

T2S CHANGE REQUEST FORM		
General Information (Origin of Request) ☐ User Requirements (URD) or GUI Business Functionality Document (BFD) ☒ Other User Functional or Technical Documentation (SYS)		
Request raised by: 4CB	Institute: 4CB	Date raised: 07/05/2025
Request title: Changes to the Billing process for the management of Direct Holding Markets		Request No.: T2S 0851 SYS
Request type: Common	Classification: Scope enhancement	Urgency: Fast-track ¹
1. <u>Legal/business importance parameter</u>²: High		2. <u>Market implementation efforts parameter</u>³: Low
3. <u>Operational/Technical risk parameter</u>⁴: Low		4. <u>Financial impact parameter</u>⁵: Very high
Requestor Category: Eurosystem		Status: Proposed for a Release

Reason for change and expected benefits/business motivation:

Given the growing number of securities accounts in T2S and potential onboarding of other direct holding markets to T2S, long term solutions must be put in place. Indeed, taking into account the current Securities Account volume (an average 2.8 million) the expected increase during the migration phase (4 million), and the projected volumes for 2030 (10 million), it is not possible to adopt the same approach used for Euroclear Finland's onboarding. That approach focused on optimizing processes, which, in some cases, were already too slow and had been adjusted to accommodate the increase (2.5 million) in accounts.

For Euronext Copenhagen's onboarding a partial redesign of the entire T2S billing chain is required in order to ensure an efficient management of increasing volumes and a regularity at performance level, by designing a process scalable both at the application and infrastructure levels, enabling an incremental management of future increases.

The objective of this change is to achieve the best performance of invoicing process without any negative effect on the markets relying on different account structures.

Description of requested change:

In light of aforementioned considerations, we have identified impacts on following components:

- **T2S Modules**

At the Start of Day all T2S modules, but CRDM, extract RAW data related to consumptions performed by T2S actors during the previous Business Date. Basing on a detailed estimation of the possible daily volume increase by T2S INTF, LCMM, SETT and ESMIG modules, a change on the T2S modules extraction approach and on the daily STSI loading process may be needed.

As for CRDM, amendments should be put in place in order to shift from the current *from-scratch extraction approach* (in which the complete set of CRDM configurations are extracted every day) to an *incremental extraction approach* for RAW data extraction and sending to STSI, allowing to extract and send only the

¹ Fast-track justification: A fast-track approach is requested due to the urgent need to implement this change, considering the onboarding of additional end-investor markets to T2S, and to mitigate the risk of adverse effects on the overall T2S performance.

² Legal/business importance parameter was set to "HIGH" since with this change guarantees the direct holding markets on-boarding in T2S, mitigating the risk of adverse effects on the performance.

³ Market implementation effort parameter was set to "LOW" since this change is not expected to require significant resources on the side of Participating CSDs, CBs and their communities in order for them to be able to take full benefit of the change.

⁴ Operational/technical risk parameter was set to "LOW" since this change is expected not to threaten the Service Level for Participating CSDs or CBs or to have no or insignificant operational impact on the Participating CSDs, CBs or 4CB.

⁵ Low < 100kEUR < Low-Medium < 200 kEUR < Medium < 400kEUR < High < 700kEUR < Very high

configuration just performed during the related business date.

This would allow the loading of the total volume of Securities Accounts (and related restrictions) in the same way, with the same approach and within the same timeframes used for the migration.

- **Short term Statistical Information (STSI) Module**

In the STSI context, which is responsible for aggregations stemming from the RAW data sent by the T2S sending Modules (T2S INTF, LCMM, SETT, ESMIG and CoCo BI), changes should be put in place in order to:

- Migrate from the current RAW data loading process into an *incremental loading approach*, for the T2S modules which adopted the incremental approach ad extraction level (as for the previous section);
- Improve the calculation process for the T2S Service Items under the Service Categories:
 - Account Management Services;
 - Settlement Services;
 - Information Services

The process will need to be made application-wise scalable by identifying micro-functionalities and logical groupings (whether linked or not to business concepts), meaning that the results of the aforementioned calculations (from 3 to n files) will potentially be ready and made available to the next step (BILLCoCo) not all at once (as is currently the case, with three files that must be received at the same time), but at different times. The whole generation process has to be over within the next business date (except the last day of a specific billing period when all information has to be sent over to BILLCoCo in time to not breach the agreed camt.077 sending timeline).

This is to ensure both the maintenance of current functionalities (in terms of timing and content) for current T2S participants and the ability to manage new configurations that will come into play with the onboarding of Euronext Copenhagen.

- **BILLCoCo (Back EndComponent, A2A GUI Components)**

Regarding the BILLCoCo Back End component (BE), the same approach used for STSI one should be adopted. Therefore, a series of processes need to be appropriately and partially redesigned in order to make them scalable at the application level, thereby also ensuring their scalability at the hardware level.

The processes identified as requiring partial refactoring are:

- Upload T2S Daily Consumption Data
- Generate Consumption Data Function;
- Generate Invoice Data/Data Set Function;
- Send (prepare) Itemised data Function for A2A and U2A querying.

As for the two components, **Billing A2A** and **Billing GUI**, they will need to be adapted to accommodate the changes made to the corresponding BE component, in particular:

- **Billing A2A** – Queries and related answers for TARGET Services are currently managed via real time message based network service. In case the current limitation of 32Kb of message size is exceeded, the BR ICAA002 is triggered by ESMIG and the file store and forward network service is used to convey the answer, with the limitation of 32MB of maximum size. After this second threshold, the BR ICAA003 is triggered by ESMIG and the transmission is aborted, due to the current limitation at the NSP level. In this context, a technical solution should be put in place in order to identify in advance itemised A2A and U2A query results which could potentially exceed this limit, avoiding the complete query execution and the useless consumption of significant computational resources for non-transmittable and non-manageable results. This approach would avoid significant performance degradation to all environment users.
- **Billing GUI** – The screens:
 - Invoice Data and Invoice Data Details screens;
 - Itemised Invoice Data screen,

may experience a significant performance degradation due to the SAC increase. Therefore, changes in the structure of the screen or restriction of search criteria or in the related processing will have to be envisaged.

The communication between the aforementioned Sending Module and STSI Module, as well as between STSI and BILL CoCo, is managed through files exchange, for which an increase in volume is expected (an assessment of the percentage increase was also mentioned above as necessary). Therefore, taking this into account, as well as the files' retention period, it has to be assessed and verified whether modifications to the current size of the system

hosting the various software components are necessary.

Submitted annexes / related documents:

Outcome/Decisions:

*CRG on 18 June 2025: the CRG agreed to recommend CR-0851 for authorisation by the T2S Steering Level, following a fast-track approach.

*CSG on 27 June 2025: the CSG agreed to authorise CR-0851.

*NECSG on 27 June 2025: the NECSG agreed to authorise CR-0851.

*PMG on 3 July 2025 requested the DA in view of R2027.JUN.

*MIB on 4 July 2025: the MIB agreed to authorise CR-0851.

*PMG on 11 September 2025: the PMG agreed to recommend the inclusion of CR-0851 in the scope of R2027.FEB, subject to a positive CRG recommendation.

*CRG on 18 September 2025: the CRG agreed to recommend to the PMG the inclusion of CR-0851 in the scope of R2027.FEB.

*OMG on 18 September 2025: the OMG identified no operational impact from the implementation of CR-0851 in the scope of R2027.FEB

*CSG on 02 October 2025: the CSG approved the inclusion of CR-0851 in the scope of R2027.FEB.

*NECSG on 02 October 2025: the NECSG approved the inclusion of CR-0851 in the scope of R2027.FEB.

*MIB on 03 October 2025: the MIB approved the inclusion of CR-0851 in the scope of R2027.FEB.

*PMG on 15 October 2025: The PMG agreed to launch the detailed re-assessment of CR-0851 with a view of scoping in R2027.JUN.

Documentation to be updated:

UDFS Updates:

BILL UDFS - 4.1. Business Rules

New A2A BR will be added "QMPC090 – The query cannot be executed because the number of SACs involved would lead to an unmanageable message size."

UHB Updates:

BILL UHB - 2.1.1 Invoice Data – Search/List Screen

Add limitations on search criteria for users belonging to Direct Holding Markets:

- Search criteria "Service", "Period Start date" and "Period End date" must be mandatory.
- Period Start date" and "Period End date" search criteria must allow at maximum a search period of one month.

BILL UHB - 2.2.2.1 Itemised Invoice Data – Search/List Screen

Add limitations on search criteria for users belonging to Direct Holding Markets:

- It is mandatory to use at least one search criteria.
- The autocomplete feature on search criteria "Securities Account number" is disabled.

Preliminary assessment:

Detailed assessment:

T2S Specific Components		Common Components	
LCMM		Common Reference Data Management	
	Instructions validation		Party data management
	Status management		Securities data management
	Instruction matching		Cash account data management
	Instructions maintenance		Securities account data management
	Penalty Mechanism		Rules and parameters data management
			Access rights management
Settlement		CRDM business interface	
	Standardisation and preparation to settlement		Report management
	Night-time Settlement		Query management
	Daytime Recycling and optimisation	X	Communication
	Daytime Validation, provisioning & booking		Outbound Processing
	Auto-collateralisation		Inbound Processing
Liquidity Management			
	Outbound Information Management		
	NCB Business Procedures		
	Liquidity Operations		
Statistics and archive			
X	Short term statistical information		Legal archiving
			Data Warehouse
T2S Interface		Eurosystem Single Market Infrastructure Gateway	
X	Communication		Communication
	Outbound Processing		Outbound Processing
	Inbound Processing		Inbound Processing
T2S information management			
	Report management		
	Query management		
Operational Services			
	Data Migration (T2S DMT)		Data Migration (CRDM DMT)
	MOP Contingency Templates	X	Business Day Management
			Business Day Management business interface
		X	Billing
			Billing business interface
			Operational and Business Monitoring

Impact on major documentation		
Document	Chapter	Change
Impacted GFS chapter		
Impacted UDFS chapter	BILL UDFS - 4.1. Business Rules	Add the new A2A BR "QMPC090 – The query cannot be executed because the number of SACs involved would lead to an unmanageable message size." Final wording proposals to be provided during implementation phase.
Impacted URD chapter	--	n.a.
Additional deliveries for Message	--	n.a.

Specification (UDFS, MyStandards, MOP contingency templates)		
UHB	BILL UHB - 2.1.1 Invoice Data – Search/List Screen	Add limitations on search criteria for users belonging to Direct Holding Markets: - Search criteria "Service", "Period Start date" and "Period End date" must be mandatory. - Period Start date" and "Period End date" search criteria must allow at maximum a search period of one month. Final wording proposals to be provided during implementation phase.
	BILL UHB - 2.2.2.1 Itemised Invoice Data – Search/List Screen	Add limitations on search criteria for users belonging to Direct Holding Markets: - It is mandatory to use at least one search criteria. - The autocomplete feature on search criteria "Securities Account number" is disabled. Final wording proposals to be provided during implementation phase.
External training materials	--	n.a.
Other impacted documentation (FA Sch. 05, FA Sch. 07)	--	n.a.
Impacted GDPR message/ screen fields	--	n.a.
Links with other requests		
Links	Reference	Title

OVERVIEW OF THE IMPACT OF THE REQUEST ON THE T2S SYSTEM AND ON THE PROJECT

Summary of functional, development, infrastructure and migration impacts

The partial redesign of the entire T2S billing chain is required for Euronext Copenhagen's onboarding and for managing potential onboarding of other direct holding markets to T2S.
The main driver of change is the increase of the number of Securities Accounts (SACs) from the current volume (an average 2,8 million) to the projected volume for 2030 (10 million).

To ensure an efficient management of increasing volumes and a regularity at performance level, enhancements are deemed necessary on all the modules involved in the chain and on interactions among them:

T2S INTE

At the Start of Day T2S modules daily extract and send to STSI RAW data related to consumptions performed by T2S actors during the previous Business Date.

CRDM CoCo

CRDM module daily extracts and sends to STSI the RAW data during the previous Business Date.
The extraction approach must change from the current "from-scratch" extraction involving of all the complete set of CRDM configurations to "incremental" extraction focused only on CRDM configuration changed during the previous Business Date.

BDM CoCo

In accordance with changes on CRDM Module must be defined a new trigger in order to activate the new Extraction Data Process. This trigger is going to be configured thanks to T2S Business Day event, after

Business Data Change (e.g. SDEX or similar). This is no impact on the functional side.

Short term Statistical Information (STSI)

STSI module daily aggregates RAW data sent by other modules (T2S INTF, LCMM, SETT, ESMIG, CoCo BI and CRDM) and send resulting aggregations to BILL CoCo.

It must be changed to adopt an incremental loading approach for gathering data from T2S modules which adopted the incremental approach at extraction level (as for the previous section) and to improve the calculation process for the T2S Service Items.

Improvement of the calculation process impacts the sending of Daily T2S Consumption Data to BILL CoCo, so it must be assured that improved aggregation and sending process must conclude in line with the T2S billing process timeline.

BILL CoCo

BILL CoCo module aggregates daily consumption received by STSI on billing period basis, produces billing process deliverables (Invoice Data, PDF Invoice, camt.077 CONS, camt.077 INVC) and offers interactive features via U2A and A2A.

The Back End component of BILL CoCo (BILL-BE) is impacted with changes necessary to ensure scalability both at application and hardware level.

BILL-BE processes which are impacted by a partially redesign and refactoring to reach an overall performance improvement are:

- Upload T2S Daily Consumption Data.
- Generate Consumption Data Function.
- Generate Invoice Data/Data Set Function.
- Send (prepare) Itemised data Function for A2A and U2A querying.

Improvement on BILL-BE process must not affect current billing process timeline and must not impact billing of other TARGET Services⁶.

BILL CoCo offers interactive features via U2A and A2A to query data produced by the process, with the increase of retrievable data due to the SACs increase, these queries could result in non-transmittable and non-manageable results.

To avoid significant performance degradation to all environment users and useless consumption of significant computational resources, interaction features must be limited to reduce query data scope or to completely avoid query execution in case its result are beyond a certain limit.

On the U2A component of BILL CoCo (BILL-U2A) the data scope of queries available on Screens will be reduced by means of mandatory search criteria for users belonging to Direct Holding Markets.

Namely, impacts on BILL-U2A Screens will be:

- Invoice Data Search/List Screen:
 - o Search criteria "Service", "Period Start date" and "Period End date" must be mandatory.
 - o "Period Start date" and "Period End date" search criteria must allow at maximum a search period of one month.
- Invoice Data Details Screen: no impacts, it benefits of changes to Invoice Data Search/List Screen.
- Itemised Invoice Data Details Screen: no impacts, with changes implemented for EFI onboarding the Screen already manages the scenario of a high number of retrievable SACs.
- Itemised Invoice Data Search/List Screen:
 - o It is mandatory to use at least one search criteria.
 - o The autocomplete feature on search criteria "Securities Account number" is disabled⁷.

Please note that these changes will impact also Direct Holding Market already onboarded on T2S (e.g. EFI)⁸.

⁶ The correct functioning of all Business Services, given the impact on shared software, will be ensured through:

- parallel execution of the old and new software (in the 4CB internal systems), followed by verification through comparison.
- non-regression user testing.

A phased installation of the new version for the non-directly impacted Business Service remaining should be possibly considered.

⁷ The autocomplete feature impacted by the change is only the one on field "Securities Account number" of Itemised Invoice Data Search/List Screen. Other fields and Screen are not impacted. The screen will evaluate if the user belongs to a Direct Holding Market leveraging on an existing CRDM configuration.

⁸ Other markets with different account structures in T2S should also perform non-regression tests.

On the A2A component of BILL CoCo (BILL-A2A) a new check will be put in place to check if the number of SACs involved would lead to an unmanageable message size.
 If so, the query will not be executed and a new A2A BR is returned to the customer notifying that query response would result in a payload higher than the maximum size manageable by NSPs.
 The new BR will be "QMPC090 – The query cannot be executed because the number of SACs involved would lead to an unmanageable message size".

Main Cost Drivers

- Implementation costs
 - Software changes in the T2S modules T2S-INTF, CRDM, BDM, STSI, BILL (62%)
 - Redesign of STSI processing to manage increased number of SACs (cf. above);
 - Adaptation of BILL CoCo (partial redesign) to STSI changes (cf. above).
 - Changes on BILL U2A and A2A (protective measures) to manage increased amount of data (cf. above).
 - Adaptations in T2S INTF data extraction and migration of extraction application to enhanced infrastructure to support the volumes (cf. above).
 - Need of additional Linux VMs and new WAS Liberty Profile: new licences and new deployment path (18%).
 - Testing of the amended functionalities (11%)
- Running costs:
 - Need of additional Linux VMs and new WAS Liberty Profile: new licences and new deployment path (71%).
 - Maintenance costs (29%)

Impact on other TARGET Services and projects

4CB invites the governances of T2, ECMS and TIPS to discuss the need of a dedicated non-regression test campaign BILL being relevant for all TS.

Summary of project risk

No risk has been identified during detailed assessment.

Security analysis

No adverse effect has been identified during security assessment.

Other impacts (yes/no)

No



Cost assessment on Change Requests

T2S-851-SYS – Changes to the Billing process for the management of Direct Holding Markets			
One-off	Assessment costs*		
	- Preliminary	not charged	Euro
	- Detailed	10,000.00	Euro
One-off	Development costs	1,353,581.75	Euro
Annual	Operational costs		
	- Maintenance costs	88,829.28	Euro
	- Running costs	265,838.95	Euro

*The relevant assessment costs will be charged regardless of whether the CR is implemented (Cf. T2S Framework Agreement, Schedule 7, par. 5.2.3).