation of the minimum reserve fulfilment the NCB can insert these also via the csv mentioned above or via the camt.998 so to insert backdated balances for the current reserve management period.

6.3.3 Minimum reserve infringement penalties

Penalties for the infringement of minimum reserve requirements will not be migrated. Therefore, the NCB must close out any open penalties in TARGET2 by the last TARGET2 business day before the go-live of T2-T2S Consolidation. Should any penalties remain open, then the NCB must process these manually.