KRONOS2 T2S
(VERSION 2.0)

Danmarks Nationalbank
Corporate Services
Portfolio Management and Central Bank Systems

DANMARKS
NATIONALBANK

Contents

1. INTRODUCTION

VP SECURITIES, the Danish financial sector and Danmarks Nationalbank have decided to become part of the joint European platform for securities settlement, Target2-Securities, T2S. T2S increases integration and competition in the market for post-trading in Europe. The T2S platform offers a multi-currency functionality enabling standardised handling of cross-border settlement between participants of different countries. DKK will be included as a settlement currency in T2S in October 2018. Kronos2 is the first RTGS system to be integrated with T2S other than TARGET2.

The solution in Kronos2 will support two types of auto-collateralisation, T2S auto-collateralisation and VP auto-collateralisation (sikkerhedsretten), cf. chapter 5. T2S auto-collateralisation is the functionality for intraday credit in T2S. VP auto-collateralisation, which is currently supported by Danmarks Nationalbank and VP SECURITIES, will continue to be supported after October 2018.

This document describes the T2S functionality in Kronos2 as well as the basic RTGS functionality that is essential to understand the solution for T2S. The targeted audience is professionals currently using – or for other reasons having an interest in – the systems of Danmarks Nationalbank.

Selected parts of the document will be presented at the T2S Test kick-off in December 2017. The document is also intended to supplement the future training of account holders.

The document will not describe the effects of the changes in the payments infrastructure to the participants' daily routines, business procedures, systems, bookkeeping and reconciliation, etc. nor will it give a detailed description of the basic Kronos2 functionality. Please find more information about Kronos2 on www.nationalbanken.dk.

1.1 Document structure

Chapter 2 gives a short overview of the account setup in Kronos2 and describes the accounts, including the T2S liquidity accounts. Chapter 3 contains information on liquidity transfers pushing liquidity to T2S from Kronos2 as well as liquidity transfers pulling liquidity from T2S. Chapter 4 describes the settlement day after T2S DKK. Chapter 5 describes collateral in Danmarks Nationalbank, including T2S and VP auto-collateralisation. Chapter 6 describes connection types and in chapter 7 is an appendix.

2. ACCOUNT SETUP

2.1 Overview of Kronos2 accounts

In Kronos2, participants hold liquidity in their primary account at Danmarks Nationalbank, the settlement account. Participants that are eligible

for credit extension are able to get an intraday overdraft on the loan account. Intraday overdrafts must be covered before the monetary policy day closes. When DKK is implemented on T2S the monetary policy day closes at 17:00[1].

Real Time Mechanism, RTM – Main accounts in Kronos2[1]   Box 1

Settlement account: The settlement account is the participant's primary account at Danmarks Nationalbank. The balance can only be positive. Incoming and outgoing payments (MT103 and MT202) are entered into the settlement account.

Loan account: The loan account is a separate account for intraday credit from Danmarks Nationalbank to the participant. The balance is either zero or negative. If the balance is negative, the participant has made use of the intraday credit facility.

[1.] The RTM is the collective term for the settlement account and the loan account. As the name indicates the mechanism is used for real-time settlement which is possible with and without credit extension.

Kronos2 has settlement with an ancillary settlement system that is conducted on sub-accounts, the so-called LOM accounts. After DKK migrates to T2S settlement in VP SECURITIES will continue, cf. Box 1.

Account setup DKK   Box 2
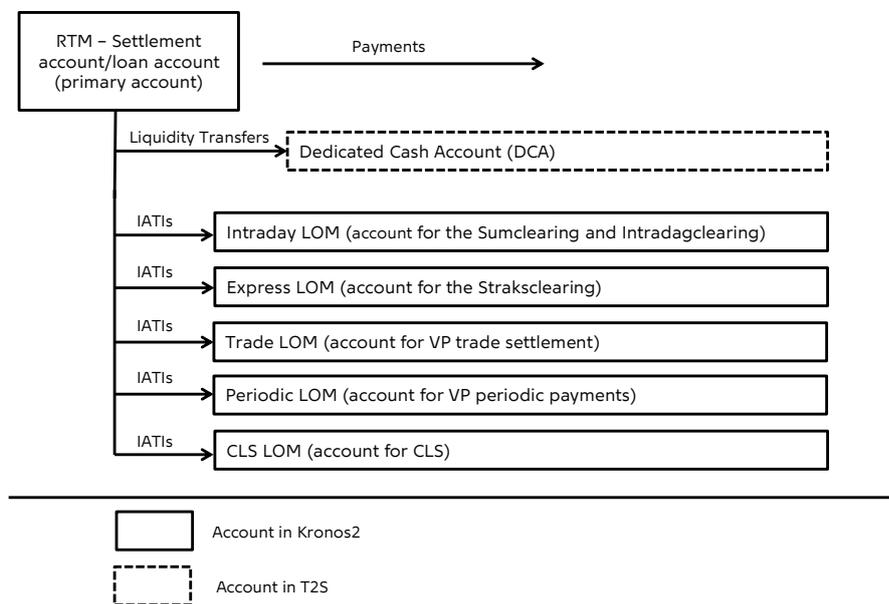
LOM settlements with VP SECURITIES and Nets are based on the interfaced settlement model because the LOM accounts are included in Kronos2. This type of settlement is characterised by prefunding, credit lines and settlement on the LOM accounts. For LOM settlement, liquidity is

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[1] Please note, that the times related to the closure of the monetary policy day are not yet final.

procured in advance by Intra Account Transfers, IATIs, in Kronos2, e.g. from a standing order or direct debits from the ancillary settlement system, cf. Box 2. In the interfaced model the participants' LOM account is always updated in real time because settlement takes place within the RTGS system. The participants hold a LOM account for each of the retail payment systems (the Sumclearing/Intradagclearing and the Straksclearing), the securities settlement system (VP Trade and VP Periodic) and the foreign-exchange settlement system, CLS.

T2S uses the integrated settlement model. In this type of settlement model both cash and securities are settled within the same system instead of being split between the RTGS system of the central bank and the settlement system of the central securities deposit, CSD. This means that the cash settlement takes place on an account outside the RTGS system; cf. the dashed box in Box 3. This account is located in T2S and is named Dedicated Cash Account, DCA. Kronos2 can be used by the participants to send liquidity transfers that either push liquidity from the settlement account in Kronos2 to the DCAs or pull liquidity back from the DCAs to the settlement account. A consequence of the integrated model is that Kronos2 will not be updated with settlement movements on the DCAs in T2S in real time (see section 3.3.1. for the possibility to see an account statement during the day). Participants are allowed to have several DCAs in T2S and can create a DCA for their clients[2].

Settlement in VP SECURITIES   Box 3

Settlement between professionals will take place in T2S after October 2018.[1] Trades between retail customers and professionals will continue to be settled in VP SECURITIES. Trade settlement in VP SECURITIES is done on the VP Trade LOM and corporate actions on the VP Periodic LOM.

[1.] ECB's Governing Council has granted Denmark the derogation that allows this type of settlement outside of T2S.

2.2 Who can create a DCA?

For access to a DCA in DKK, the same rules apply as for the current account in Kronos2. It is not a requirement to be an account holder in Kronos2 in order to own a DCA. However, as every DCA must be emptied to Kronos2 every day, the DCA must be linked to a settlement account in Kronos2. This account could be owned by another legal entity. Danmarks Nationalbank can give the following access to hold a current account in DKK:

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[2] The creation of a DCA is free of charge. However, if a participant requests the creation of more than a handful of DCAs, Danmarks Nationalbank may choose to charge a fee for the maintenance and creation of the accounts.

1. credit institutions which are subject to the supervision of the Danish Financial Supervisory Authority,
2. branches in Denmark of foreign credit institutions which are subject to the supervision of another EU member state, or of a country with which the EU has concluded a cooperation agreement on home country supervision,
3. branches in Denmark of foreign credit institutions which are subject to the supervision of the Danish Financial Supervisory Authority,
4. foreign credit institutions which are subject to the supervision of another EU member state, or of a country with which the EU has concluded a cooperation agreement on home country supervision, and which conduct cross-border activities in Denmark, and
5. other entities which in the evaluation of Danmarks Nationalbank are of significance to the settlement of payments at Danmarks Nationalbank.

Danmarks Nationalbank will allow all CSDs on T2S to open a DCA in DKK, because they are considered to be entities of significance to the settlement of payments, cf. chapter 4.

2.3 How to open a DCA with Danmarks Nationalbank?

In beginning of December, Danmarks Nationalbank will send the relevant forms for DCA and T2S party creation to all current-account holders. Participants that wish to hold a DCA must fill in these forms and return them to Danmarks Nationalbank by the mid of January.

Parties that are not current-account holders may contact Danmarks Nationalbank by email, K2-T2S@nationalbanken.dk, to discuss the possibility of becoming a DCA account holder.

3. KRONOS2 AND T2S FUNCTIONALITY

3.1 Liquidity transfers from Kronos2

With regard to T2S, the settlement banks can request the following liquidity transfers:

- A "liquidity transfer push" transfers liquidity from a settlement account in Kronos2 to a DKK DCA in T2S
- A "liquidity transfer pull" releases liquidity from a DKK DCA in T2S back to a settlement account in Kronos2.

Box 4 shows the flows of the push and the pull liquidity transfers. All transfers go through the "T2S Control Account" in Kronos2 and the "Dedicated Transit Account" in T2S. Both are technical accounts that include the total position for all participants.

Liquidity transfers to T2S Box 4

Kronos2

| Bank A Settlement Account | Bank B Settlement Account | Bank C Settlement Account |

T2S Control Account

T2S

Dedicated Transit Account

| Bank A DCA | Bank B DCA | Bank C DCA | Clearstream DCA |
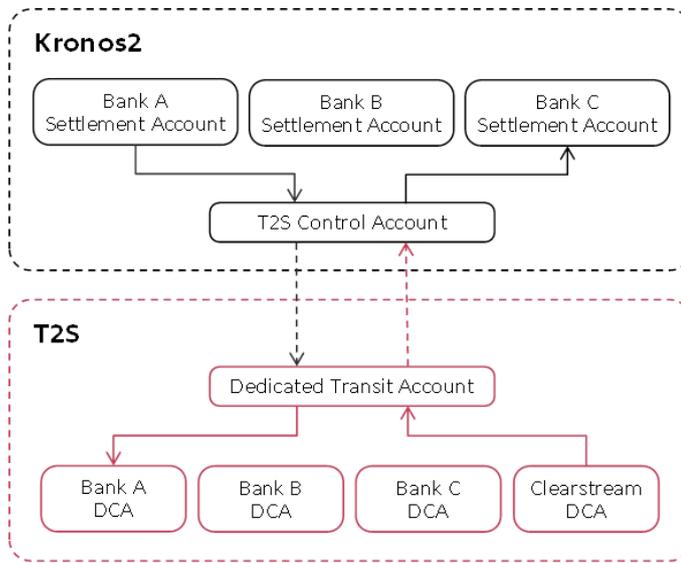
Participants can instruct a liquidity transfer push either as a standing order or an ad hoc transfer. It is possible for participants to utilise intraday credit, e.g. VP auto-collateralisation in Kronos2, for push transfers. Standing orders for night-time settlement are expected to run at 19:30 each night.[3] The standing order is maintained in the Kronos2 GUI and the ad hoc liquidity transfer instruction can be submitted as an MT202 instruction via SWIFT from the participant's back-office application or can be captured in the Kronos2 GUI – see appendix 4.

Liquidity transfer pull instructions can either be instructed from the GUI in Kronos2, the T2S GUI, or from the participant's back office as MT202 – see appendix 5.

T2S parties connected through Kronos2 can instruct the push of funds to any DCA in T2S through the Kronos2 GUI. Similarly participants can pull funds from their own DCA to any RTGS settlement account in Kronos2. Box 5 shows all available liquidity transfer options for account holder A. Liquidity transfers between DCAs are only possible for directly connected parties, DCPs, that have access to the T2S GUI, and only liquidity transfers between own DCAs are possible.

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[3] Before this event VP SECURITIES transfers VP auto-collateralisation to Kronos2.

Transfer options of account holder A   Box 5
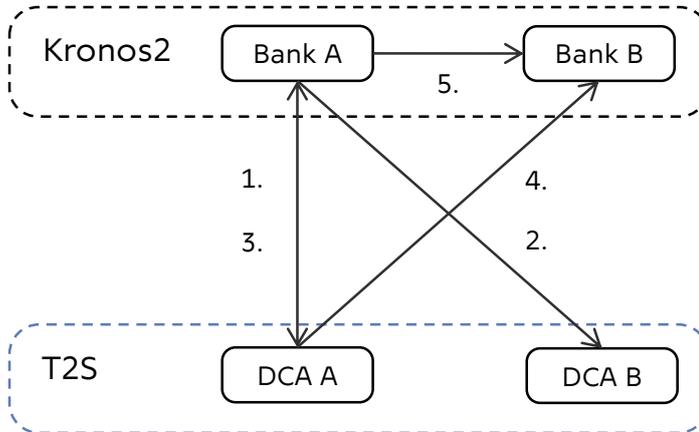
1. Liquidity Push with or without credit utilisation to own DCA.
2. Liquidity Push with or without credit utilisation to other participants' DCA.
3. Liquidity Pull to own settlement account.
4. Liquidity Pull to other participants' settlement account.
5. Liquidity transfer in Kronos2.

3.2 Settlement in T2S

The cash leg of e.g. a DvP settlement (Delivery versus Payment) on the DCAs is conducted in T2S and hence outside Kronos2.

T2S includes multi-currency functionality. Investor links allow e.g. CSDs to hold foreign securities. In the example in Box 6 Danish participant A buys securities from participant B which participant B has bought from partici-pant C of a foreign CSD using EUR to pay for the securities.

Settlement in T2S   Box 6

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              ┌──────┐                    ┌──────────┐
              │  DN  │                    │ NCB Euro │
              └──────┘                    └──────────┘
      ┌──────────────┐ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
      │ Participant A│ │ Participant B│ │ Participant B│ │ Participant C│
      └──────────────┘ └──────────────┘ └──────────────┘ └──────────────┘
  ┌─ T2S ─────────────────────────────────────────────────────────────────┐
  ┊   ┌──────────┐    ┌──────────┐    ┌──────────┐    ┌──────────┐         ┊
  ┊   │   DKK    │ →  │   DKK    │    │   EUR    │ →  │   EUR    │         ┊
  ┊   │  DCA A   │    │  DCA B   │    │  DCA B   │    │  DCA C   │         ┊
  ┊   └──────────┘    └──────────┘    └──────────┘    └──────────┘         ┊
  ┊                                                                         ┊
  ┊   ┌──────────┐    ┌──────────┐                    ┌──────────┐         ┊
  ┊   │   SAC    │ ←  │   SAC    │  ←─────────────────│   SAC    │         ┊
  ┊   │    A     │    │    B     │                    │    C     │         ┊
  ┊   └──────────┘    └──────────┘                    └──────────┘         ┊
  └─────────────────────────────────────────────────────────────────────────┘
      ┌──────────────┐ ┌──────────────┐              ┌──────────────┐
      │ Participant A│ │ Participant B│              │ Participant C│
      └──────────────┘ └──────────────┘              └──────────────┘
              ┌──────────┐                            ┌──────────┐
              │    VP    │                            │  CSD X   │
              └──────────┘                            └──────────┘
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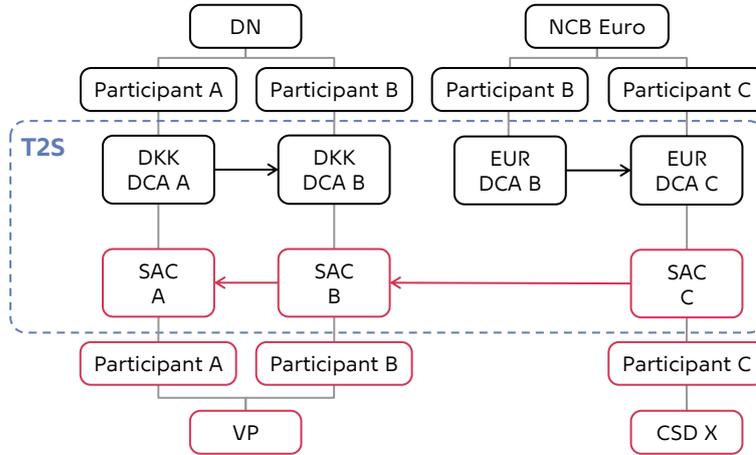
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1. SAC is the Securities Account in T2S.

3.3 Graphical User Interface in Kronos2 and T2S

This section describes the new functionalities for T2S in the Kronos2 GUI and the T2S GUI available for DCPs (Directly Connected Parties of T2S) on the cash side in T2S. Screenshots are included in the appendices.

Please note: This section does not describe all GUI functionalities. The focus in this version of the document is on liquidity monitoring in Kronos2 and on the DCA account in T2S.

3.3.1   Kronos2 GUI

The T2S enhancement of Kronos2 includes both monitoring tools and functionality for pushing and pulling liquidity to T2S. The joint term "external liquidity" is used in the Kronos2 GUI for the T2S positions. Account balances on DCAs in T2S and positions from T2S auto-collateralisation can be requested on demand by the "Refresh" button. Kronos2 offers the classic view and the consolidated view.

The *consolidated positions monitor* in Kronos2 provides an overview of the liquidity and collateral positions for all the main accounts and sub-accounts in the RTGS. A screenshot of the monitor is provided in appendix 1. The red box in the appendix highlights the updates made in Kronos2 GUI for T2S on this monitor. The participant can see the external positions both regarding the funds on the DCA and the loan granted in T2S as T2S auto-collateralisation.

The *classic positions monitor* in Kronos2 provides another type of over-view than the consolidated position monitor. Appendix 2 includes a screenshot of this monitor.

An account statement for DCAs will be made available in the Kronos2 GUI as an HTML report. The statement will cover each business day from the start of day, including the start-of-day balance, until the time the report is generated by T2S. All transactions that impact the balance of the DCA will be included in the statement along with datestamp and timestamp, amount, and transaction ID. At four predefined times each business day[4] T2S will push an updated statement to Kronos2 where it will be made available for each participant. The statement can be set up to be time triggered or event triggered, and the proposed times are:

- 08:00 – time triggered
- 14:00 – time triggered
- 16:00 – event triggered by the DvP (trade) cut-off in T2S
- 18:00 – event triggered by the end-of-day event in T2S.

The 08:00 report is intended to provide an overview of the transactions during the night-time settlement, while the 14:00 report will give a pre-liminary overview of the activities of the day. At the DvP cut-off event par-ticipants should be able to get a complete picture of the trade-related transactions, while the update triggered by the end-of-day event will provide a complete statement for the business day that can be used for accounting purposes. Note that the proposed times are not exact times, since it might take some time for the statement to be generated in the systems.

There is no direct way to identify different types of settlement from the ac-count statement, as the only possible values of the Transaction type col-umn are LIQT and SETT, meaning liquidity transfers and settlement. It is, however, possible to indirectly derive which kind of settlement a posting stems from by looking at the columns Instructing party reference, Account servicer reference, and Account owner reference:

- Trades will be instructed by the account owner, and therefore all three columns will contain a reference code
- Account movements stemming from corporate actions will lack the account owner reference.
- Postings from T2S auto-collateralisation will not contain any of the three references, because they are instructed directly by T2S.

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[4] Danmarks Nationalbank is responsible for setting up the reports. All participants will receive the report at the same predefined times.

- The automated cash sweep that T2S performs by the end of every business day will always have the instructing party reference "EOD".

DCA account statement: Timestamp of the posting   Box 7

The timestamp in the account statement is odd by construction, as the date part refers to a business date and not a calendar date. This means that an account statement covering the business date 08.11.2017 will include the calendar period 07.11.2017 19:30 to 08.11.2017 18:00, but only use the date 08.11.2017 as the date part of the timestamp.

As an example, a posting from a night-time settlement at *calendar date* **07**.11.2017 22:41 will have the timestamp **08**.11.2017 22:41. This logic will result in a sorting where 08.11.2017 22:41 is earlier (with regards to the business day) than e.g. 08.11.2017 07:00, which may seem counter-intuitive at first.

Appendix 7 shows an example of a DCA account statement in Kronos2. In the example, the first posting is a corporate actions payment that is settled by utilising T2S auto-collateralisation, which can be identified as the second account posting that credits the account with DKK 50, but does not contain a reference code in any of the three columns. Lines two and four are received corporate actions while the last posting is a liquidity transfer from the RTGS system.

3.3.2   T2S GUI

The T2S GUI is available only for Directly Connected Parties, DCPs[5], of T2S on the cash side. In the T2S GUI, directly connected parties can monitor account movements and balances and request a wide range of reports directly from T2S. The T2S GUI functionality also includes liquidity transfers back to Kronos2 and between own DCAs as well as manual repayment of T2S auto-collateralisation before the automatic reimbursement. Note that liquidity transfers are only available between a participant's own DCAs – i.e. it is not possible to transfer liquidity between two different legal entities within the T2S platform[6].

The *cash account postings* screen in the T2S GUI includes all the account postings on a specific DCA in T2S, including changes from securities settlements. It is possible to access account postings from past and current

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[5]   See chapter 6 for more information on DCPs.
[6]   It is possible to make de facto liquidity transfers as PFoD settlements (Payment Free of Delivery) in T2S within the DvP settlement window. However, this transaction type is considered a securities settlement which needs to be matched and accepted by both the receiver and the deliverer. Note that PFoD instructions are made from the securities side and are not considered to be liquidity transfers.

value dates. Appendix 3 shows a screenshot of the account postings screen in T2S.

Liquidity transfers in T2S are possible as a standing order, a predefined liquidity transfer or an ad hoc transfer. Appendix 6 shows a screenshot of an ad hoc transfer. A standing order is either scheduled for a certain point in time or at the occurrence of a specific business event. Predefined liquidity transfers are executed only once when reaching the specified time or business event, whereas standing orders are repetitively executed every time the business or time event is reached. An example of a standing order is the "optional cash sweep" that occurs after the reimbursement of T2S auto-collateralisation. Danmarks Nationalbank will set up this early cash sweep for all indirectly connected parties to revert the DKK liquidity to Kronos2 as soon as possible after the DvP cut-off. Directly connected parties will have the possibility to set up the optional cash sweep as a standing order, or they can choose to use only the automated cash sweep initiated by T2S, that takes place shortly after the reimbursement event.

3.4 Settlement restrictions in T2S

This section provides a short description of useful liquidity management tools available for directly connected parties both as an A2A and U2A functionality. Settlement restrictions are used to move a quantity of cash from a cash account or securities from a securities account to a specified sub-balance in the same account. The sub-balance is then blocked (securities and cash), reserved (securities and cash) or earmarked (only securities) for a specified purpose. Note that restrictions on a securities account (such as earmarking) are done through a CSD, i.e. it is not possible to instruct settlement restrictions for securities from the cash side of the T2S GUI. A directly connected party on the securities side has the option to set up restrictions directly in the T2S GUI. New cash restrictions come into effect from the next business day at the earliest.

3.4.1 Blocking and reservation

There are two ways of restricting cash on a DCA – blocking and reservation. T2S defines blocking as the process of preventing the transfer of a specified amount of funds or a specified quantity of securities.

Reservation is similar to blocking; the main difference being that a reservation instruction can settle partially, where as much as possible is reserved. If a participant attempts to block a higher amount than currently available on the DCA, the blocking instruction is recycled every time new cash becomes available, but only comes into effect once it is able to fully settle. Contrarily, when an instruction for reservation is for a higher amount than currently available, it will settle as much as possible, and all

future incoming cash will automatically also be reserved until the reservation is fulfilled completely. Blocking and reservation can be done on both cash accounts and securities accounts.

Example of reservation   Box 8

Bank A knows it must pay DKK 1 billion in corporate actions tomorrow. Bank A wants to ensure that it will have the money when it becomes time for pay-out; it therefore sets up a settlement restriction of the type "reservation" for 1 billion on its cash account ABC. The next day, as cash comes into account ABC, it is automatically restricted – up to the reserved DKK 1 billion.

3.4.2   Earmarking

Earmarking is a settlement restriction exclusively available for securities. Like all securities-related instructions, earmarking can only be instructed from the securities side.

T2S defines earmarking as the process of specifying that a quantity of securities in a securities account is only eligible for specific types of transactions or processes. Earmarking can be used for a specific amount of an ISIN, but unlike blocking and reservation, earmarking can also be used on a securities account level, meaning that an entire securities account can be earmarked for a specific purpose. Participants that wish to use T2S auto-collateralisation can earmark a securities account for this purpose, allowing T2S to look for eligible collateral in this securities account.

If the needed quantity of securities is not available, the instruction will be partially filled, but no future incoming securities will be earmarked.

4.   SETTLEMENT DAY

4.1   Danmarks Nationalbank, VP SECURITIES and T2S

The monetary policy day in Kronos2 is expected to start at 17:45 and end at 17:00 on the next business day[7]. In Kronos2 all intraday loans must be repaid before 17:00. Trade settlement in T2S ends with the DvP cut-off at 16:00. It is expected that reimbursement of T2S auto-collateralisation will be at 16:30 and that the automated cash sweep of funds on the DCA will be at 16:30[8].

Night-time settlement in T2S starts at 20:00 and consists of two settlement cycles that are divided into sequences. T2S aims to finish the first cycle by 22:00 and the last cycle by 00:00, and T2S starts the last settlement cycle immediately after the conclusion of the first. Night-time set-

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[7] Note, that the changes to the monetary policy day will alter the settlement time for the last Intradagclearing and the settlement times for the two last Straksclearing.

[8] Please note, that the times related to the end of day events in T2S are not yet final.

tlement in T2S resembles the settlement batches in VP SECURITIES in the sense that it uses a large degree of netting. Night-time settlement is less costly than settlement during daytime due to a reduced cost of each instruction.

Night-time settlement in T2S   Box 9

The night-time settlement in T2S consists of two settlement cycles with five settlement sequences in the first cycle and four settlement sequences in the last cycle. Each settlement sequence includes a larger array of instruction types than the previous. Find below an overview of the night-time settlement cycles and sequences:

First night-time settlement cycle:
- Sequence 0: Liquidity transfers, cash settlement restrictions
- Sequence 1: Sequence 0 plus corporate actions
- Sequence 2: Sequence 1 plus free-of-payment instructions for rebalancing purposes
- Sequence 3: Sequence 2 plus central bank operations
- Sequence 4: Sequence 3 plus all remaining settlement types

Last night-time settlement cycle:
- Sequence 4: Similar to sequence 4 from the first settlement cycle
- Sequence X: Sequence 4 functionality but with partial settlement
- Sequence Y: Standing orders reverting liquidity to RTGS
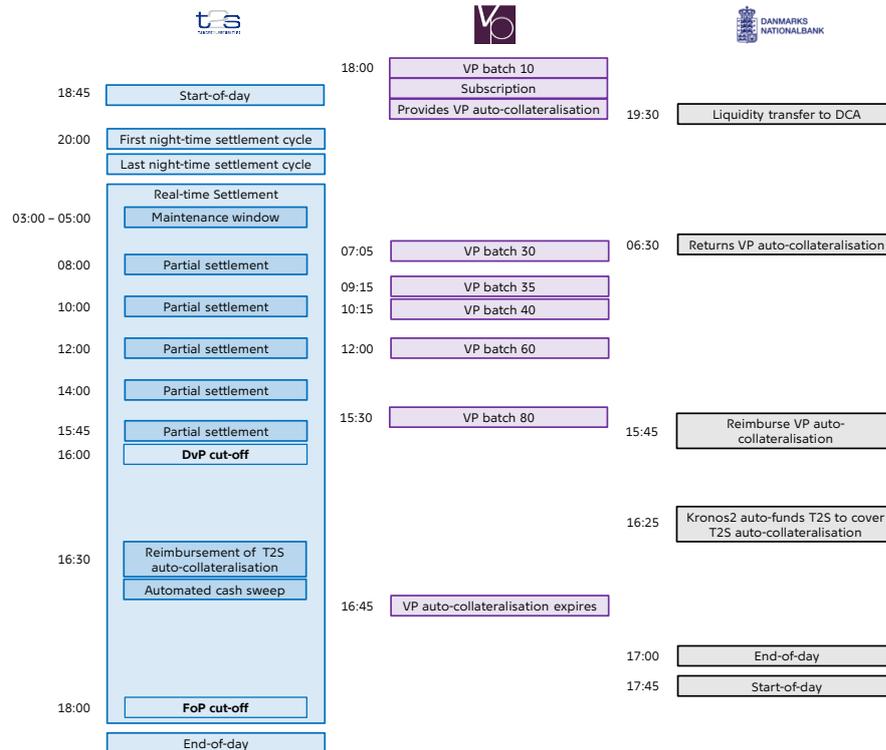- Sequence Z: Liquidity transfers.

Source: T2S UDFS v.2.3.

After the conclusion of the last night-time settlement cycle real-time settlement starts and continues until the two-hour maintenance window from 03:00 to 05:00. After maintenance, real-time settlement resumes and continues during daytime settlement.

Settlement day   Box 10

t2s		VP		DANMARKS NATIONALBANK	
		18:00	VP batch 10		
18:45	Start-of-day		Subscription		
			Provides VP auto-collateralisation	19:30	Liquidity transfer to DCA
20:00	First night-time settlement cycle				
	Last night-time settlement cycle				
	Real-time Settlement				
03:00 – 05:00	Maintenance window				
		07:05	VP batch 30	06:30	Returns VP auto-collateralisation
08:00	Partial settlement				
		09:15	VP batch 35		
10:00	Partial settlement	10:15	VP batch 40		
12:00	Partial settlement	12:00	VP batch 60		
14:00	Partial settlement				
15:45	Partial settlement	15:30	VP batch 80	15:45	Reimburse VP auto-collateralisation
16:00	DvP cut-off				
				16:25	Kronos2 auto-funds T2S to cover T2S auto-collateralisation
16:30	Reimbursement of T2S auto-collateralisation				
	Automated cash sweep	16:45	VP auto-collateralisation expires		
				17:00	End-of-day
				17:45	Start-of-day
18:00	FoP cut-off				
	End-of-day				

Note: Times of end-of-day related events are not yet final.

Settlement in VP SECURITIES is carried out in settlement cycles (VP10, VP30, VP40, VP60, VP80, and VP35) that run at fixed times during the day, cf. schedule. Before a settlement cycle, liquidity should be transferred from the settlement account to the relevant LOM account in Kronos2. Credit lines are also submitted for each participant, informing VP SECURITIES about the balance of the LOM account, i.e. the amount guaranteed by Danmarks Nationalbank on behalf of the participant. After each settlement, any balance on the LOM account is automatically transferred to the participant's settlement account, bringing the LOM account balance to zero. It has been agreed with the sector that Kronos2 will also support real-time transactions in VP SECURITIES.

4.2 T2S calendar

T2S will adapt the Danish banking calendar for settlement in DKK. This means that securities settlement with a cash leg in DKK will be suspended on e.g. Maundy Thursday where securities trades and corporate actions

in EUR along with free-of-payment transactions can still be performed. See below for a complete list of the Danish bank holidays in 2019:

2019
1 January: Bank holiday
18 April: Maundy Thursday
19 April: Good Friday
22 April: Easter Monday
17 May: General Prayer Day
30 May: Ascension Day
31 May: Bank holiday
5 June: Constitution Day
10 July: Whit Monday
24 December: Bank holiday
25 December: Christmas holiday
26 December: Christmas holiday
31 December: Bank Holiday

Easter 2019   Box 11

Easter 2019 T2S settlement in DKK will end as usual on Wednesday 17 April at 16:00. The next business day for DKK is Tuesday 23 April. Night-time settlement for the value day 23 April will take place at calendar date Monday 22 April at 19:30. Between calendar dates 17 April at 16:00 and 22 April at 19:30 no DKK liquidity can be transferred to T2S and no instructions involving DKK will settle. T2S however, will open for settlement in EUR on 18 April and for FoP instructions on 18, 19, 20, 21 and 22 April.

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5. COLLATERAL

After the implementation of DKK on T2S the participants will have their holding of securities split between VP SECURITIES and T2S. Three pledging facilities will support that the securities can be used to obtain credit in DKK.

- Credit in Kronos2
    - Traditional pledging
    - VP auto-collateralisation (sikkerhedsretten)
- Credit in T2S
    - T2S auto-collateralisation.

Traditional pledging can be used to obtain monetary policy loans and intraday credit in Kronos2 based on pledged securities in T2S. VP auto-collateralisation can be used to obtain intraday credit in Kronos2 based on securities in VP SECURITIES, and T2S auto-collateralisation can be used to obtain intraday credit in T2S based on securities in T2S. Each facility is described in detail below.

Participants can transfer liquidity between Kronos2 and T2S if needed, cf. section 3.1. This makes it possible to utilise credit in Kronos2 for the DCA in T2S, both from traditional pledging and from VP auto-collateralisation, cf. Box 7.

Securities accounts and DKK credit Box 12

Liquidity type	Liquidity available in	Kick-off and cut-off	Location of securities[1]	Examples of possible usage
Intraday credit (Collateral list)	Kronos2	From: 17:45 To: 17:00	VP SECURITIES or T2S	Batch clearing VP settlement T2S funding
VP auto-collateralisation (Sikkerhedsret)	Kronos2	From: After VP10 To 15:45	VP	Straks- and batch clearing VP settlement T2S funding
T2S auto-collateralisation	T2S	From: 20:00 To: 16:00	T2S	T2S settlement[2]

[1.] Required location of participants' securities to be available for pledging.
[2.] T2S auto-collateralisation is only available for settlement of securities-related instructions within the T2S platform.

5.1 T2S auto-collateralisation

T2S auto-collateralisation is a flexible intraday credit facility offered by Danmarks Nationalbank to participants on the T2S platform. This section describes how intraday credit is provided on T2S and how the loans are reimbursed.

5.1.1 Intraday credit from T2S auto-collateralisation

Participants that have an agreement with Danmarks Nationalbank to utilise T2S auto-collateralisation are able to obtain intraday credit in DKK directly on the T2S platform.

If the participant has sufficient eligible collateral available on a T2S securities account earmarked for auto-collateralisation, credit is automatically granted when the participant attempts to settle corporate actions or trades for which it has insufficient cash available on its DCA. T2S will prioritise securities incoming "on flow" as a result of the trade, before using securities already in stock. Securities are automatically pledged to Danmarks Nationalbank as collateral for the loan and DKK intraday credit is transferred to the DCA of the credit receiver – the buyer of the securities.[9] For a full example of T2S auto-collateralisation, please refer to Box 8.

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[9] Danmarks Nationalbank uses the repo model of T2S auto-collateralisation. This means that the securities are automatically transferred to a separate securities account in T2S pledged to Danmarks Nationalbank.

T2S handles T2S auto-collateralisation automatically, however the intra-day credit is legally granted by Danmarks Nationalbank. Danmarks Nationalbank defines a list of securities that are eligible as collateral for the T2S auto-collateralisation, along with the collateral value for each ISIN. The list is available in Kronos2.

5.1.2   Reimbursement

When a loan from T2S auto-collateralisation is granted in T2S the repayment instructions are immediately generated with the status "on hold". The instructions are on hold until the automatic reimbursement at 16:30. At this time the repayment instructions will activate and reimburse Danmarks Nationalbank.

The automated design of T2S auto-collateralisation ensures a high level of flexibility, as the loan is automatically repaid or converted into other eligible securities, if the participant needs the currently collateralised securities for another purpose.

5.1.2.1   Manual reimbursement

The instructions for repayment of the loan are created automatically when the loan is granted. Until automatic reimbursement the repayment instructions have the status "on hold". By releasing these instructions, a participant can manually trigger the repayment of their T2S auto-collateralisation. This can be done from the securities side, i.e. through VP SECURITIES, or it can be done from the cash side by directly connected parties with access to the T2S GUI, i.e. indirectly connected parties must rely on the automatic reimbursement or instruct the repayment from the securities side. Note that a T2S auto-collateralisation loan can be collateralised by a large number of different securities, resulting in a large number of individual repayment instructions that must be released one by one, if done manually.

5.1.2.2   Automatic reimbursement

The T2S auto-collateralisation credit should be repaid at 16:30, where T2S will automatically release all "on hold" repayment instructions. To prevent participants from failing the repayment, due to their liquidity being split between Kronos2 and T2S, a check is implemented in Kronos2. Five minutes prior to the automatic reimbursement at 16.30, Kronos2 will check if each participant has any outstanding T2S auto-collateralisation credit that cannot be repaid given their current DCA balance. If the check reveals a lack of cash on the participant's DCA, Kronos2 searches the participant's settlement account for available liquidity, and will push the amount needed for reimbursement to the participant's DCA.

5.1.2.3   Relocation and release of collateral

If a participant has insufficient funds on his DCAs to reimburse Danmarks Nationalbank at 16:30, T2S will relocate the collateralised securities from the pledged securities account to another securities account that is also pledged to Danmarks Nationalbank. This results in the T2S auto-collateralisation credit, including the collateralised securities, being converted to intraday credit in Kronos2.

Kronos2 will try to release the collateralised securities 15, 10 and 5 minutes before the close of the monetary policy day, at 17.00. It is not possible to release the securities after 17.00. Therefore, the converted credit has to be repaid no later than at 16.55. Kronos2 will instruct T2S to release the securities to a securities account predetermined by the participant.

T2S auto-collateralisation

T2S participant A sends an instruction to buy 50 units of specific securities, ISIN X, from another participant, B. The securities are eligible for T2S auto-collateralisation. For simplicity it is assumed that both the market and the collateral value of one unit of ISIN X is DKK 1.

The DCA balance of participant A is DKK 40. Because the 50 units of ISIN X are worth a total of DKK 50, T2S notices that the participant has insufficient cash and needs a loan if the trade is to go through. T2S proceeds to check if the participant can be granted a loan based on T2S auto-collateralisation. Since the ISIN X is eligible for T2S auto-collateralisation, the missing DKK 10 are automatically credited to the DCA of participant A, while 10 units of ISIN X are moved to a securities account pledged to Danmarks Nationalbank. With help from T2S auto-collateralisation the trade settles.

Liquidity check

At 16:25 Kronos2 will notice that participant A lacks DKK 10 for the impending automatic reimbursement process. However, it is assumed that participant A has no available funds on the settlement account, and therefore Kronos2 is not able to fund participant A's DCA with the liquidity needed.

Reimbursement

At the time of automatic reimbursement, 16:30, participant A has no liquidity available on his DCA and has not repaid the T2S auto-collateralisation manually through the T2S GUI during the day.

When the on-hold repayment instructions activate at 16:30, T2S performs a provision check and notices the participant's lack of cash. This triggers the relocation of securities to a securities account pledged to Danmarks Nationalbank, which allows the reverse T2S auto-collateralisation to settle without overdrawing the DCA of the participant. In this process, the T2S auto-collateralisation is converted into a traditional intraday loan in Kronos2.

Reimbursement of the converted T2S auto-collateralisation

After the relocation of securities and conversion of the T2S auto-collateralisation to a traditional intraday loan, participant A has 25 minutes to acquire the funds needed to repay the loan. Kronos2 will automatically attempt to repay the loan and release the securities 15, 10 and 5 minutes prior to the closure of the monetary policy day.

The illustration below shows all cash and securities movements associated with each step of the T2S auto-collateralisation process – from the trade to the relocation of securities.

REPO model	Cash			Securities			
	DN DCA	Bank A DCA	Bank B DCA	DN SAC	DN AC SAC	Bank A SAC	Bank B SAC
Bank A DCA balance = 40, Bank B SAC balance = 50	.	+40	.	.	.	.	+50
2. Bank A buys securities from Bank B using auto-col.:							
2. Trade instruction	.	-50	+50	.	.	+50	-50
2. T2S auto-collateralisation	-10	+10	.	.	+10	-10	.
2. Result	**-10**	**0**	**+50**	**0**	**+10**	**+40**	**0**
3. Reimbursement (16:30)							
3. Reverse T2S auto-collateralisation	+10	-10	.	.	-10	+10	.
3. Security relocation	-10	+10	.	+10	.	-10	.
3. Result	**-10**	**0**	**+50**	**+10**	**0**	**+40**	**0**

[1.] Red brackets indicate technical netting where instructions are executed simultaneously.

<table>
<tr><td colspan="2">Settlement and liquidity types</td><td align="right">Box 14</td></tr>
<tr><td></td><td colspan="2"><i>Liquidity type</i></td></tr>
<tr><td>Straks- and batch clearing</td><td colspan="2">1. Intraday credit (Collateral list)</td></tr>
<tr><td></td><td colspan="2">2. Cash</td></tr>
<tr><td></td><td colspan="2">3. VP auto-collateralisation (Sikkerhedsret)</td></tr>
<tr><td>VP settlement</td><td colspan="2">1. Cash</td></tr>
<tr><td></td><td colspan="2">2. Intraday credit (Collateral list)</td></tr>
<tr><td></td><td colspan="2">3. VP auto-collateralisation (Sikkerhedsret)</td></tr>
<tr><td>T2S settlement</td><td colspan="2">1. Liquidity from Kronos2
  • Cash
  • Intraday credit (Collateral list)
  • VP auto-collateralisation (Sikkerhedsret)</td></tr>
<tr><td></td><td colspan="2">2. Cash "on flow" from e.g. trades or incoming corporate actions</td></tr>
<tr><td></td><td colspan="2">3. T2S auto-collateralisation</td></tr>
</table>

5.1.3 Credit Memorandum Balance

A credit memorandum balance, CMB, is needed to establish an account link between participants' DCA and securities accounts in T2S. This account link is necessary for T2S to be able to determine which DCA to use for the settlement of the cash leg of e.g. trades and corporate actions. There are two types of CMBs – a mandatory primary CMB for each DCA and an optional secondary CMB.

5.1.3.1 Primary CMB

The creation of a primary CMB is done by the central bank. After the CMB is created the CSD can create account links to one or more securities accounts. The primary CMB is also used to set up T2S auto-collateralisation. Once a primary CMB is in place, the central bank must tie a credit limit to the CMB, which enables the lender to monitor the granted amount of credit, and allows the borrower to view the remaining headroom. Danmarks Nationalbank does not plan to limit the amount which a payment bank can borrow. However, since the credit limit is a mandatory field, Danmarks Nationalbank will enter the highest value possible.

Two DCAs and three securities accounts must be linked. The two DCAs are the Danmarks Nationalbank's DCA from which the credit is given and the payments bank's DCA receiving the loan. The three securities accounts are, the securities account of the payment bank, a receiving securities account pledged to Danmarks Nationalbank where collateral is placed intraday, and a securities account pledged to Danmarks Nationalbank where collateral is held in case in case of lack of cash to repay the T2S auto-collateralisation at the time of automatic reimbursement.

The primary CMB can be used to authorise other legal entities to use the DCA. Authorisation is done on a BIC level and requires the CSD to link the authorised party's securities account to the CMB. Once the authorisation and account link is in place, the authorised party will have unlimited access to use liquidity from the DCA for settlement.

5.1.3.2 Secondary CMB

A secondary CMB is a means for payment banks to link their clients' securities accounts to a sub-balance of their DCA. This allows the client to use a specified amount from the payment bank's DCA for settlement in T2S. It should be noted, that this functionality is only available through the T2S GUI, and therefore only accessible for directly connected parties.

When setting up a secondary CMB, the account holder needs to set the following three limits:

- External guarantee limit, the maximum intraday credit that the client can obtain based on collateral handled outside of T2S.
- T2S client collateralisation limit, the maximum intraday credit based on collateral handled by T2S.
- Unsecured credit limit, the maximum unsecured intraday credit that the client can obtain.

All the above limits can be set to zero or any positive number. For payment banks that wish to use e.g. the external guarantee limit only, this limit should be the only one with a positive limit.

The external guarantee limit will reset daily, i.e. T2S always assumes that the repayment was successfully handled outside the T2S system. This poses a potential operational risk which payment banks using the functionality should be aware of. It is possible to forget to set the limit to zero for a client that is no longer supposed to receive credit extension on T2S. Further, since the collateralisation is handled outside T2S, T2S does not keep track of the client's collateral.

The second limit, the T2S client collateralisation, works similarly to T2S auto-collateralisation. There are, however, some important key differences that the users should be aware of. The T2S client collateralisation has no automatic mechanism for handling loans not repaid by the end of the day. While each instruction generated by T2S auto-collateralisation is free of the T2S charge, the instructions for T2S client collateralisation are not.

The payment bank offering the service of T2S client collateralisation to their clients must upload or manually define a list of eligible assets to T2S. Unless the list is rarely updated and contains a very limited amount of different ISINs, the manual handling of this list is very time consuming. The alternative of sending a list of eligible assets to T2S via SWIFT or SIA Colt requires an A2A certification and is considered a very advanced method.

T2S client collateralisation is set up through the creation of a secondary CMB. Note that is possible to link a DCA to multiple secondary CMBs, but not possible to link several DCAs to the same CMB – i.e. one secondary CMB is required per T2S client collateralisation agreement.

It is technically possible for the payment bank offering T2S client collateralisation to collateralise their clients' assets with Danmarks Nationalbank in order to receive T2S auto-collateralisation to provide liquidity for the T2S client collateralisation. However, the legal aspects of such an agreement is not yet in place, and since the expected usage of T2S client collateralisation is very limited in the Danish market, Danmarks Nationalbank will not investigate the legal aspects further, if not explicitly asked to do so by the Danish financial sector.

An unsecured limit works similarly to the external guarantee limit.

Credit Memorandum Balances   Box 16
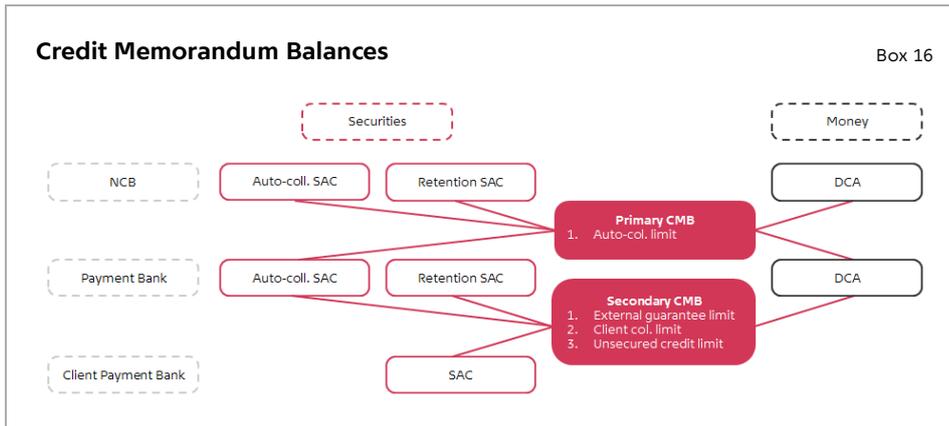
5.1.4   **Securities account for newly issued refinancing bonds**

New issuance of refinancing bonds (RTL bonds) takes place when the refinancing auctions are held about 1 month before settlement day.

The new issues should not be used as collateral in Danmarks Nationalbank before the old refinancing bonds have matured. Therefore, from the time of the auctions until maturity of the old bonds, the issuer must make sure to place the new issues in a T2S securities account that is not earmarked for T2S auto-collateralisation.

To achieve this goal, Danmarks Nationalbank has suggested the following model:

The new issues should be settled out of the issuance securities account. In sequence 1-3 (of the first NTS) on the settlement day, T2S will redeem old bonds to the extent that liquidity is available on the issuer's DCA and available from T2S auto-collateralisation (based on other securities than the new issues). In sequence 4, the new issues are settled to the investor. In the same sequence the liquidity received from the new issues is netted against the amount needed to redeem the old refinancing bonds, which were not already redeemed in sequence 1-3.

In the cases where new issues are settled before the maturity date of the old issues and the issuer buys back maturing refinancing bonds, the maturing bonds should, likewise, be settled into a securities account which is not earmarked for auto-collateralisation. Alternatively the old bonds should be redeemed.

[The model suggested by Danmarks Nationalbank will be discussed with the issuers].

5.2 Collateral in Kronos2

5.2.1 VP auto-collateralisation in VP SECURITIES

VP auto-collateralisation is an arrangement for pledging collateral for intraday credit in DKK. This will continue to support settlement in VP SECURITIES between professionals and retailers after the migration of DKK to T2S. Credit under the automatic collateralisation arrangement must be reimbursed by 15:45 on the same monetary policy day. Kronos2 will enable the participants to manually reserve liquidity under the automatic collateralisation arrangement from 7:00 to 15:45.

After VP SECURITIES settlement cycle 10, after 18:00 and usually before 19:30, VP SECURITIES transfers an amount from VP auto-collateralisation to Kronos2. The credit can be used for the Sumclearing, the Intradagclearing and the Straksclearing and also T2S. The following value day, Danmarks Nationalbank releases the automatic collateralisation arrangement before the VP SECURITIES settlement cycle at 7:05 is run. At the request of the sector, VP SECURITIES will introduce a cap on the auto-collateralisation whereby the participants define the amounts that may be transferred. This means that part of the available amount will not be transferred to Danmarks Nationalbank.

5.2.2 Traditional pledging

From an overall perspective traditional pledging will remain the same. It will still be a facility whereby participants can obtain credit in Kronos2, and Danmarks Nationalbank will determine the collateral value.

The pledged securities accounts will be moved to T2S. This will not have any impact on the functionality offered to the participants. As in the current setup each participant has to inform Danmarks Nationalbank which securities account he will use to deposit securities to the pledged securities accounts. This securities account can be in T2S or VP.
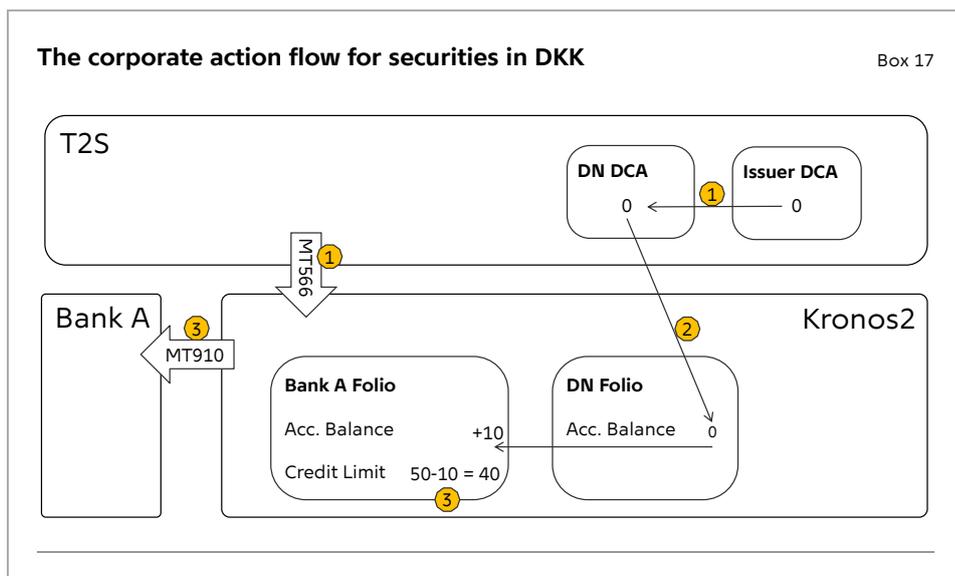
5.2.2.1 Corporate actions on pledged securities

Corporate actions on pledged securities are paid to Danmarks Nationalbank. If sufficient collateral is pledged, the cash will be distributed to the account holder. In the existing setup this takes place instantaneously after settlement in VP SECURITIES (batch 35 and 45).

Settlement of corporate actions in T2S can, in theory, occur anytime during the day. The financial sector, however, has agreed that settlement of corporate actions on Danish mortgage bonds will take place in the night-time cycles.

Kronos2 will distribute the cash received during night-time settlement to the participants around 7:00. Any corporate action settlement delayed for daytime settlement will be distributed to the participants instantaneously.

The corporate action flow for securities in DKK is illustrated in Box 9. Step 1: Settlement on T2S; Step 2: Sweeping to Danmarks Nationalbank's Folio Account (settlement account) in Kronos2; Step 3: Decrease of credit limit and payment to participants.

The corporate action flow for securities in DKK   Box 17

T2S

DN DCA	Issuer DCA
0 ← ①	0

MT566 ①

Bank A ③

MT910

② Kronos2

Bank A Folio	DN Folio
Acc. Balance +10	Acc. Balance 0
Credit Limit 50-10 = 40	
③	

The corporate action flow for securities in EUR is illustrated in Box 10. Step 1: Settlement on T2S; Step 2: Sweeping to Danmarks Nationalbank's PM Account in TARGET2; Step 3: Decrease of credit limit; Step 4: Payment to participants.

The corporate action flow for securities in EUR   Box 18
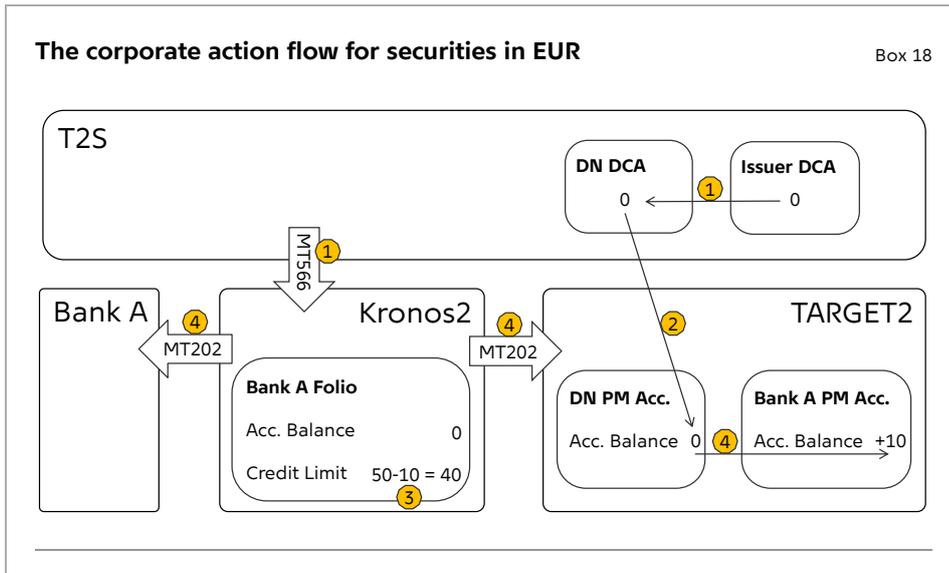
Danmarks Nationalbank will send a notification to the pledger when corporate actions on a pledged account are released to the participant. Danmarks Nationalbank expects that investor notifications are sent via email to the participants. This functionality must be ready for Kronos2 go-live in March 2017.

6. T2S CONNECTION TYPES

The Danish banking and mortgage banking sector has expressed an interest in Danmarks Nationalbank's assessment of the necessity for a direct connection to T2S on the cash side. The purpose of this chapter is to help T2S participants make an informed decision regarding T2S connection type as the document provides an overview of the T2S functionality available through Kronos2 and of the type of services only available through a direct connection to T2S.

Note that connection to T2S and the associated T2S functionality is split into a cash side and a securities side. As an example, liquidity transfers are considered a cash side service, while securities instructions and instructions for corporate actions are securities side services. The scope of this document is solely the cash side connection to T2S, and it is left to the reader to request similar information on the securities side from the relevant CSDs, if they have interest in becoming a DCP on the securities side.

6.1 DCA requirement

VP SECURITIES requires that T2S securities accounts must be linked to both a DCA in DKK and one in EUR. However, it is possible to link a secu-

rities account to a DCA owned by a different legal entity, and it is not a requirement that it is the DCA holder.

This requirement of VP SECURITIES applies regardless of what type of settlement is intended to take place in the T2S account and regardless of what kind of securities is expected to be kept on the T2S securities account.

Participants can open their own DCA or set up an agreement with an entity that has a DCA in DKK or EUR to make use of their DCA. I.e. it is not a requirement that the DCA of a participant is owned by the same legal entity that owns the securities account.

With regard to DKK DCAs, Danmarks Nationalbank expects participants who have a VP settlement account (afviklingskonto) in Kronos to also open a DKK DCA since DKK DCAs in a sense correspond to this account in Kronos. Nevertheless, this is not required by Danmarks Nationalbank and it is left to each participant to assess their need to own a DKK DCA. The process for creating a DKK DCA is described in the Test Guide.

With regard to EUR DCAs Danmarks Nationalbank recommends that participants investigate the possibility of using a EUR DCA of another participant before taking steps towards opening their own EUR DCA for the sole purpose of receiving potential corporate actions payments in EUR. Using another participant's DCA might be less costly and require less administration than having a self-owned EUR DCA. Especially for participants that are not TARGET2 members, owning a EUR DCA would have very limited value since they cannot link their DCA to their own PM account.

You are welcome to contact Danmarks Nationalbank to discuss the possibility of opening both a DCA in DKK and one in EUR. The email address is K2-T2S@nationalbanken.dk.

6.2   Pricing policy for T2S

The partial cost recovery regime in Kronos2 will also apply to the connection of Kronos2 to T2S, i.e. Danmarks Nationalbank covers internal costs, while the participants cover external costs.

The external costs related to Kronos2's connection to T2S will be recovered from the T2S participants as a fixed monthly subscription fee.
The costs related to each participant's individual consumption of T2S services will be forwarded monthly directly to the participant by Danmarks Nationalbank.

After the connection to T2S, the invoicing from Danmarks Nationalbank will consist of three charge categories for the participants opting for the T2S module. For those participants not opting for the T2S module only the first category is relevant.

- Subscription fee for the basic version of Kronos2
- Subscription fee for the T2S enhancement of Kronos2
- Variable cost directly associated with the individual consumption of T2S services for the previous month

4CB's pricing policy for use of T2S services can be found here:
https://www.ecb.europa.eu/paym/t2s/pricing/list/html/index.en.html

The billing information of T2S related costs (for the previous month) is available as a HTML report in the Kronos2 GUI Medio each month, and is itemised on a pr. DCA level. The costs will be recovered in DKK by Danmarks Nationalbank (the third charge category mentioned above).

Danmarks Nationalbank plans not to charge for the link between a Kronos2 account and a DKK DCA, which is a mandatory part of the DCA creation process. (As a reference TARGET2 charges a monthly fee of EUR 250 pr. EUR DCA for such an account link.)

6.3 Not a DCA holder

Today, some participants use third party liquidity providers for settlement of the cash leg when they settle their trades. The same will be possible when settlement is moved to the T2S platform. Every securities account must be linked to a dedicated cash account that is used to settle the cash leg of trades, corporate actions or other types of settlement involving the use of cash. However, it is not required that the account owner of the cash account is the same legal entity as the owner of the securities account. Participants that wish to outsource the cash settlement to a third party are free to do so.

Participants that do not hold a DCA of their own but use a third party liquidity provider on T2S are not considered T2S parties on the cash side. They may, however, be T2S parties on the securities side, if they own a securities account in T2S.

On the cash side the choice of becoming a T2S party should be determined by what is more convenient for each organisation. Opening and holding a DCA is free of charge, but opting for access to the T2S functionalities of Kronos2 incurs a fixed T2S subscription charge, and less administration – among other considerations – may weigh in favour of using a third party liquidity provider. As a general rule Danmarks Na-

tionalbank expects participants that hold a VP settlement account (afvik-lingskonto) to also open a DKK DCA.

6.4 Connection to T2S

T2S participants will have access to a limited array of T2S functions through the Kronos2 Graphical User Interface, GUI, as this is the prerequisite for being able to transfer DKK liquidity to the T2S system. The participants who wish to become a T2S party must decide whether they also need to interact directly with T2S on the cash side to fulfil their business needs. This choice of communication channel will define the T2S party type of the participant:

- *Option 1*: Indirectly Connected Party of T2S, ICP:
  - Only indirect connection through the Kronos2 GUI
  - Limited to basic T2S functions provided by Danmarks National-bank in the Kronos2 GUI
  - Simple.

- *Option 2*: ICP and also Directly Connected Party of T2S, DCP:
  - ICP as above
  - Direct connection through two possible channels (one or both can be chosen)
    - U2A: User to application interaction through the T2S GUI
    - A2A: MX message-based application to application communi-cation (ISO20022)
  - Full range of T2S functionality available (after agreement with Danmarks Nationalbank)
  - Advanced.

Option 1 (indirect connection) is intended to provide T2S parties with minimum functionality and is targeted at organisations only interested in the simple use of T2S, while option 2 (with DCP connection) caters for the intermediate to advanced organisations.

As illustrated in Box 11, participants can have different connection types on the cash and the securities side, respectively.

T2S connection types Box 19

Participants can communicate with T2S both directly and indirectly. Direct communication requires a DCP connection, while a partner organisation like Danmarks Nationalbank is needed as a proxy for indirect communication. The diagram below illustrates the available communication channels to T2S on both the cash and the securities side.

Cash side

Participant

ICP   DCP

NCB: DN

Securities side

Participant

ICP   DCP

CSD: VP

T2S
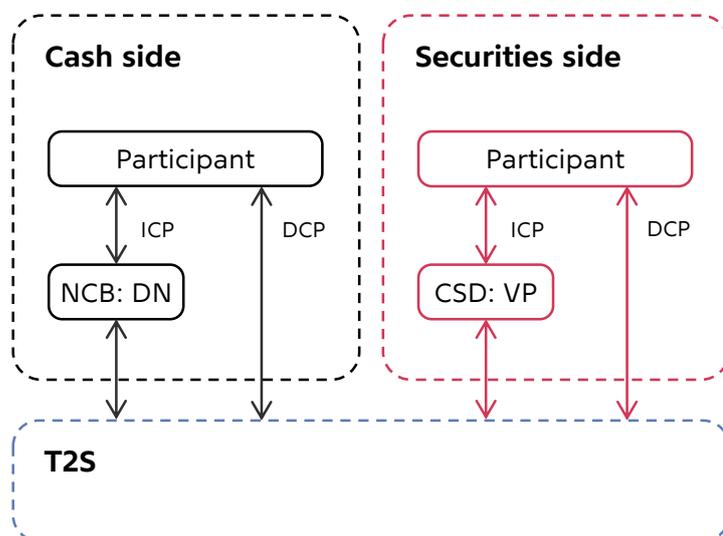
Note: DKK liquidity transfers to T2S can be instructed through Danmarks Nationalbank (ICP).

6.5 T2S functionality available through Kronos2 GUI (ICP)

Danmarks Nationalbank offers participants to access a select array of cash-related T2S functions through the Kronos2 GUI. Due to T2S being a platform for securities transactions, the cash side tools needed to utilise the core functions of T2S are relatively limited. This is reflected in the T2S services available through the Kronos2 GUI, as these are meant to provide participants with just enough tools to perform the basic tasks. Consequently the T2S functions in Kronos2 are limited to including liquidity transfers to and from T2S and requesting DCA balances. This is in line with the T2S features available in Target2.

The access to T2S auto-collateralisation in DKK is independent of the participant's connection type and will be available to Kronos2 participants that have an agreement with Danmarks Nationalbank to receive this service and that are either an ICP (option 1) or a DCP (option 2) in T2S.

A daily account statement for each DCA will be available in the Kronos2 GUI. The account statement includes start of day balance, end of day balance, as well as a complete list of account postings during the day with datestamp and timestamp. The statement is available as an HTML report and will be updated four times each.

The table in Box 12 lists the T2S functions available in the Kronos2 GUI and some (but not all) T2S functions only available for DCPs, to illustrate the limitations of the ICP interaction with T2S.

6.6 T2S functionality available as cash side DCP

There are two ways of interaction with T2S, as a DCP-U2A through the browser-based T2S GUI and as an A2A, i.e. from the participant's back-office system directly to T2S. The A2A communication is the more advanced but is also more efficient for large scale operations, while the U2A interaction with T2S is better for ad hoc tasks and for quick, manual monitoring. It is important to note that A2A connection will be in ISO20022 message format (MX messages).

Parties connected directly to T2S will have access to a wider range of liquidity management tools than those of ICPs. Some of these functions are simple, such as liquidity transfers between the participant's own DCAs, while others are more advanced. A DCP connection to T2S provides the participant with a number of reports and monitoring tools that will help advanced users maintain an overview of their cash accounts and credit utilisation. T2S offers cash forecast services that estimate the cash needed based on diarised securities transactions, standing liquidity transfers and outstanding T2S auto-collateralisation credit.

Among the advanced liquidity management tools are cash restrictions such as blocking and reservation. These tools are essential for T2S actors who hold DCA accounts for their clients. Another advanced function available to cash side DCPs is the limit management. This service is relevant for T2S actors who want to facilitate "T2S client collateralisation" – a service similar to T2S auto-collateralisation, but with the participant acting as loan provider for its clients.

6.7 Comparison of ICP and DCP

All cash side DKK T2S parties will be indirectly connected to T2S through their Kronos2 participation, as this is the prerequisite for being able to transfer DKK liquidity to the T2S system. As an example, a DCP can hold DCA accounts on behalf of their clients, but the funding of these accounts will always stem from Kronos2.

Liquidity transfers between two of a participant's DCAs are only possible through a direct connection to T2S, but as Kronos2 allows for DKK liquidity transfers to any DKK DCA, ICPs can obtain the same net effect by first pulling liquidity back to Kronos2 and then transferring DKK liquidity to the other DCA.

T2S auto-collateralisation is available to Kronos2 participants who have the relevant agreement with Danmarks Nationalbank. The automated design of T2S auto-collateralisation ensures a high level of flexibility. If a participant wishes to sell securities currently pledged to Danmarks Nationalbank as collateral for an outstanding T2S auto-collateralisation credit, T2S will either automatically repay the loan and release the securities or automatically convert the credit to be collateralised by other securities of the same collateral value. The conversion requires sufficient eligible securities while the automatic repayment requires the participant to have sufficient funds on the DCA account or incoming "on flow" as a result of the sale of the securities in question.

The functional limits of the ICPs are most explicit when it comes to advanced use, e.g. acting on behalf of subsidiaries or clients, as this will require the use of functions such as limit management which are only accessible as a DCP.

T2S-related cash management services in Kronos2 and T2S			Box 20
Service	Kronos2	T2S cash DCP	Service complexity
Immediate DKK liquidity transfer:			
Kronos2 to T2S	Yes	No	Simple
Standing DKK liquidity transfer:			
Kronos2 to T2S	Yes	No	Simple
Immediate DKK liquidity transfer:			
T2S to Kronos2	Yes	Yes	Simple
Standing DKK liquidity transfer:			
T2S to Kronos2	Yes	Yes	Simple
DKK liquidity transfer:			
T2S internal transfer (DCA to DCA)	No	Yes	Simple
View total liquidity position in T2S	Yes	Yes	Simple
View T2S auto-collateralisation position	Yes	Yes	Simple
View individual DCA balances	Yes	Yes	Simple
Account statement*	Yes	Yes	Simple
Cash forecasts	No	Yes	Intermediate
Improved liquidity monitoring tools	No	Yes	Intermediate
Custom reports	No	Yes	Intermediate
Debit/credit notifications for DCA	No	Yes	Advanced
Cash reservation	No	Yes	Advanced
Cash blocking	No	Yes	Advanced
Limit management	No	Yes	Advanced
Client collateralisation (CMB)	No	Yes	(very) Advanced

6.8 Decision on connection type

This section contains some considerations regarding the choice of connection type. It should be noted that it is entirely up to the institution to decide on the connection type based on their business needs, strategy, costs, benefits, etc.

With the basic tools provided in Kronos2 and with access to T2S auto-collateralisation regardless of connection type, most participants will be able to perform their daily tasks with the cash side ICP connection.

For small organisations that only perform simple cash-related tasks and have a very limited need for advanced monitoring and cash management tools, the costs associated with a DCP connection may exceed the benefits of the added functionality. Therefore, the ICP connection is likely to be the optimal choice for this type of organisations.

Due to the additional monitoring tools and the more flexible reports available to DCPs, both advanced institutions and more intermediate users wanting a better overview of their cash positions and movements have a business case for becoming a DCP.

For the medium-sized parties the added functionality and monitoring tools are likely to make a direct connection worth the additional cost. This is especially the case for organisations currently using a SWIFT or SIA/Colt infrastructure, as the extra cost of the T2S connection-specific hardware and software may be relatively limited.

Advanced institutes and parent organisations wanting to act on behalf of subsidiaries will have a strong business need to become a DCP. The cash management tools needed by these types of organisation are most likely only available through a direct connection to T2S, and these institutes are likely to have already invested in either SIA/Colt or SWIFT infrastructure which may reduce the cost of becoming a DCP. The same applies for institutions that plan to keep DCAs for clients or plan to facilitate T2S client collateralisation.

6.9 How to become a DCP

If the institution decides to become a DCP, the process is briefly summed up below. The institution should inform Danmarks Nationalbank if they choose to become a DCP.

As the deadline for DCP registration has been passed by the time version 2.0 of this document is published, it should be noted, that parties wishing to become a directly connected party through Danmarks Nationalbank will be able to start the process only after the planned DKK migration to T2S on 29 October 2018.

Step 1:   Choose Value Added Network Service Provider, VA-NSP
• The participant needs to choose either SIA/Colt or SWIFT as their VA-NSP. Only SIA/Colt and SWIFT are T2S-approved technical communication channels. The VA-NSP will facilitate safe communication between the participant and T2S, see also section 6.4.

Step 2:   Establish the contractual relationship with the chosen VA-NSP
• This includes ordering the related products. It is likely that the participant has already a contractual relationship with the chosen VA-NSP. The contract must be augmented with the relevant T2S services and products.

Step 3:   Installation of the required hardware and software
• E.g. requesting the VA-NSP PKI certificates.
• Subscription to the NSP's Services for T2S. Based on registration forms to T2S Service Desk and the Closed User Group, CUG, for T2S.
• The VA-NSP is responsible for providing the participant with the documentation needed for implementing the T2S connectivity services.

Step 4:   Connectivity setup with VA-NSP is established
• Process between participant and VA-NSP.

Step 5:   Create the new participant in T2S Static Data according to the T2S registration procedure
• Danmarks Nationalbank is responsible for this procedure.
• The process consists of e.g. registering Distinguished Names. This is used for the technical address and for authentication and signature.

Step 6:   Link the participant to the VA-NSP of choice in Static Data
• Danmarks Nationalbank is responsible.

Step 7:   Create 2 admin users for the specific participant
• T2S operator is responsible. Based on registration form from Danmarks Nationalbank.
• These two admin users can later on create the remaining users needed.

Step 8: *Danmarks Nationalbank sets up statements and reports in Static Data*

Step 9: Connectivity test and certification test with T2S is initiated

- The Eurosystem will make test environments available for this purpose as part of the community test and the connectivity test phase before that. Every DCP must pass the Eurosystem's certification tests and additional tests defined by Danmarks Nationalbank (to be decided). The amount of certification tests from the ECB's side for the U2A users are fairly simple once connectivity has been established (making an outbound liquidity transfer and displaying a report). It is most extensive for A2A users, i.e. participants who have chosen application-to-application communication which is intended for handling large volumes of instructions.

The four documents listed below give more detailed information on the process described above:

1. For the functional part: UDFS (User Detail Functional Specifications, chapter 2 and 3).
2. For the communication part: The T2S Connectivity Guide.
3. For the network part: the License Agreement.
4. The physical connection to the T2S platform being performed through one of the two VA-NSPs.

The documents regarding 1. to 3. can be found at the T2S website under the caption Technical/Functional key documents. Link:
http://www.ecb.europa.eu/paym/t2s/about/keydocs/html/index.en.html

6.10 Choice of VA-NSP
As described above, the first step in the process of becoming a T2S DCP is choosing which VA-NSP to use. The choice is entirely up to each participant, but if the organisation already receives other services from one of the VA-NSPs, the amount of additional hardware and software required for connecting to T2S might be reduced if they can use existing infrastructure.

The contract between the participant and the VA-NSP is a strictly bilateral agreement, and as such is outside the scope of this document. Therefore, it is not possible for Danmarks Nationalbank to indicate any price level or costs associated with becoming a DCP.

Participants planning to engage in A2A communication with T2S may benefit from a software solution offered by both VA-NSPs easing the exchange of MX messages with T2S considerably. The SWIFT application is

called "Connector for T2S" while the SIA/Colt equivalent is called "Smart Integrator Advanced". The applications handle the verification, signature, encryption and compression of the MX messages according to T2S requirements. Otherwise this complex task needs to be carried out by the participant's own systems and is likely to require a significant amount of development.

Links to the VA-NSP T2S connection web pages:

Link to SWIFT
https://www.swift.com/our-solutions/market-infrastructures/swift-for-smis/smis-on-swift/swift-for-target2-securities/swift-van-solution

Link to SIA/Colt
https://www.sia.eu/en/solutions/network-services/messaging-services/multi-domain-access/access-to-t2s-sia-colt-t2s-vansp

6.11 Access-rights management
The first part of this section starts with a short description of the new roles introduced to Kronos2 once connected to T2S. The second part is a description of the model for access-rights management in the T2S GUI which Danmarks Nationalbank plans to adopt.

6.11.1 Access rights in Kronos2
Access-rights management for Kronos2 will remain the same after the integration of T2S into Kronos2, meaning that Danmarks Nationalbank will still administer all users in the system. However, Danmarks Nationalbank has created two new, additional roles for the RTGS module that our users can be granted. See no. 5 and 6 in the matrix below.

Existing roles   New roles

1 Liquidity
Can make payments
Can see balances
can view all
reconciliation reports

3 Bank reconsiliation
Cannot make
payments
Cannot see balances
can view all
reconciliation reports

5 T2S transfers
Can make T2S
transfers
Can see balances of
both RTGS and T2S
can view all
reconciliation reports

2 Registration
Can make payments
Cannot view balances
Limited view of
reconciliation reports

4 Only requests
Cannot make
payments
Can see balances
Can view all
reconciliation reports

6 T2S reports
Cannot make
payments
Cannot see balances
Can view T2S reports

You can read more about these roles in "Forklaring af nye brugerprofiler i Kronos2". Here is a brief explanation of the roles:

Role 5: T2S transfers
This role gives full access to all T2S functionality in Kronos2. The user can make all types of T2S liquidity transfers, view balances of all accounts including the current-account and view all T2S-related reports.

Role 6: T2S reports
This role only gives limited access to the T2S functionality. The user can monitor T2S balances, but not the balance of the current-account. However, the role does give its user full access to T2S-related reports.

While role 5 is meant as a natural addition to role 1, role 6 is more closely linked to role 4.

6.11.2 Access rights in the T2S GUI
In T2S there are three different types of system entities:

- T2S Operator
- Central Securities Deposits, CSD
- National Central Banks, NCB

The T2S Operator is the 4CB[10] that operate the T2S platform, and each NCB and CSD has a legal relationship with the T2S Operator. Parties of NCBs and CSDs have a legal relationship with their NCB and CSD, respec-

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[10] Deutche Bundesbank, Banque de France, Banca d'Italia, and Banco de España.

tively, and do not have a direct relation to the T2S Operator. A party is defined by a parent BIC and a party BIC. For NCB parties the parent BIC will be the BIC of their NCB while the party BIC is the BIC code of their own legal entity. This means that a single legal entity can exist as several different T2S parties – see Box 13 for such an example.

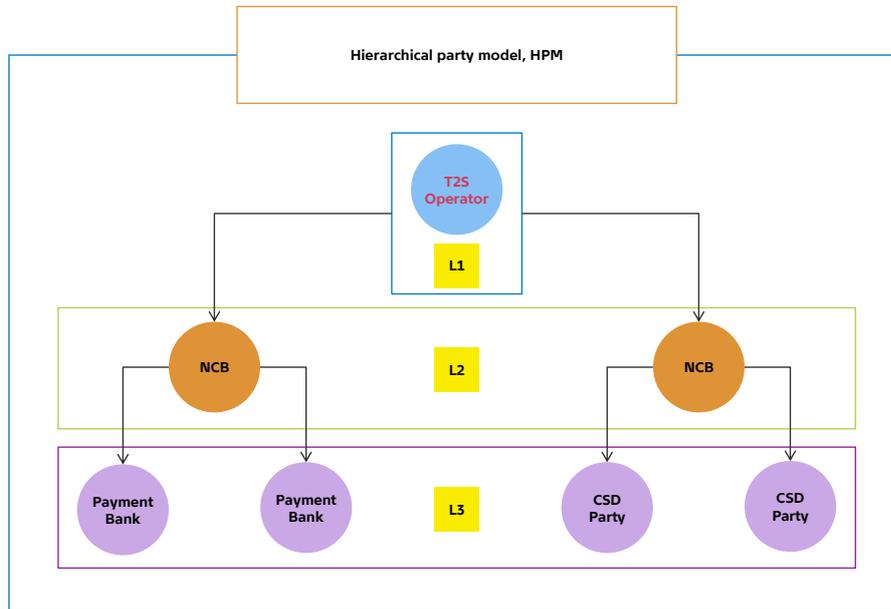**Example of how one legal entity can be multiple parties on T2S**   Box 22

A payment bank is a party of Danmarks Nationalbank and has a DCA in DKK. The same bank has a DCA with another NCB in order to receive T2S auto-collateralisation in EUR. Further the bank acts as a settlement bank through VP SECURITIES. This adds up to a total of three separate T2S parties:

- NCB party through Danmarks Nationalbank: Parent BIC: DKNBDKKK; Party BIC: BANKDKKK
- NCB party through another NCB: Parent BIC: NCBEUROX; Party BIC: BANKDKKK
- CSD party through VP SECURITIES: VPDKDKKK; Party BIC BANKDKKK.

With regards to access rights and privileges, T2S follows a hierarchical party model with the T2S Operator on top of the hierarchy, the NCBs and CSDs in the second level, and parties of the NCBs and CSDs as the third level. This means that the default data scope of the T2S Operator is unlimited, and as such contains all of both NCBs' and all CSDs' data scope. The default data scope of an NCB and a CSD contains all accounts and users within their own system entity, including their parties and their parties' users. The privileges of a system entity, a party, or a single user can be extended or reduced.
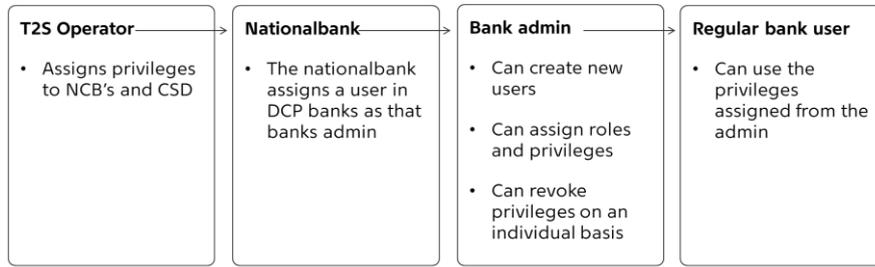
The model which Danmarks Nationalbank plans to use is similar to the decentralized models used by other European NCBs. Here Danmarks Nationalbank will be responsible for creating one or two admin user; the admin user(s) will then be responsible for creating the bank's other users and assign the needed privileges and roles to them. Only in emergencies – e.g. an admin user accidentally deletes his or her own privileges – will Danmarks Nationalbank step in and restore access rights.

6.11.2.1 Roles in T2S GUI

Danmarks Nationalbank will also be responsible for maintaining a small number of standard roles – a role is a collection of privileges. This approach will give DCPs the opportunity to customise the user configuration to fit individual organisational needs. Here is a birds-eye view of how the model works:

User access-rights assignment   Box 25

T2S Operator	Nationalbank	Bank admin	Regular bank user
• Assigns privileges to NCB's and CSD	• The nationalbank assigns a user in DCP banks as that banks admin	• Can create new users • Can assign roles and privileges • Can revoke privileges on an individual basis	• Can use the privileges assigned from the admin

DCPs can ask Danmarks Nationalbank to create one or two admin users. By default these will not be able to do anything through the T2S GUI, other than create users and assign roles to these users. An admin user can even create new admin users. An admin user will in principle also be able to assign himself/herself the other roles and thereby create a "super-user". If this is a concern, you can request Danmarks Nationalbank to impose the 4-eyes principle on your admin users.

The roles maintained by Danmarks Nationalbank, which are available to DCPs, are described in here:

1	Access rights 2-eyes	A user with this role can manage users. This role will be granted to payment bank administrators, if the payment bank has requested 2-eyes verification for all its user changes. Only works in combination with "Access rights queries".
2	Access rights 4-eyes	A user with this role can manage users. This role will be granted to payment bank administrators, if the payment bank has requested 4-eyes verification for all its user changes. Only works in combination with "Access rights queries" and "4-eyes configuration".
3	Access rights queries	This role must be granted, when either Access rights 2-eyes or Access rights 4-eyes is granted.
4	4-eyes configuration	This role must be granted, when Access rights 4-eyes is granted or when a user has a need for verifying changes in 4-eyes mode.
3	Reading role	This role must be granted to all non-administrator users, i.e. roles 4-7.
4	CMB manager	A user with this role can manage secondary CMBs.
5	Configuration manager	This role enables a user to manage message subscription, report configuration and the routing. This is mostly relevant for DCPs with an A2A connection.
6	Liquidity manager	This role enables a user to create liquidity transfers, limits, cash blockings and reservations and to view reports.
7	Collateral manager	This role enable a user to manage T2S auto-collateralisation links and securities valuations. This is used for collateralisation for secondary CMBs.

7. Appendix

7.1 Appendix 1 – Consolidated positions monitor in Kronos2

	Total	RTM	TARGET2-Securities
			Updated:2017-11-27 17:01 Refresh
Accounts			
Account balance	6.998.828,00	6.998.828,00	
Loan account balance	0,00	0,00	
Account position	6.998.828,00	6.998.828,00	
Total RCP trust account balance	0,00	0,00	
External liquidity account balance			0,00
External liquidity collateral utilised			n.a.
Collateral position (collateral values)			
Total collateral reserved	10.000.000,00	10.000.000,00	
Total collateral reserved (overnight acceptable)	10.000.000,00	10.000.000,00	
Utilised for RTGS settlement	0,00	0,00	
Utilised to secure external sources	0,00	0,00	
Total available collateral	10.000.000,00	10.000.000,00	
Total collateral available (overnight acceptable)	10.000.000,00	10.000.000,00	
Balance plus available collateral	16.998.828,00	16.998.828,00	
Queued (in settlement engine)			
Payable value	0,00		
Balance plus available collateral and queued	16.998.828,00	16.998.828,00	
Diarised for current FSVD payable	0,00	0,00	0,00
Balance plus available collateral, queued and diarised	16.998.828,00	16.998.828,00	
Account position plus RCP trust account, queued and diarised	6.998.828,00		

Note: Balances do not include an unlimited credit limit.

7.2 Appendix 2 – Classic positions monitor in Kronos2

Test Bank

Current FSVD: 2017-11-28   Current window: Open
Next FSVD: 2017-11-29   Next event start: 2017-11-27 18:00
Next event: VP10

Userid: DKNB001
BIC: DKNBDKKK0
Context: RTGS (SB)

RTGS(SB)   **GCSD**

main   about   logout

- Instructions
- Enquiries
- Notifications
- Reports
- Authorisation
- Edit
- Data list download
- User preferences
- Consolidated position
- Classic Position
  - Monitor

Currency: DKK (Danish Krone)

Real-time Settlement Mechanism (RTM) position
Test Bank (Active)
Last RTGS update : 28-11-2017 06:59

Settlement position		
Settlement account balance	6.998.828,00	
Loan account balance	0,00	
Total RCP trust account balance	0,00	
Total RTM settlement position	**6.998.828,00**	

Collateral position	[Collateral position (collateral values)]	
Total collateral reserved	10.000.000,00	
Total collateral reserved (overnight acceptable)	10.000.000,00	
Utilised for RTGS settlement	0,00	
Utilised to secure external sources	0,00	
Total available collateral	10.000.000,00	
Total collateral available (overnight acceptable)	10.000.000,00	
Estimated RTM capacity (settlement account balance + available collateral)		**16.998.828,00**

External Liquidity

External liquidity agent	Account balance (total)	Time of last update	Collateral utilised	Time of last update	Total position	Refresh from external liquidity agent	Settlement paused
TARGET2-Securities	0,00	2017-11-27 17:01:59	n.a.	-	0,00	Refresh	

[Conditional Release Mechanism (CRM) (for current FSVD)]

Total payable value of FSIs	0,00	
Total value of intra-account transfer instructions	0,00	
Total value of liquidity transfer push	0,00	
Total value of request for liquidity transfer pull	0,00	

7.3 Appendix 3 – Cash account postings in T2S

T2S Dedicated Cash Account Number	RT	Date	Impacted Amount			Instruction		Restriction Reference	Timestamp
			Dbt/Crd	Cur.	Amount	Type	Internal Reference		
CDKDKKDKNBDKKKXXX01	DLVR	2017-11-23	Credit	DKK	10,000,000.00	LT	0000000001395421	0	2017-11-23 12:40
CDKDKKDKNBDKKKXXX01	DLVR	2017-11-23	Debit	DKK	10,000,000.00	LT	0000000001395866	0	2017-11-23 16:47
CDKDKKDKNBDKKKXXX01	DLVR	2017-11-23	Debit	DKK	350,000.00	SI	1711230186553628	0	2017-11-23 09:10
CDKDKKDKNBDKKKXXX01	DLVR	2017-11-23	Credit	DKK	350,000.00	SI	1711230186553629	0	2017-11-23 16:20

7.4 Appendix 4 – Liquidity transfer push instruction in Kronos2 GUI

Instruction detail

External Liquidity Agent:	Target 2 Securities
Liquidity transfer options:	● Liquidity transfer push ○ Request liquidity transfer pull
CRM options:	○ Yes ● No
Funds settlement value date:	2008-04-11 📅 (yyyy-MM-dd)
Currency:	DKK (Danish Krone)
From account:	COMMSA00000000 (Settlement account,Active)
To account:	Show own accounts Account: Commercial	PTSAZADD	DCACOMM00002
Transfer option:	(None)
Amount:	
Related reference code:	
Receiver information:	(None)

Originator reference

Reference code:	
	The reference number will be system generated if not filled in.

submit

7.5 Appendix 5 – Request liquidity transfer pull instruction in Kronos2 GUI

Instruction detail

External Liquidity Agent:	Target 2 Securities ⌄
Liquidity transfer options:	○ Liquidity transfer push ◉ Request liquidity transfer pull
CRM options:	○ Yes ◉ No
Funds settlement value date:	2008-04-11 📅 (yyyy-MM-dd)
Currency:	DKK (Danish Krone) ⌄
From account:	COMMERCIAL | PTSAZADD | DCACOMM00002 ⌄
To account:	Show own accounts ⌄ Account: COMMERCIAL | PTSAZADD | Settlement account ⌄
Transfer option:	Maximum available amount - no credit ⌄
Amount:	
Related reference code:	

Originator reference

Reference code:	

The reference number will be system generated if not filled in.

| submit |

7.6 Appendix 6 – A liquidity transfer pull in T2S GUI. ONLY DCPs can access T2S GUI

7.7 Appendix 7 – Account statement of DCAs in Kronos2

Funds settlement value date: 18-10-2017 - Interim

Statement number	20171018CA000055		
Covered period from	17-10-2017 17:45:16	Covered period to	18-10-2017 09:00:00
Opening balance	0,00 CRDT	Closing balance	10.614.014,53 CRDT

Currency: DKK (Danish Krone)

Timestamp of the posting	Unique identifier of the posting	Credit Debit Indicator	Amount	Transaction type	Transaction reference	Instructing party reference	Account servicer reference	Account owner reference	Market infrastructure reference
2017-10-18 18:34:03.223529	2010121344100001	DBIT	50,00	SETT	1710170183918882	VPCA171017000030	VPCA171017000030		
2017-10-18 18:34:03.223529	3050009659100001	CRDT	50,00	SETT	1710170183941175				
2017-10-18 18:46:24.727175	3010121115700027	CRDT	41,85	SETT	1710130183739858	VPCA171013000091	VPCA171013000091		
2017-10-18 18:46:24.727175	3010121118600017	CRDT	613.972,68	SETT	1710130183741537	VPCA171013000147	VPCA171013000147		
2017-10-18 18:46:24.727175	3030133451600001	CRDT	10.000.000,00	LIQT	1334516	PD2			

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