General Information (Origin of Request)		
☐ User Requirements (URD) or GUI Business Functionality Document (BFD) ☒ Other User Functional or Technical Documentation (SYS)		
Request raised by: Clearstream	**Institute:** CSD	**Date raised:** 10/01/2017
Request title: T2S to prevent duplicate sequence numbers and duplicate T2S References after a Recovery After Disaster		**Request ref. no:** T2S 0650 SYS
Request type: Common		**Urgency:** Urgent
1. Legal/business importance parameter: High		**2. Market implementation efforts parameter:** Low
3. Operational/Technical risk parameter: Low		**4. Financial impact parameter:** Low
Requestor Category: CSD		**Status:** Authorised at steering level

Reason for change and expected benefits/business motivation:

In case of a regional disaster T2S will failover to second region. In case the connections in the first region cannot be properly closed before the failover, a loss of data (RPO <2 minutes) may occur. After T2S has restarted in the second region, CSDs and NCBs need to apply a reconciliation, to ensure their systems are again aligned with T2S.

In operations related testing (ORT) activities where a Recovery After Disaster (RAD) scenario was executed, it was figured out that T2S might send duplicate sequence numbers in a RAD scenario (see INC000000183937). Namely, prior to the RAD, certain input was sent to T2S which was lost on T2S due to failover. However, prior to the failover, feedback messages for this input were sent out by T2S and already processed by the CSD.

After the RAD, T2S is generating other feedback messages which might have duplicate sequence numbers. This is creating processing issues on the CSD side, as duplicate sequence numbers should never occur. These issues add further complexity to an already complex processing of reconciling internal CSD systems vs the post-RAD status of T2S.

Another observation was that T2S might also send duplicate T2S references in such scenarios. Namely, if an inbound instruction is accepted briefly prior to the RAD, a corresponding sese.024 "accepted" with a T2S Reference is sent out.

In the RAD however, the information that a given T2S Reference was already used and reported might get lost, and as a result, T2S could send out other sese.024 "accepted" with T2S Reference numbers that were previously assigned to other instructions. Again, this leads to issues on the CSD side, as duplicate T2S references are not expected, and lead to errors in the processing.

To avoid these issues, T2S must prevent that duplicate sequence numbers or duplicate T2S References are sent out after a RAD scenario.

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Description of requested change:

When T2S is starting operation again after a RAD scenario,

1. the sequence numbers in outbound messages in T2S must be larger than any sequence number that was sent out prior to the failover. This should be done by assigning the post-RAD sequence numbers with a predefined minimum value of 50.000.000.
2. any T2S Reference newly assigned by T2S must not overlap with another T2S Reference already assigned prior to the disaster.

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Submitted annexes / related documents:

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Proposed wording for the Change request:

UDFS v2.3, Chapter 3.2.2.1.1 Application Header, page 1017: new footnote to be added:

In messages sent by T2S, the Priority <Prty> element provides a sequence number which informs the recipient of the message about the business order of settlement status/notification messages of an individual T2S instruction (i.e. Settlement Instruction, Cancellation Instruction, Amendment Instruction, Hold & Release Instruction, Settlement Restriction on securities and Settlement Restriction on cash) received from T2S.

This number is an independent counter defined for each Party technical address. It allows T2S Actors to process messages delivered by T2S in the correct order from business perspective, in case they would be received in

wrong order.

In case the sequencing chain is interrupted and a T2S outbound message is missing the T2S Actor can use this information to initiate a respective message re-sending (recurring to the message admi.006 to flag the need for such a re-sending).[1]

Update of the message documentation (Usage Guideline) of head.001:
on head.001.001.01/Priority
– T2S-use:
[…]In case of incoming messages within T2S this information will be ignored.
In case of Recovery After Disaster (RAD), T2S will send out T2S outbound messages after the recovery with minimum sequence numbers of 50.000.000, to clearly differentiate them from pre-RAD messages, and to avoid any duplicate sequence number during the RAD process.

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High level description of Impact:

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Outcome/Decisions:

* CRG meeting on 24 January 2017: The CRG was of the view that this Change Request is similar to the Change Request T2S-0446-SYS (Blocking of U2A interface for submitting new instructions to T2S during reconciliation process post RAD (Recovery After Disaster)) and the CR initiator could be asked to consider whether they want to integrate the CR650 in CR446 provided the 4CB confirm it is feasible.

* CRG meeting on 24 April 2017: The CRG recommended the Change Request for the detailed assessment and requested the 4CB to check the feasibility to deliver it as part of the R2.0.

* Operational Mangers Group on 4 May 2017: During a written procedure from 26 April - 4 May 2017, the Operations Managers Group did not identify any blocking operational impact of the Change Request.

* Advisory Group on Market Infrastructures for Securities and Collateral (AMI-SeCo) on 12 May 2017: Following a written procedure from 8 to 12 May 2017, the AMI-SeCo was in favour of launching the detailed assessment on the Change Request.

* CSD Steering Group on 15 May 2017: Following a written procedure from 8 to 15 May 2017, the CSD Steering Group was in favour of launching the detailed assessment on the Change Request.

* CRG teleconference on 20 July 2017: The CRG recommended the approval of the Change Request and its inclusion in the T2S Release 2.0.

* Operational Mangers Group on 27 July 2017: Following a written procedure from 20 - 27 July 2017, the Operations Managers Group reconfirmed that the Change Request does not have any blocking operational impact

* Project Mangers Group meeting on 1 September 2017: The Project Managers Group was in favour of adding the Change Request to Release 2.0 from a planning perspective.

* Advisory Group on Market Infrastructures for Securities and Collateral (AMI-SeCo) on 7 September 2017: Following a written procedure from 4 to 7 September 2017, the AMI-SeCo was in favour of approving the Change Request and its inclusion in T2S Release 2.0.

* CSD Steering Group on 8 September 2017: Following a written procedure from 4 to 8 September 2017, the CSG adopted the resolution to approve the Change Request and its inclusion in T2S Release 2.0.

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[1] In case of Recovery After Disaster (RAD), T2S will send out T2S outbound messages after the recovery with minimum sequence numbers of 50.000.000, to clearly differentiate them from pre-RAD messages, and to avoid any duplicate sequence number during the RAD process.

EUROSYSTEM ANALYSIS – GENERAL INFORMATION			
Impact On T2S	**Static data management**		**Interface**	
	Party data management		Communication	
	Securities data management	x	Outbound processing	
	T2S Dedicated Cash account data management		Inbound processing	
	Securities account data management			
	Rules and parameters data management			
	Settlement		**Liquidity management**	
	Standardisation and preparation to settlement	x	Outbound Information Management	
	Night-time Settlement		NCB Business Procedures	
	Daytime Recycling and optimisation		Liquidity Operations	
	Daytime Validation, provisioning & booking		**LCMM**	
	Auto-collateralisation	x	Instructions validation	
			Status management	
	Operational services		Instruction matching	
	Data Migration		Instructions maintenance	
	Scheduling		**Statistics, queries reports and archive**	
	Billing		Report management	
	Operational monitoring		Query management	
			Statistical information	
			Legal archiving	
	All modules (Infrastructure request)			
	No modules (infrastructure request)			
	Business operational activities			
	Technical operational activities			

Impact on major documentation		
Document	**Chapter**	**Change**
Impacted GFS chapter		
Impacted UDFS chapter	3.2.2.1.1 Application Header	Adding the footnote where the post-RAD behaviour is explained
	3.3.5.1 BusinessApplicationHeaderV01 (head.001.001.01) -> MyStandards	Update of the T2S-Use of field head.001.001.01/Priority
Additional deliveries for Message Specification		
UHB		
External training materials		
Other documentations		
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		

Update of UDFS chapter 3.2.2.1.1 Application Header to include a footnote explaining the post-RAD behaviour of sequence numbers.

Update of the message documentation of the head.001 (T2S-Use of field Priority).Testing that the sequence numbers are switched to values > 50.000.000 after a special script is started.

LCMM:

New scripts to update several sequences used for the generation of different ID's (such as Settlement Instruction ID, Settlement Restriction ID, Inbound Msg ID for DMT Instructions, etc.).

T2S Reference test: to make sure the references are being generated with a value of at least 50,000,000 in excess of the highest reference number generated before the disaster. This is not a fixed value and could be modified in case it is considered necessary due to the Regional Disaster specificities.

As the current logic applied in T2S to assign the T2S Reference is not described in any SDD, it is not necessary to perform any change to depict the new logic in case of RAD. However, an update in the corresponding section of the MOP would be advisable.

Additional information:
The same logic (as mentioned above) is applied for T2S References generated for LT's (Technical LT Identifier).

Summary of project risk
None

Security analysis
No potentially adverse effect was identified during the security assessment.

19 May 2017

Cost assessment on Change Requests

T2S-0650-SYS – T2S to prevent duplicate sequence numbers and duplicate T2S References after a Recovery After Disaster			
One-off	Assessment costs* - Preliminary - Detailed	2,000.00 10,000.00	Euro Euro
One off	Project phase costs	78,178.97	Euro
Annual	Operational costs	7,996.14	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).