



**EUROPEAN CENTRAL BANK**  
**EUROSYSTEM**

<b>T2S CHANGE REQUEST FORM</b>		
<b>General Information (Origin of Request)</b>		
<input type="checkbox"/> User Requirements (URD) or GUI Business Functionality Document (BFD) <input checked="" type="checkbox"/> Other User Functional or Technical Documentation (SYS)		
<b>Request raised by:</b> OMG	<b>Institute:</b> 4CB	<b>Date raised:</b> 29/10/2020
<b>Request title:</b> Mitigation measures for missing partial settlements and new COLGEN tool		<b>Request ref. no:</b> T2S 0746 SYS
<b>Request type:</b> Common	<b>Classification:</b> Maintenance	<b>Urgency:</b> Fast track
<b>1. Legal/business importance parameter:</b> High <sup>1</sup>		<b>2. Market implementation efforts parameter:</b> Low <sup>2</sup>
<b>3. Operational/Technical risk parameter:</b> Medium <sup>3</sup>		<b>4. Financial impact parameter:</b> No financial impact <sup>4</sup>
<b>Requestor Category:</b> 4CB		<b>Status:</b> Allocated to a release

**Reason for change and expected benefits/business motivation:**

In the course of the incident occurred during the NTS phase of 25th May 2020, as explained in the Post Mortem Report Incident 200525-T2SO-270812, SETT did not communicate to LCMM a number of partial settlements, causing that the related instructions were not updated to reflect such partial settlements and, consequently:

- i. The related outgoing confirmation messages (sese.025 informing about the partial settlement) were not generated.
- ii. The T2S GUI showed incorrect information for these instructions i.e. missing the partial settlement.
- iii. In case these instructions had a further settlement (either for the whole remaining part or another partial), the related outgoing confirmation message sent contained incorrect information in some fields such as the PreviouslySettledQuantity and PreviouslySettledAmount. For the same reason, the GUI also showed incorrect information after further settlements on these instructions.

To correct these issues, the Reprocessing Tool could not have been used because it was designed to cope specifically with the scenarios of the incidents occurred on 27th Nov 2018 and 17th Apr 2019, both during the RTS phase, and as such it is not applicable in the context of NTS-related notifications.

As a consequence:

- For the missing or incorrect outbound messages, the T2S Operator either extracted the data in .xlsx or generated them in .csv (XML format) with the OMEGA tool, and provided it to the requesting CSDs during the following days, allowing for a manual injection of the messages in their systems.
- The missing partial settlements were not resent to LCMM to update the instructions, and the missing information could not be manually added to the Instructions database due to the complexity and risk of the update required to reflect a partial settlement, particularly high due to the number of affected instructions and the lack of a dedicated operational tool designed for this purpose. Consequently, the information reported when the affected instructions were queried remained incorrect, i.e. showing incorrect information in the GUI as described in ii) and iii) above.

<sup>1</sup> Legal/business importance parameter was set to High because a disturbance in the message flow to the customers can cause major issues from a business point of view. The absence of these tools can lead to major operational issues, impacting CSDs reconciliation process and causing potential delays in the business day.

<sup>2</sup> Market implementation effort parameter was set to Low because it does not require relevant adaptations from T2S CSDs / NCBs and their participants.

<sup>3</sup> Operational/technical risk parameter was set to Medium because the implementation of these tools has an operational impact, and the relevant operational procedures have to be enhanced/ defined.

<sup>4</sup> Low < 100kEUR < Low-Medium < 200kEUR < Medium < 400kEUR < High < 700kEUR < Very high

As confirmed in the lessons learned, this situation revealed the need to implement solutions that will help to detect, reduce and, when possible, eliminate the previously mentioned impacts and, hence, improving the recovery capacity from a critical incident or contingency scenario. Accordingly, addressing also the Action Point #11 of the Post Mortem Report Incident 200525-T2SO-270812, while CR-07xx implements the AID tool<sup>5</sup> for the T2S Operator, the aim of this Change Request is to implement the following solutions

First, mitigation measures for missing partial settlements will be implemented in LCMM:

- a) Reduction of inconsistencies: A new logic that reduces the impact in case of a missing previous partial settlement will be implemented to calculate, store in the instructions database and inform in the confirmation messages the PreviouslySettledQuantity and PreviouslySettledAmount.  
More precisely, the PreviouslySettledQuantity and the PreviouslySettledAmount will be calculated by LCMM based on information communicated by SETT when a settlement occurs, instead of using the Settled Quantity and Settled Amount previously stored in the instruction (which could be wrong when a previous partial settlement was not communicated to LCMM). Hence, this new logic eliminates the impact in the information featured in confirmation messages in case such incident occurs.
- b) New LCMM detection check: When a settlement update is received from SETT, LCMM will compare 1) the PreviouslySettledQuantity and PreviouslySettledAmount calculated from the communication received, with 2) the Settled Quantity and Amount previously stored for the instruction, in order to verify that they are the same. In case they are different, for example the previously stored Settled Quantity and Settled Amount are lower in LCMM (as it would have occurred on 25th May 2020 for the instructions where a previous partial settlement was not communicated to LCMM), an alarm for the T2S Operator will be triggered to investigate the issue and usage of the corresponding operational tools (Reprocessing Tool and AID tool implemented with CR-07xx).

Second, with this Change Request a new operational tool, COLGEN (Collateral Generation), will be implemented in Settlement to allow to regenerate autocollateralisation instructions that could not be created during the NTS because of a contingency situation. This tool complements the existing Reprocessing tool, which allows to regenerate autocollateralisation instructions that could not be created during the RTS (via resending of the standard RTS flow from Settlement to LCMM).

When autocollateralisation instructions are regenerated by the COLGEN tool, all the outbound messages related to the autocollateralisation instructions will be generated and sent A2A via T2S Interface.

Regarding the Financial impact parameter of this Change Request, it is worth mentioning that it has no financial impact as the implementation and running cost will be borne by the 4CB. Nevertheless, the implementation of this Change Request will consume 4CB capacity for evolution (according to the required implementation cost for the 4CB).

#### **Description of requested change:**

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When an instruction is successfully settled, partially or fully, SETT creates both the securities and cash movement through the postings in the securities accounts and cash accounts, and also communicates these movements to LCMM in order to update the instruction and to generate the confirmation messages to inform the interested T2S actors about this settlement status update.

#### **I- Mitigation measures for missing partial settlements:**

- a) Reduction of inconsistencies:  
Currently, to generate the confirmation message, LCMM receives from SETT the following information when a settlement occurs on an instruction:
  - Quantity and Amount that was settled (SettledQuantity and SettledAmount) i.e. the quantity and amount of the related postings for this settlement
  - Quantity and Amount that remains to be Settled, if any (RemainingToBeSettledQuantity and RemainingToBeSettledAmount)

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<sup>5</sup> AID tool addresses:

- a) the identification of postings of the current business day in the SETT database whose corresponding settlement status entry in the related instruction is missing in LCMM; and,
- b) the application of the needed and approved operational actions to restore a coherent situation by reflecting the missing settlement entries in the instructions, as well as to generate the corresponding confirmation messages to be sent A2A via T2S Interface.

In order to inform in the confirmation message the PreviouslySettledQuantity (quantity of financial instrument settled in all the previous partial settlement(s), if any), and the PreviouslySettledAmount (amount of money settled in all the previous partial settlement(s), if any), LCMM retrieves this information from the instruction (as it is pre-calculated as the previously Settled Quantity and Settled Amount<sup>6</sup>).

As a consequence, in case a partial settlement on the instruction is not communicated to LCMM and is missing in the instruction database, the confirmation message for a subsequent settlement will feature incorrect information: the PreviouslySettledQuantity and the PreviouslySettledAmount will be incorrect and not in line with the RemainingToBeSettledQuantity and RemainingToBeSettledAmount.

To mitigate this impact, instead of retrieving the pre-calculated information from the instruction, LCMM will calculate as follows the information from the communication received from SETT:

- PreviouslySettledQuantity: By taking the SettledQuantity and the RemainingToBeSettledQuantity communicated by SETT and deducting them from the MatchedQuantity.
- PreviouslySettledAmount: By taking the SettledAmount and the RemainingToBeSettledAmount communicated by SETT and deducting them from the MatchedAmount.

The same logic will be implemented in LCMM to update the instruction when a settlement occurs. For this purpose the RemainingToBeSettledQuantity and RemainingToBeSettledAmount have to be included not only in the flow to generate the confirmation message but also in the related status update communication flow between SETT and LCMM.

The assumption for this measure is that the information provided in each communication from SETT to LCMM is correct. Nevertheless, in case it would be incorrect, the new implementation will not worsen the situation as compared with the current processing. Additionally, to take advantage of the current processing and identify possible inconsistencies in the data, the detection check described below will be implemented.

b) LCMM Detection check when a settlement update is received from SETT:

Upon reception of the communication from SETT that triggers the settlement status update on an instruction, LCMM will compare 1) the PreviouslySettledQuantity and PreviouslySettledAmount calculated as described above from the communication received, with 2) the previously Settled Quantity and Settled Amount stored in LCMM, in order to verify that they are the same. In case they are different, for example the previously Settled Quantity and Settled Amount are lower in LCMM (as it would have occurred on 25th May 2020 for the instructions where a previous partial settlement was not communicated), an alarm for the T2S Operator will be triggered to investigate the issue and assess the situation and the need to use any of the operational tools.

**II- New COLGEN tool:**

This tool will be implemented by SETT in order to regenerate missing autocollateralisation that could not be generated during the NTS. The COLGEN tool will manage cases of discrepancies between SETT and LCMM on ACO, detected in NTS (during RTS this function is already covered by the existing Reprocessing tool).

It will run upon request during RTS and will use standard SETT-LCMM flows to create ACO instructions (that could not be created during the NTS) and the associated transaction generation notifications and confirmation messages. The tool will work in an all-or-nothing mode for the collateral solution, i.e. both the instructions providing the credit and the reverse instructions have to be created.

This tool will allow to produce missing sese.025 and sese.032 and enable unsettled reverse collateral transactions to be reimbursed in SETT by creating in LCMM database instructions related to ACO set-up.

It is also worth highlighting that as of the next business day, OMEGA remains the only tool available to cover the generation of messages for these contingency situations.

**Submitted annexes / related documents:**

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- OMG\_CR74X- Mitigation measures for missing partial settlements & COLGEN & AID tools (ppt)

**High level description of Impact:**

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**Outcome/Decisions:**

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\*CRG on 9 November 2020: the CRG agreed to recommend CR-746 for authorisation by the T2S Steering Level.

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<sup>6</sup> LCMM calculates and stores the total quantity and amount settled so far after each settlement (that will be the previously Settled Quantity and Settled Amount when a further settlement occurs)

- \* AMI-SeCo on 18 November 2020: the AMI-SeCo agreed to the recommendation of the CRG to authorise CR-746.
- \* CSG on 18 November 2020: the CSG agreed to authorise CR-746.
- \* NECSG on 18 November 2020: the NECSG agreed to authorise CR-746.
- \* PMG on 19 November 2020: the PMG proposed to allocate the CR to R5.0, and launched its detailed assessment.
- \* MIB on 24 November 2020: the MIB agreed to authorise CR-746.
- \* CRG on 10 December 2020: the CRG agreed to reduce the scope of CR-746 to include only COLGEN and missing partial settlement features. The AID (Align Instructions Database) tool was raised as a separate CR-750.
- \* CRG on 17 December 2020: the CRG recommended to the PMG the implementation of CR-746 in release 5.2.
- \* OMG on 17 December 2020: the OMG identified an operational impact for CR-746.
- \* PMG on 18 December 2020: the PMG recommended the inclusion of CR-746 in STP for R5.2 for approval by the Steering Level.
- \* CSG on 7 January 2021: the CSG approved the inclusion of CR-746 in STP for R5.2.
- \* NECSG on 7 January 2021: the NECSG approved the inclusion of CR-746 in STP for R5.2.
- \* MIB on 27 January 2021: the MIB approved the inclusion of CR-746 in STP for R5.2.
- \* OMG on 3 June 2021: the OMG confirmed the earlier operational assessment of CR-746.

**Documentation to be updated:**

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**I- Mitigation measures for missing partial settlements:****GFS v9.0**

The following chapter needs to be updated:

**3.4.2.2 Description of the data related to LCMM Instructions**

The diagram needs to be updated to reflect the inclusion of the Settlement Timestamp in the Status History table stated in the conceptual data model

**II- New COLGEN tool**

- There is no impact in the SDDs because of this change.

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**Preliminary assessment:**

- **Not performed**
- **Fast Track. Earliest release possible**

## Detailed assessment:

EUROSYSTEM ANALYSIS – GENERAL INFORMATION			
T2S Specific Components		Common Components	
<b>LCMM</b>			
	Instructions validation		
X	Status management		
	Instruction matching		
	Instructions maintenance		
	Penalty Mechanism		
<b>Settlement</b>			
X	Standardisation and preparation to settlement		
X	Night-time Settlement		
	Daytime Recycling and optimisation		
X	Daytime Validation, provisioning & booking		
X	Auto-collateralisation		
<b>Liquidity Management</b>			
	Outbound Information Management		
	NCB Business Procedures		
	Liquidity Operations		
<b>T2S Interface</b> (as of June 2022 without Static Data Management, Communication for SDMG, Scheduler, Billing)			
	Communication		
	Outbound Processing		
	Inbound Processing		
<b>Static Data Management</b> (until June 2022)		<b>Common Reference Data Management</b> (from R6.0 June 2022)	
	Party data management		Party data management
	Securities data management		Securities data management
	Cash account data management		Cash account data management
	Securities account data management		Securities account data management
	Rules and parameters data management		Rules and parameters data management
<b>Statistics and archive</b>		<b>Statistics and archive</b>	
	Statistical information (until June 2022)		Short term statistical information
	Legal archiving (until June 2022)		Legal archiving (from R6.0)
			Data Warehouse (from R6.0)
<b>Information</b> (until June 2022 containing reference data)		<b>CRDM business interface</b> (from R6.0 June 2022)	
	Report management		Report management
	Query management		Query management
			Communication
			Outbound Processing
			Inbound Processing
<b>Operational Services</b>			
	Data Migration (T2S DMT)		Data Migration (CRDM DMT, from R6.0)
	Scheduling (until June 2022)		Business Day Management (from R6.0)
			Business Day Management business interface (from R6.0)
	Billing (until June 2022)		Billing (from R6.0)
			Billing business interface (from R6.0)

	Operational Monitoring		Operational and Business Monitoring
	MOP Contingency Templates		
	T2S Operator AID tool		

Impact on major documentation			
Document	Chapter	Change	
Impacted GFS chapter	<p><u>For I – Mitigation Measures:</u></p> <p>3.4.2.2 Description of the data related to LCMM Instructions</p> <p>Conceptual Data Model.</p>	<p>The diagram needs to be updated to reflect the inclusion of the settlement timestamp in the Status History table stated in the conceptual data model</p> <p>LCMM conceptual data model has to be enhanced to add the Settlement Timestamp into the Status History Entity of Instructions.</p>	
Impacted UDFS chapter			
Additional deliveries for Message Specification (UDFS, MyStandards, MOP contingency templates)			
UHB			
Other documentations			
<ul style="list-style-type: none"> <li>Links with other requests: T2S-07XX-SYS AID tool for the T2S Operator</li> </ul>			
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			
<p>I- <u>Mitigation measures for missing partial settlements:</u></p> <p><b>LCMM:</b></p> <p>a) Reduction of inconsistencies:</p> <p>The process on LCMM that updates the instructions and generates the confirmation messages will be updated to retrieve the information directly from the flow incoming from SETT (instead of using the information stored in the status history). This ensures that the outbound message doesn't report information not aligned with SETT even if a previous partial settlement on the instruction was not communicated to LCMM.</p> <p>Any time LCMM receives a communication from SETT that triggers the settlement status update ("PSET" or "SETT") on an instruction, SETT will provide in the status update request communication the "Remaining to be Settled Quantity" and "Remaining to be Settled Amount". With this information LCMM will be able to calculate the PreviouslySettledQuantity and PreviouslySettledAmount as follows:</p> <ul style="list-style-type: none"> <li>- Previously Settled Quantity= "Matched Settlement Quantity" - "Remaining to be Settled Quantity" - "Settled Quantity"</li> <li>- Previously Settled Amount= "Matched Settlement Amount" - "Remaining to be Settled Amount" - "Settled Amount"</li> </ul> <p>Being (just quantities are described, but the same is for the amounts):</p> <p>"Matched Settlement Quantity": Quantity stored in LCMM.</p> <p>"Remaining to be Settled Quantity": Quantity communicated by SETT in the status update.</p>			

“Settled Quantity”: Quantity communicated by SETT in the status update.

The PreviouslySettledQuantity and PreviouslySettledAmount calculated as described above will be then stored in the instructions and also informed in the confirmation messages by LCMM.

b) LCMM Detection check when a settlement update is received from SETT:

A detection check is to be implemented on LCMM to detect missing previous partial settlement on the instruction.

Upon reception of a settlement update communication from SETT, LCMM will compare 1) the instruction’s PreviouslySettledQuantity and PreviouslySettledAmount calculated as described above, with 2) the Settled Quantity and Settled Amount previously stored for the instruction in LCMM, in order to verify that they are the same.

In case they are different (e.g. in case a previous partial settlement is missing in the instruction), an alarm for the T2S Operator will be triggered, to investigate the issue and assess the situation and the need to use any of the operational tools.

All in all, both Mitigation measures a) and b) are active continuously throughout the day. Nevertheless, they require a settlement to be triggered. I.e. Despite of being active continuously, if nothing settles, neither the new logic will be used nor the detection check will be performed.

To further understand the behavior of T2S with the two Mitigation measures in place, the following example describe their benefits:

A first partial settlement occurs on an instruction: The settlement instruction with a matched quantity of 60 is partially settled by 10.

The sese.025 (PAIN) reports:

Settled Quantity =10 Remaining to be settled =50 Previously settled =0

A second partial settlement occurs on the instruction: The settlement instruction is again partially settled, this time by 20. However, due to a contingency, this settlement is not communicated from SETT to LCMM and therefore the sese.025 is not sent to the Actor (i.e. missing partial settlement confirmation).

The information of this settlement (not reported to the Actor as LCMM was not informed) is:

Settled Quantity =20 Remaining to be settled =30 Previously settled =10.

A third and last settlement: Communication between SETT and LCMM is restored. The settlement instruction has a final partial settlement of 30.

Thanks to the Mitigation measure a) Reduction of inconsistencies, even if the previous partial settlement is missing in the instruction, the confirmation message sent to the Actor is correct.

The sese.025 (PARC) reports:

Settled Quantity =30 Previously settled =30

(Remaining to be settled =0 is not informed in sese.025 PARC messages)

Additionally, thanks to the Mitigation measure b) LCMM Detection Check, the T2S Operator will detect the missing previous partial settlement in the instruction because an alarm will be triggered:

Upon reception of the third and last settlement in LCMM, the check will compare:

1) the instruction’s PreviouslySettledQuantity (30) calculated with a new formula described above, with 2) the Settled Quantity (10) previously stored for the instruction in LCMM.

As the quantities compared are different (30 vs 10), the LCMM Detection Check will detect that there is a missing partial settlement in the instruction and an alarm for the T2S Operator will be triggered.

## SETT

The RemainingToBeSettledQuantity and RemainingToBeSettledAmount (as well as their related decimal numbers) have to be included in the Settlement Instruction Status Update communication flow between SETT and LCMM.

## **II- COLGEN tool**

### LCMM

As the information is sent to LCMM through the standard SETT-LCMM channel used in RTS, SETT has to respect the rules of this interface and consequently there is no impact on LCMM.

### SETT

This tool will be implemented by SETT with the goal of providing all information required to generate on LCMM side the missing settlement instructions and settlement restrictions (related to the settlement transactions internally generated by SETT in the context of ACO) which could not be generated during the NTS. The retrieved information will be sent to LCMM through the standard channel used in RTS (synchronous interfaces) in order to generate the missing data in LCMM.

Regarding the ACO instructions, the COLGEN tool will work in an all-or-nothing mode for the collateral solution, i.e. both the instructions providing the credit and the reverse instructions have to be created.

This tool will allow LCMM to produce missing sese.025 and sese.032 and allow to end the life cycle of a reverse ACO unsettled in SETT.

#### **Main cost drivers :**

##### I. Mitigation Measure for missing partial settlements:

- Enhance the process on LCMM that updates the instructions and generates the confirmation messages to retrieve the information directly from the flow incoming from SETT, ensuring that the outbound messages don't report information not aligned with SETT.
- LCMM will be enhanced to calculate the PreviouslySettledQuantity and PreviouslySettledAmount with the "Remaining to be Settled Quantity" and "Remaining to be Settled Amount" provided by SETT, with the formula explained in the change request.
- Implementation of a new LCMM detection check to detect missing previous partial settlement on the instruction not communicated by SETT.

##### II. COLGEN tool:

- The COLGEN tool will run in contingency situation to solve issues and inconsistencies occurred during the NTS period.
- It will be in charge of reprocessing the settlement instructions and settlement restrictions related to the settlement transactions internally generated during the NTS period in SETT database (in the context of ACO) that could not be generated in LCMM database. The information required from SETT will be sent to LCMM through the standard channel used in RTS (synchronous interfaces)
- If the COLGEN tool is not able to re-send to LCMM the required information, the information will be made available in an ad hoc view for the LCMM AID tool.

#### **Impact on other TARGET Services and projects**

No impact on CSLD project.

No impact on ECMS.

No impact on TIPS.

#### **Summary of project risk**

#### **Security analysis**

No potentially adverse effect was identified during the security assessment.



DG - MARKET INFRASTRUCTURE &amp; PAYMENTS

ECB-PUBLIC



08 December 2020

## Cost assessment on Change Requests

<b>T2S-746-SYS – Mitigation measures for missing partial settlements and new COLGEN</b>			
One-off	Assessment costs*		
	- Preliminary	2,000.00	Euro
	- Detailed	10,000.00	Euro
One-off	Development costs	447,530.71	Euro
Annual	Operational costs		
	- Maintenance costs	0.00	Euro
	- Running costs	0.00	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).