EUROPEAN CENTRAL BANK

TARGET INTERLINKING SPECIFICATIONS

November 2001 edition

June 2002

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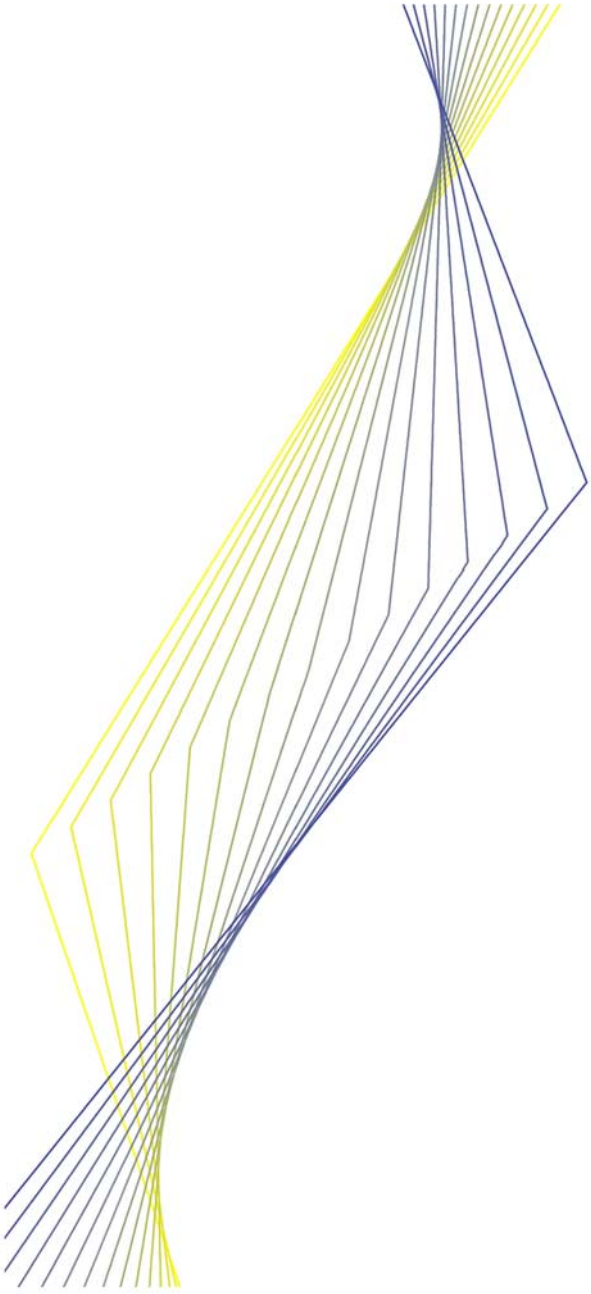

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ISBN 92-9181-308-7

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INTERLINKING SPECIFICATIONS

1. INTERLINKING SYSTEM OVERVIEW

1.1 The background and scope of the Specifications

The Trans-European Automated Real-Time Gross settlement Express Transfer system (TARGET) is a decentralised system with only a few common functions performed by the European Central Bank (ECB).

For these purposes:

- Domestic RTGS systems retain their specific features to the maximum extent compatible with ESCB monetary policy and a level playing field for credit institutions.
- Linkages are established between national real-time gross settlement (RTGS) systems and the ECB Payment Mechanism (EPM). These linkages (the Interlinking system), together with the national RTGS systems and the EPM, form the TARGET system. TARGET only processes payments in euro.

Starting from these principles, the detailed business design was made. In this process:

- the 'Minimum common performances features of RTGS systems within TARGET' were developed; and
- the 'Interlinking User Requirements' were elaborated.

They are the basis for the technical design of common elements of NCBs and the ECB in TARGET.

This document sets out the procedures for the implementation of the Interlinking System and describe the technical solutions that fulfil the User Requirements.

The implementation of these functions is the separate responsibility of each NCB, and the ECB.

1.2 Design Strategy and Methodology for the Exchange of Information

1.2.1 Design strategy

The TARGET design takes into account the decentralised structure of the system.

The design strategy is illustrated in the following figure:

Technical and Operational Annexes to the TARGET Guideline

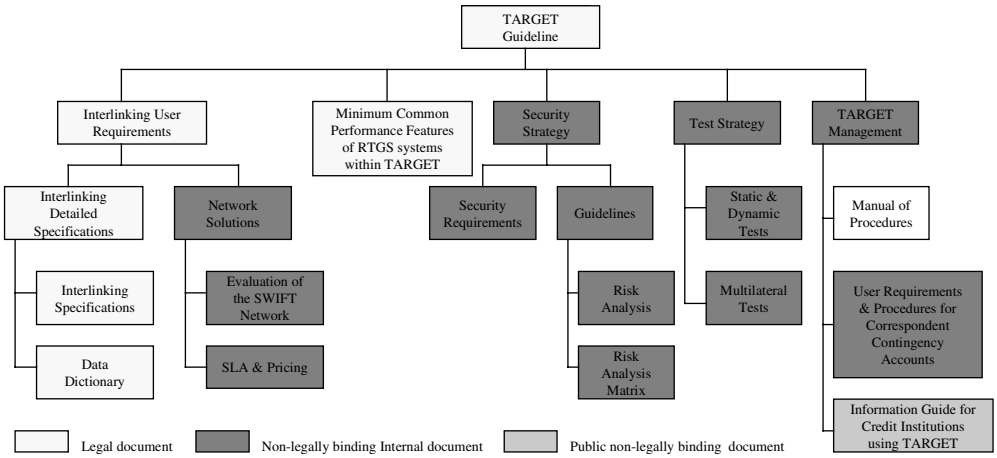

Figure 1-1 - Technical and operational annexes to the TARGET Guideline

Within the above design strategy it was decided to use the existing SWIFT FIN system as a communication network for the Interlinking for several reasons, in particular to cope with the tight time schedule for TARGET. SWIFT FIN has already been used by all the central banks and the ECB.

However, to be open to potential future requirements in the rapidly developing market of large-value payment services and to minimise dependence on the network provider, TARGET is technically built on three pillars:

- Application-oriented functions (e.g. payment system functions) are clearly separated from network functions (e.g. data transmission, message authentication).
- A logical communication structure that strictly follows the message-oriented concept of the system has been designed.
- The message policy supports a maximum independence from SWIFT formats but allows them to be used as a basis.

Furthermore, a comprehensive strategy for security issues and testing has been elaborated.

The strategic guidelines for the Interlinking can be summarised as flexibility and independence.

1.2.2 Methodology for the exchange of information

To comply with the previous design strategy, the Interlinking Specifications use the following methodology:

1.2.2.1 Classification of messages for Interlinking purposes:

- **Request Messages.** These messages are used when a defined action from the receiving NCB/ECB is required. Typical messages of this type are payment messages (which require an acknowledgement) and end-of-day messages to the ECB (which require a matching notification).
- **Notification Messages**. The messages in this category are replies to requests. The notifications (or acknowledgements) can be either positive (ACK) or negative (NACK). A notification completes the communication cycle initiated by a request.

- **Free Format Messages (IFFM).** These are informative plain text messages. IFFMs can be either broadcast to many NCBs/ECB or sent to a single destination. For example, the ECB can send a message to warn an NCB that it has not received end-of-day information at the required time. IFFMs do not require a notification.
- **Statistical Information Messages (ISIM).** These messages contain statistical information on the Interlinking traffic between NCB/ECB.

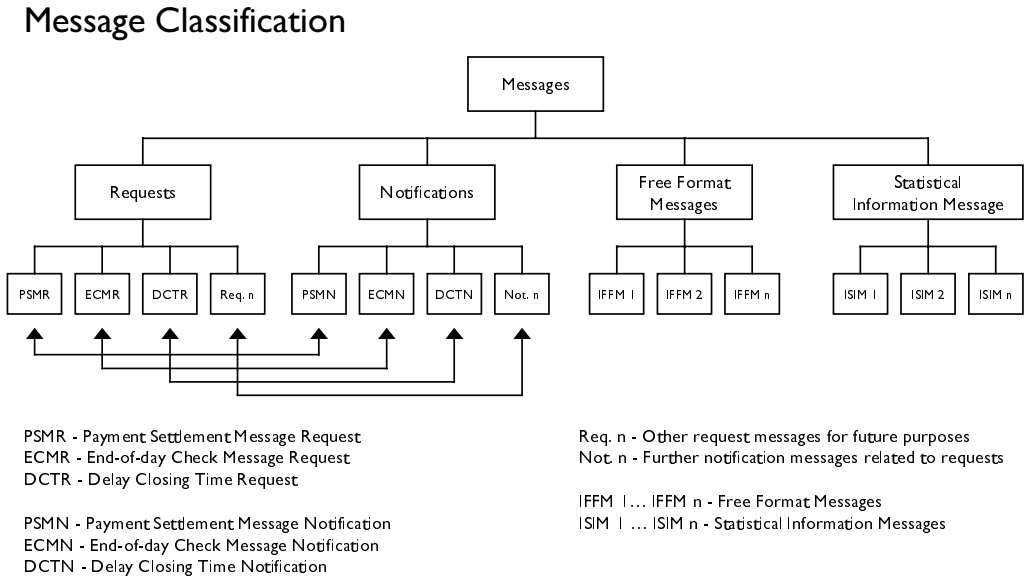

Figure 1-2 - Message classification

1.2.2.2 Message framework within the SWIFT FIN service:

The SWIFT messaging system is used as a technical envelope in which the Interlinking data is transmitted.

Such a framework gives total flexibility over the use of current data formats, the provision of confidentiality and the evolution of the data formats. For payment system purposes it is envisaged to use subsets of what are currently the most common used SWIFT message types: MT100, MT103 (STP and non-STP) and MT202. For specific Interlinking messages a specific 'Interlinking design' has been made.

1.2.2.3 Interlinking Internal Referencing

In the Interlinking, there is a need for unique numbering on a bilateral basis, closely related to the payment system functions of the system (independent from SWIFT's referencing, which is directly related to the network).

1.3 The physical and logical infrastructure of the system

1.3.1 Network and processing infrastructure

Since RTGS systems are implemented differently in each member state, the approach to the design of the Interlinking components is as flexible as possible. Three types of RTGS topologies (V-shape, Y-shape, L-shape) currently exist and can operate within the TARGET framework. Because they are

differently structured and operate on different computer systems, the common design ends at the functional level.

Hence, technically the Interlinking is the link between different IT infrastructures at the NCBs and the ECB or operators who work on their behalf. The link between the different systems takes place via the Interlinking infrastructure, which supports a unique communication interface.

The common element of all these structures is that they provide an agreed set of logical RTGS and Interlinking functions:

- **RTGS communication functions;**
- **RTGS processing functions;**
- **Interlinking communication functions; and**
- **Interlinking processing functions.**

Components and Interfaces

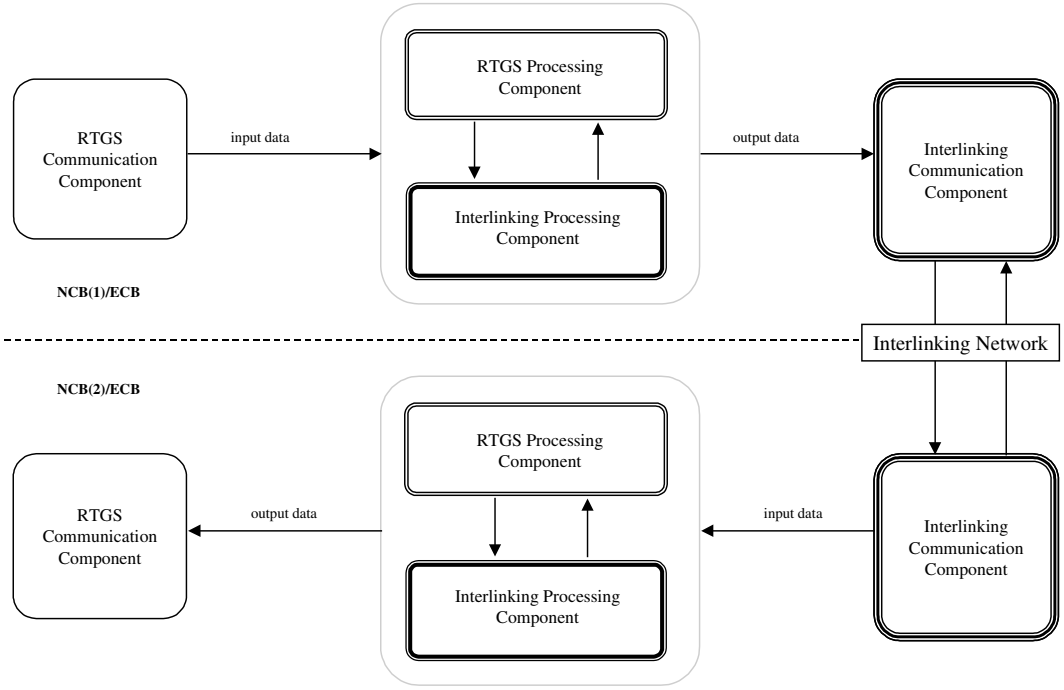

Figure 1-3 - Components and Interfaces

1.3.2 Accounting infrastructure

From an Interlinking point of view, the accounting systems of the NCBs and the ECB is the logical business framework for the cross-border exchange of payments. Two accounting functions are provided in TARGET:

- Irrevocable and final debiting and crediting of payment (RTGS function);
- Record keeping on inter-NCB/ECB accounts (Interlinking function).

Irrevocable and final debiting[1] creates a sound basis for the secure crediting of the cross- border payment in another RTGS system. The intra-day record keeping on inter-NCB accounts is required for the successful conduct of end-of-day operations.

1.4 The business functions of the system

1.4.1 Cross-border single payment transfers

Following strictly the logic of RTGS system processing, in which payment orders are processed item by item, the Interlinking uses a processing cycle which is directly linked to each single payment message. Once payments are irrevocably and finally debited[1], they are forwarded via the Interlinking. The following figure describes a complete message handling process:

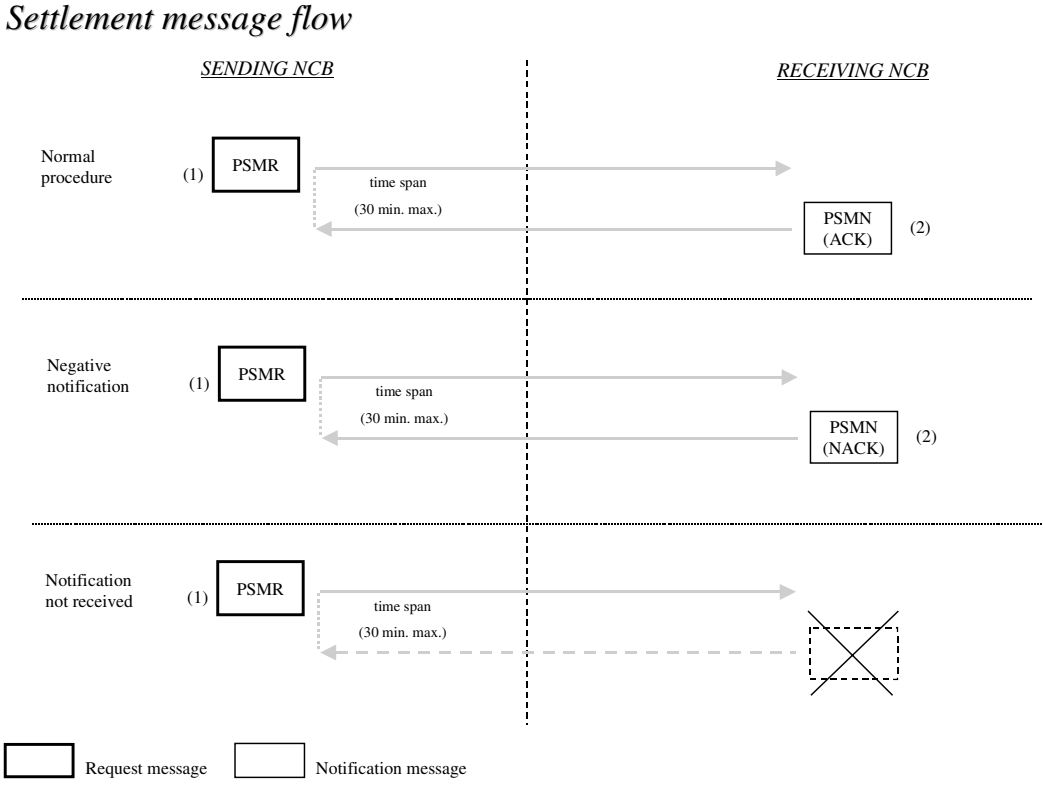

Figure 1-4 - Settlement message flow

In the case of normal processing, a positive acknowledgement (after crediting the amount sent in the receiving RTGS system) or a negative acknowledgement, stating the reason for rejection, will be sent to the sending NCB/ECB. If it does not arrive within 30 minutes[2], the sending NCB/ECB which is, in this case, still responsible for the payment, has to start error detection procedures.

TARGET is designed for making payments between RTGS participants. Furthermore, the Interlinking and RTGS systems will be used for making payments between NCBs/ECB and RTGS participants and for payments between NCBs/ECB.

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1 Other equivalent methods are not excluded (e.g. blocking and debiting after the crediting).

2 30 minutes should be regarded as the maximum for the starting phase of the system. Later improvements may be possible.

1.4.2 End-of-day Control Operations

Taking into account the general design of the Interlinking network, particularly in relation to the function of acknowledgements, the end-of-day control operations ensure, on a technical basis, that all bilateral operations conducted during the day match each other. It checks that:

- the last IIR sent by an NCB/ECB to another NCB/ECB has been received and vice versa;
- the total credit turnover and the total debit turnover of the cross-border payments positively acknowledged between the NCBs/ECB during the business day match each other.

These controls are performed by the ECB. Successful completion of the end-of-day message check is the last action taken in the Interlinking. Steps which go beyond this function are not within the scope of the payment system. They form part of the NCB/ECB or inter-NCB/ECB accounting.

1.5 Ensuring availability, security and minimum capacity

As defined in the Interlinking User Requirements, RTGS systems and Interlinking components have to provide a high level of reliability. In other words, they must have high availability, be secure and have sufficient capacity to meet the User Requirements.

It is the individual task of each NCB and the ECB to ensure adequate availability, security and capacity levels on systems and communication lines up to the point where the data are taken over by SWIFT's access point.

1.5.1 Availability

Because of the decentralised design of the Interlinking and the inclusion of the SWIFT network, two areas which have to meet the User Requirements can be clearly distinguished:

- NCBs/ECB individual processing and communication up to SWIFT's access point
- SWIFT network SAP (SWIFT Access Point) to SAP

It is SWIFT's task to ensure sufficient availability both of their network and of their OPCs. (SWIFT Operating Centre).

1.5.2 Security

In the Interlinking context, the methods used to check integrity, authenticity, confidentiality and non-repudiation are provided by SWIFT and have been evaluated. In addition, SWIFT has well-defined methods for network access and for access to the FIN application.

By contrast, the security implementation within domestic computer systems used by NCBs and the ECB depends on the chosen Computer Based Terminal (CBT). The development of software in this environment is an individual task of the participants in the Interlinking. SWIFT provides only a description of the functions.

1.5.3 Minimum capacity

The NCB/ECB computer systems for TARGET/Interlinking purposes are chosen by the NCBs/ECB to allow a sufficient throughput. The telecommunication link to SWIFT's access point should be adjusted to the volume of payments expected. SWIFT must be informed with a sufficient lead time about

current and future capacity needs in the network stemming from the link to a national RTGS system in order to balance the throughput of its systems.

1.6 Responsibilities

1.6.1 Interlinking communication functions

Because of the store and forward logic of the SWIFT FIN service, NCBs and the ECB will never communicate directly with each other on the network layer. SWIFT is the 'intermediary' in the communication process. Only the authentication function in SWIFT FIN directly interconnects NCBs and the ECB. The following responsibilities can be distinguished:

- NCBs and the ECB are responsible for their equipment (including the link to SWIFT's SAPs) and for the reliable use of tools for the exchange of messages with SWIFT and the exchange of keys with other participants in the Interlinking.
- SWIFT is responsible for the proper design and maintenance of the 'communication tools' and the highly secure delivery of messages after acknowledging the message to the sending NCB/ECB.

1.6.2 Interlinking business functions

The Interlinking business functions are described in this document. These functions are mainly:

- the logical structure of communications (e.g. request/acknowledgement structure);
- tasks that have to be fulfilled in a specific time-span (e.g. start of error detection procedures);
- data presentation requirements (e.g. definition of message types).

Because the application layer of TARGET is completely independent from the underlying network, each NCB and the ECB is responsible for its individual systems.

1.7 Changes to the specification

The key business features of the system have been agreed. They were the basis for the creation of a system specification which has allowed the development of a properly functioning Interlinking system.

Technical design issues may be re-opened to update the system in the future.

A change management scheme has been developed, which channels change requests and brings the decision-making process to the appropriate layer of responsibility.

2. THE BACKGROUND AND SCOPE OF THE SPECIFICATIONS

2.1 TARGET and the Interlinking

"*The main objective of the TARGET system will be to serve the single monetary policy in Stage Three. The other objective of the TARGET system will be to improve the soundness of EU payment systems in Stage Three. This implies a wider use of RTGS procedures, which are the safest payment mechanism to process large-value payments. However, in accordance with the market principle enshrined in the EU Treaty, the use of TARGET will not be compulsory, except for payments directly related to the implementation of monetary policy. TARGET will also improve the efficiency of cross-border payments in Stage Three, as required by Article 109f(3) of the treaty on European Union.[…]*

TARGET will be a decentralised system with only a few common functions undertaken by the European Central Bank (ECB)."

These statements from the 1995 TARGET report create guidelines and the framework for the Interlinking system. However, this leaves a lot of scope for the development of the system.

To have a secure basis for the detailed design, within the framework of the TARGET guideline, the NCBs and the ECB elaborated common User Requirements for the Interlinking system. They constitute the reference document for the detailed specifications of the system. The detailed specifications consist of the Interlinking Specifications and the Interlinking Data Dictionary.

2.2 Scope of the Interlinking specification

This document sets out the procedures for the implementation of the Interlinking system. The purpose of this document is to describe a technical solution that fulfils the User Requirements.

The Interlinking Specifications take into account the different solutions that NCBs have developed for their domestic RTGS systems. Starting from this, the proposed solution is flexible enough to link all kinds of RTGS infrastructures.

The Interlinking Specifications deal mainly with the link between NCBs and between NCBs and the ECB. The provision of an adequate infrastructure for the domestic link between the RTGS systems, the ECB Payment Mechanism and the Interlinking functions is an individual task of each NCB and the ECB.

The link between the NCBs and between the NCBs and the ECB is built on network interfaces. The network itself will be transparent. Attributes of the initial network are specified and examined in the '*Evaluation of the SWIFT Network*'[3].

2.3 Interlinking specificationS and User Requirements

The User Requirements describe comprehensively the business functions of the system. The Interlinking Specifications refer to the User Requirements from a procedural point of view within existing infrastructures.

To clarify the links between the User Requirements and Interlinking Specifications, each procedural description starts with the relevant User Requirements. On the one hand, this method makes clear that

[3] This document was approved by the EMI Council during its meeting on 2 July 1996. It has not been published.

all User Requirements have been taken into consideration; on the other hand, this method presents the different Interlinking functions following the intra-day logic of the business day.

2.4 Interlinking specifications within existing infrastructure

The Interlinking specifications are built on pre-defined RTGS-infrastructures within the NCBs, the ECB-payment mechanism at the ECB and on the SWIFT network service. The proposal takes into account the fact that these components will be used but leaves it to the NCBs to define how they will be implemented.

In addition, the Interlinking Specifications describe what further infrastructure is needed to fulfil the User Requirements.

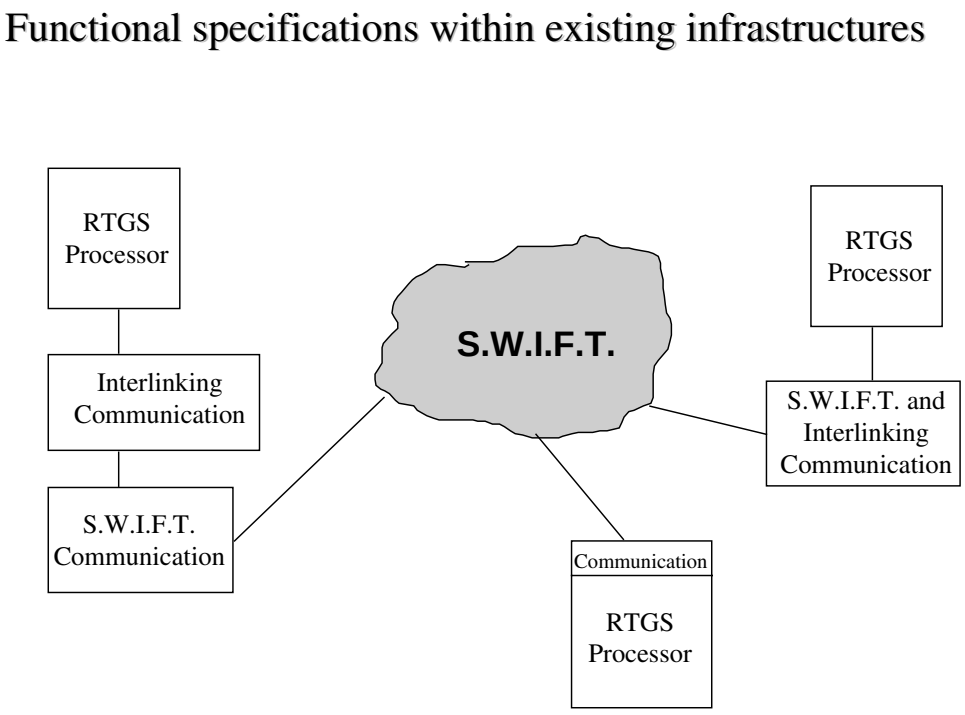

Figure 2-1 - Functional specifications within existing infrastructures

2.5 Interlinking specifications, operational rules and User Handbook

The following specifications translate the requirements of payment systems experts into the more formal language of IT experts. The specifications indicate who has to provide what technical function and for what equipment. Because it is a main task of this document to support the technical development of the system, the specifications do not deal with organisational matters.

3. DESIGN STRATEGY AND METHODOLOGY FOR THE SYSTEM

3.1 Design strategy

3.1.1 The User Requirement references

(UR 1.4)

The design should ensure that it is possible to add new central banks and/or new facilities without complicating the system or introducing new systemic risks. Therefore the interface between the different systems involved should be well defined and follow agreed (international) standards as far as possible. The following minimum guidelines should be adhered to:

- *The exchange of payments should be message-oriented (item by item);*
- *The data exchange within the Interlinking should be based on SWIFT formats.*

3.1.2 Structured design

The TARGET design takes into account the decentralised structure of the system. The logic underlying this approach is shown in the Figure 1-1 - Technical and operational annexes to the TARGET Guideline.

Starting from the TARGET guideline, business requirements for the RTGS systems – Minimum common performance features of RTGS systems within TARGET – and for the common element – the Interlinking – have been defined.

Beneath this level, a common technical design has been made for the Interlinking. On the other hand, the 'Minimum common performance features for RTGS systems within TARGET', the security strategy and the test strategy ensure that the individual elements of the TARGET system – the RTGS systems – comply with a standard defined for TARGET as a whole.

This scheme allows a structured implementation of new features and a structured adding of new NCBs:

- Adding new features can start with the business design and can be subsequently detailed by following the described top-down logic.
- Adding new NCBs is facilitated by the above design. They can easily recognise which common elements have to be provided and what the individual freedom is for the design and implementation of RTGS systems.
- In addition, the scheme facilitates the classification of the various papers in the context of TARGET as a whole.

3.1.3 Building the system on decentralised individual RTGS systems and the existing network infrastructure

For several reasons, it was decided that each country should build TARGET on individual RTGS systems, and that these systems should be linked along with the ECB payment mechanism via the existing SWIFT infrastructure. Nevertheless, these decisions offer some leeway in the design of the

Interlinking system. To support an open and flexible development of the system, a strategy for its design is needed.

To be open to a potential change in the network services, application-oriented functions (e.g. payment system functions) have been clearly separated from network functions (e.g. data transmission, Message Authentication Code (MAC) calculation and MAC check on the communication layer). To be flexible for future developments, a logical communication structure was designed that facilitates the addition or change of functions (request/acknowledgement concept). Furthermore, the message policy supports a maximum independence from SWIFT -formats but allows them to be used as a basis. The strategic guidelines for the Interlinking can be summarised as flexibility and independence.

The reference time for TARGET will be "European Central Bank (ECB) time". This avoids difficulties inherent in using either Central European Time (CET) or Greenwich Mean Time (GMT). CET has not been a stable concept over time and GMT would not take into account changes from summer to winter time, and vice-versa.

The adoption of ECB time, defined as the local time at the location of the ECB, has the advantage of being easily identifiable and would automatically adapt to summer and winter time.

3.1.4 Flexibility and independence

3.1.4.1 Distinction between communication functions and business application functions

Distributed data processing, as required by the Interlinking, needs data storage, data processing and communication functions. Within this structure, communication functions add, for several reasons (security, identification), information to the application data or even manipulate the data (e.g. encryption).

- Where these communication functions are integrated in the data processing for RTGS systems, a merging of functions will arise.
- If communication data and application data were to be integrated, an inappropriate and unmanageable merging of data would arise.

Consequently, to enable the NCBs and the ECB to have a clear functional design of their systems, a clear distinction between communication data and application data has been made throughout the functional specification. This means that communication data are presented only in the header and the trailer of the message, and payment information is incorporated only in the text body of the message. Thus, all parties have a secure basis for the structured implementation of the system functions (see Figure 3-3).

3.1.4.2 Structured and secure communication

The User Requirements recommend that TARGET should be an efficient system, secure on the one hand, and providing a basis for a flexible development on the other.

Therefore, the Interlinking Specifications are based on a clear logical structure for communication. For example, in the Interlinking, messages are classified either as requests, notifications, free format or as statistical information messages.

For request messages, a structure has been designed that defines the action or reactions triggered by the request. For notifications that follow a request, a structure has been designed that tells the sender whether or not it was possible to comply with the request, and if so, what action was taken. A request is completed when the sender has received the appropriate matching notification. By definition, notifications never require an answer.

Free format messages provide general information, and statistical information messages provide e.g. information about the value and volume of payments processed by an NCB. Both message types do not require an answer.

This approach facilitates not only the definition of criteria for the completion of a communication but also it is completely flexible as to the design of what was completed and what action has to be taken as a follow-up.

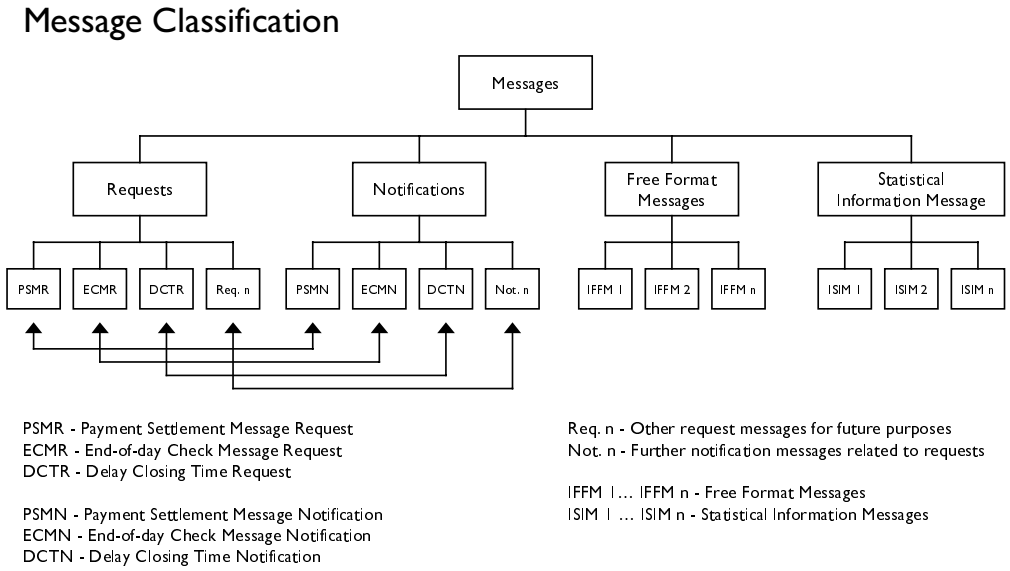

Figure 3-1 - Message classification

3.1.4.3 Message policy

The Interlinking message design is based on the widely used SWIFT message standards. To minimise dependence on SWIFT message definition and to avoid a merging between payment data (e.g., amount, beneficiary, etc.) and the protocol information of the communication, all messages are presented within an “envelope”: the SWIFT-proprietary message (MT 198).

This approach gives the NCBs, and the ECB, maximum flexibility to change or even to expand the Interlinking formats independently from SWIFT. On the other hand, the NCBs and the ECB can adopt SWIFT message standardisation processes where appropriate.

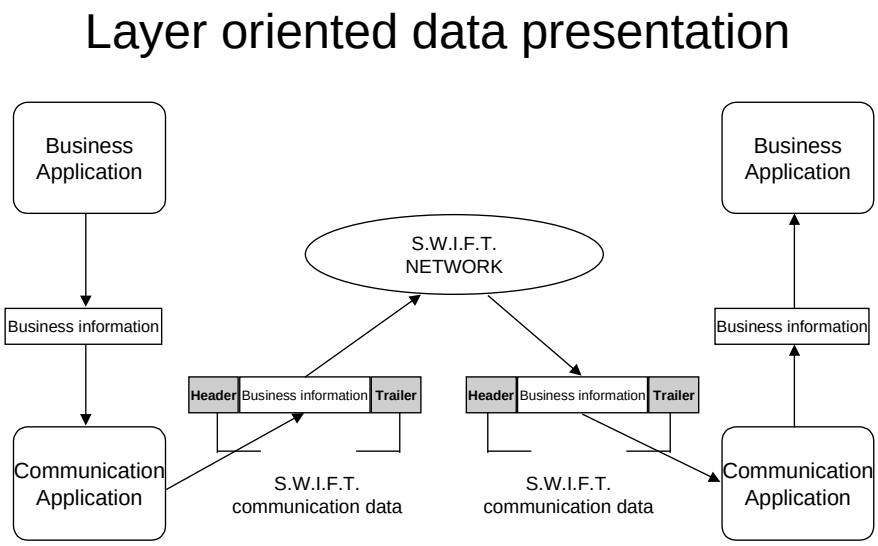

Figure 3-2 - Layer--oriented data presentation

3.1.5 New functions within the existing infrastructure

Because they are not necessary for domestic RTGS systems, the Interlinking business functions as they are described in the User Requirements were completely new for NCBs/ECB. Neither SWIFT nor any NCB provided these functions before. Nevertheless, the above-mentioned design strategy allows use of the SWIFT FIN service without any modification and, at the same time, a large degree of independence from the network provider.

3.2 Methodology for the exchange of information

3.2.1 The User Requirement references

(UR. 2.5.3.) If domestic formats deviate from the standardised Interlinking formats, the domestic Interlinking component has to be able to handle fully standardised incoming Interlinking payment messages and convert them, if necessary, into domestic format data. It also has to convert outgoing domestic data formats into the standardised data presentation used in the Interlinking.

NCBs or their operators are expected to handle incoming Interlinking messages such as SWIFT MT 202, MT 100 or MT 103 (STP and non-STP) using SWIFT MT198 as an envelope.

The Interlinking component at each NCB also has to be able to create and transmit standardised messages for other services (handling of errors, end-of-day message check, transmission of management information data etc.).[4]

[4] *Interlinking message types could stay within the FIN message definition if the maximum size of a single message is less than or equal to 10000 characters (free formatted message).*

3.2.2 Classification of messages

In the Interlinking System, four categories of messages will be implemented:

- **Request Messages.** Messages used when a defined reaction from the receiving NCB/ECB is required. Typical messages of this type are payment messages (which require an acknowledgement) and end-of-day messages to the ECB (which require a matching notification).
- **Notification Messages**. Messages in this category are replies to requests. Notifications (or acknowledgements) can be either positive (ACK) or negative (NACK). A notification completes the communication cycle initiated by a request.
- **Free Format Messages (IFFM).** These are informative plain-text messages. IFFMs can be either broadcast to many NCBs/ECB or sent to a single destination. For example, the ECB can send a message to warn an NCB that it has not received end-of-day information at the required time. IFFMs do not require a notification.
- **Statistical Information Messages (ISIM)**. These messages contain statistical information on Interlinking traffic between NCB/ECB.

3.2.3 The use of a message framework

The Interlinking will initially use the following message framework:

The SWIFT proprietary messages MT198. The MT198 messages are envelope messages which contain a free space that can be formatted by the users according to rules bilaterally agreed. SWIFT applies no validation to the content of the envelope, except that the characters used must belong to the SWIFT character set, and the length of each line must not exceed 78 characters.

Such a framework gives a high flexibility to the use of current data formats, the provision of confidentiality and the evolution of data formats.

For payment messages, the User Requirements mention that the Interlinking exchanges messages like MT100, 103 and 202. Therefore, within the envelope:

1. A subset of these messages has been retained as the maximum common format for all NCBs and the ECB. As a minimum, all mandatory SWIFT fields have been retained.

2. Bank identification must be established by using BIC codes. BIC codes have to be validated against the BIC file distributed on a quarterly basis by SWIFT.

3. If SWIFT amends the syntax for the fields used in the MT100, 103 (STP and non-STP) or 202, NCBs and the ECB are free to evaluate whether or not they must adapt the Interlinking messages format.

3.2.4 The Request messages

3.2.4.1 The Payment Settlement Message Request (PSMR)

This category of message involves the following payment messages:

- Customer Transfer
- General Financial Institution Transfer

By issuing one of these messages, the sending NCB/ECB is requesting the receiving NCB/ECB to process a payment.

Because different cut-off times will apply to customer and interbank payments in TARGET, domestic systems must be able to differentiate between them.

As a minimum, amounts up to 12 integer digits and 2 decimal digits will be accepted by all NCBs/ECB.

3.2.4.2 The End-of-day Check Message Request (ECMR)

This is the message sent by an NCB to the ECB at the end-of-day. It is used to provide the ECB with information concerning the payment messages exchanged during the business day with other NCBs and the ECB as well as information about the next three business dates and times. As with all request messages, a reply is expected from the receiver, in this case the ECB, the End-of-day Check Message Notification (ECMN).

If the NCB is not in a position to submit an ECMR, the ECMR may be manually keyed in by the ECB in the end-of-day application.

3.2.4.3 The Delay Closing Time Request (DCTR)

The third kind of request message is used when an NCB or the ECB faces technical problems toward the end of the business day and needs to postpone its official closing time. The ECB, on behalf of the NCB/ECB which has requested a delay in closing, will send a DCTR. If the ECB is unable to send a DCTR this could be sent by other NCBs. A notification from the receivers is required, the Delay Closing Time Notification (DCTN). A DCTR requests all NCBs to stay open to make and receive payments to and from all other NCBs/ECB. Bilateral delayed closing time is not allowed.

3.2.5 The Notifications

3.2.5.1 The Payment Settlement Message Notification (PSMN)

This notification is a response to a PSMR. The receiving NCB/ECB will notify the sending NCB of the completion of processing by issuing a Payment Settlement Message Notification (PSMN). The PSMN should reach the sending NCB/ECB within the required time-span of 30 minutes after debiting has taken place. The result of the processing may be:

- positive if the receiving NCB/ECB has successfully credited the RTGS account of the credit institution. When the positive PSMN is received by the sending NCB/ECB, the responsibility for the payment is taken over by the receiving NCB/ECB;
- negative if the receiving NCB/ECB cannot process the request. In this case, the sending NCB/ECB remains responsible for the payment.

The PSMN is fundamentally different from either the SWIFT ACK or the SWIFT Delivery Notification.

The SWIFT ACK is an acknowledgement that SWIFT has taken the responsibility to carry the message to its final destination. It implies that SWIFT has processed all the necessary validation, i.e., TID, syntax, etc. It is also a proof that SWIFT has safely stored the message.

The SWIFT Delivery Notification is delivered to the sender of the message, if requested, and signifies the delivery of the message. This notification implies that the CBT of the receiver has safely stored the message.

A positive PSMN goes far beyond these SWIFT messages. It is generated by the receiving RTGS/ ECB payment mechanism after crediting the participating credit institution in the receiving system.

A negative PSMN should always be returned to the sending NCB/ECB if a message is received whose message sub-type is not supported or not recognisable.

3.2.5.2 The End-of-day Check Message Notification (ECMN)

The End-of-day Check Message Notification is used to notify NCBs about the result of the end-of-day control operations. It will contain the results of the matching procedures performed by the ECB. This message should be received by the NCBs within 30 minutes of the ECMR having been sent.

The ECMN will contain information relating to:

- successfully matched data (if only successfully matched data are reported, the receiving NCB can close);
- unsuccessfully matched data (if some unsuccessfully matched data are reported, the involved NCBs have to stay open);
- the next three business days and times for each country.

3.2.5.3 The Delay Closing Time Notification (DCTN)

This notification is the response to the Delay Closing Time Request (DCTR). The receiver must accept the new closing time and confirm agreement by sending a positive DCTN. If the DCTR is syntactically incorrect, a negative DCTN, with the relevant error code, is sent. The DCTN should reach the sender within the required time-span of 30 minutes.

3.2.6 The Free Format Messages (IFFM)

These messages cover a wide range of uses. For example:

- to request end-of-day information from an NCB which has failed to send it by the required time;
- to broadcast information on local operational problems, e.g., RTGS system problems, or to inform other NCBs/ECB that the situation is back to normal.

These are free format messages, so it is possible to provide the information in plain text. The IFFMs can either be printed or screened. They do not require a reply.

3.2.7 The Statistical Information Messages (ISIM)

The ISIM is a message used to provide the ECB with statistical data in a predefined format. The information contained describes the volume and value of the successful and unsuccessful payments sent by the NCB/ECB to each of the other NCBs/ECB on a specific business day. Each line of information is categorised according to its type of payment, the time period that the payment was made and the code of the receiving NCB or the ECB. The ECB does not need to confirm its receipt.

3.2.8 Message referencing

The most important information in a SWIFT message, excluding the text itself, is the Message Input Reference (MIR), related to the sender, and the Message Output Reference (MOR), related to the receiver.

It is also important to be able to have a unique reference for any inquiries to SWIFT. However, the Transaction Reference Number (TRN), mandatory in every message, cannot be guaranteed to be unique. Many messages may have been sent with the same reference because they concern the same

operation. Conversely, MIR and MOR are a collection of (network- and message-related) elements that form a unique reference during transmission over the SWIFT Network.

A message will contain both the MIR and the MOR. Under normal circumstances, if no monitoring facilities were activated when the sender issued the message, only the receiver of the message will know both references.

However, those two references have an important drawback: they do not allow consecutive numbering between two NCBs/ECB. The numbering is only consecutive in relation to SWIFT. No easy gap detection is therefore possible during the day for messages received from a particular NCB/ECB.

For this reason, the Interlinking needs its own reference. The Interlinking Internal Reference (IIR), which is a bilateral reference, is a unique bilateral numbering system for the messages.

Interlinking Internal Reference (IIR)

The references described above will only be useful when requests are sent to SWIFT.

In the Interlinking, there is a need for consecutive sequential numbering on a bilateral basis: the Interlinking Internal Reference (IIR).

Each NCB has a different formatted numbering sequence that has the following format:

A	*Y*	*Y*	*M*	*M*	*D*	*D*	*C1*	*C1*	*C2*	*C2*	*N*	*N*	*N*	*N*	*N*

where:

A	*is the application identifier (A, B, C or D)*
YYMMDD	*is the sending date*
C1C1	*is the sending country*
C2C2	*is the receiving country*
NNNNN	*is the sequence number of the message*

Example: A001123BEGB02345 is the reference for the message number 2345 sent on 23 November 2000 by Belgium to UK with regard to a PSMR (A).

The sequence number of the message is reset every day and is independent for each application code and within each application code for each pair of country codes.

The advantages of such a numbering mechanism are:

- During the end-of-day control operations, all NCBs report the highest number received during the day, as well the highest number sent during the day. These numbers are used for the matching procedure.
- If the receiving NCB needs to request the re-sending of a specific message, or a range of messages, there is no ambiguity concerning the reference identifier of the messages.
- If an investigation needs to be carried out by two NCBs, they have a common standard structured reference. In case of differences observed during the matching procedure at the end of the day, the sending NCB/ECB should be capable of justifying any gaps in the IIRs received by the receiving NCB/ECB which are caused by special action on the part of the sending NCB/ECB, e.g. a PSMR has been cancelled after the IIR has been generated, but before the message was sent.

Notes: 1) The ECB and the Deutsche Bundesbank share the same country code in their BIC code[5], i.e. DE. Therefore, any time a country code is used in isolation from a BIC code, EU will be used for the ECB and DE for the Deutsche Bundesbank.

2) During the day, no gap detection in IIR is required. However, according to error handling procedures, the sending NCBs should be able to justify any unsent IIR.

3.2.9 The re-sending of messages

The message strategy above defines a message life cycle as being "open" until the message request has been closed by a notification. However, in some situations, e.g. when a PSMR has been sent but never received, or the notification has never been received, specific actions need to be taken to close that cycle. Therefore, NCBs/ECB should be capable of sending a duplicate of any PSMR, PSMN, ECMR or ECMN. The content of this duplicate should be exactly the same as in the original message, including its IIR.

Because IIRs have to be unique, if an NCB/ECB receives a message with a duplicate IIR, this second message will be disregarded. Any duplicate message received should be stored by the receiving NCB/ECB for audit trail purposes.

[5] ISO rejected the request to create a country code for Europe.

4. THE PHYSICAL AND LOGICAL INFRASTRUCTURE OF THE SYSTEM

4.1 Technical components and interfaces

4.1.1 The User Requirement references

(UR. 1.3.) The Interlinking system comprises a set of processing functions at each NCB and the ECB:[6].

- *Payment system-related functions;*
- *accounting system-related functions;*
- *communication functions between the Interlinking components;*
- *functions to ensure availability and security;*
- *interface functions to the domestic RTGS systems and the ECB payment mechanism.*

The Interlinking handles payments in euro only, regardless of the currencies used in the domestic RTGS systems.[7]

4.1.2 Network topologies for domestic RTGS systems' components and Interlinking components

Since RTGS systems are implemented differently from country to country, the approach to the design of the Interlinking components was to be as flexible as possible. In this chapter, several types of RTGS topologies that comply with the User Requirements are described, together with their interfaces with the 'Interlinking Components' that allow the settlement of cross-border payments.

According to the 'User Requirements', "The Interlinking System is composed of a set of processing functions at each NCB and ECB." These functions were identified as: payment system-related functions, accounting system-related functions, monitoring functions at the ECB, communication functions of the Interlinking components, availability and security functions, interface functions between domestic RTGS systems and the ECB payment mechanism.

To facilitate the description, the following components were defined.

4.1.2.1 RTGS Communication Component

The *RTGS Communication Component* (RCC) is the domestic RTGS interface with the processing components. It consists of procedures which handle the communication functions between domestic RTGS participants, and convey the cross-border payments orders for further treatment by the processing components.

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[6] *Some or all functions may be provided by a third party. In this case, the NCB and/or the ECB is/are responsible for the compliance of the operator with the User Requirements set out in this document.*

[7] *Participating RTGS systems still using national currencies must provide a conversion feature to allow payments to be handled in the Interlinking.*

4.1.2.2 Processing Components: RTGS Processing Component and Interlinking Processing Component

The cross-border payment order has to be processed in two different stages: domestically and by the Interlinking. That is why the processing features of the system are divided into two different parts: the *RTGS Processing Components* (RPC) and the *Interlinking Processing Component* (IPC). Each one is responsible for dealing with the cross-border payment order in its design. The IPC implements only the payment system-related functions and the interface functions to the domestic RTGS systems, or the ECB payment mechanism.

4.1.2.3 Interlinking Communication Component

The *Interlinking Communication Component* (ICC) implements the communication functions between the Interlinking components and the Interlinking network. It is responsible for receiving, sending and routing of Interlinking messages. It has to transmit, receive and decrypt Interlinking messages. It can also handle any errors that may occur during the communication process between the participants in the Interlinking System.

4.1.3 The interfaces between components

The functional specification does not require a detailed description of how processing is organised prior to the Interlinking communication component. It is up to the NCBs and the ECB to organise these functions. Hence, the functional specifications will refer to a standard interface description which distinguishes between RTGS communication components, processing components (RTGS and Interlinking) and Interlinking communication components. This structure will be used in the whole functional specification for analysing and presenting data flow and describing the interaction between different functions.

These elements are described below, together with the interfaces established between them. For each one reference is made to the appropriate section of the User Requirements.

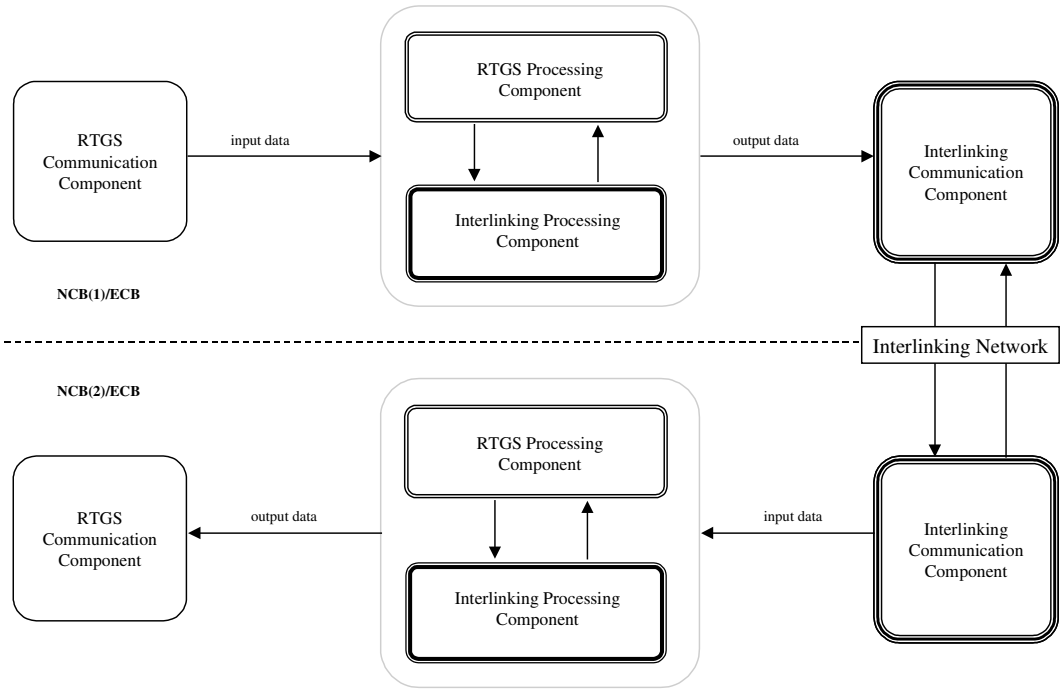

Figure 4-1 - Components and Interfaces

4.1.4 Topologies

4.1.4.1 V-shaped topology

Within a V-shaped system, a full domestic payment message is passed by the sending bank to the NCB. Once settlement is complete, the full message is passed by the NCB to the receiving bank.

Within a V-shaped routing, the NCB receives cross-border payment orders directly from its participants. After processing (syntax check, settlement etc.), the NCB submits the whole payment message to the Interlinking network. Incoming Interlinking messages will be processed and transmitted to the beneficiary credit institutions.

Interlinking payments in a V-shaped topology

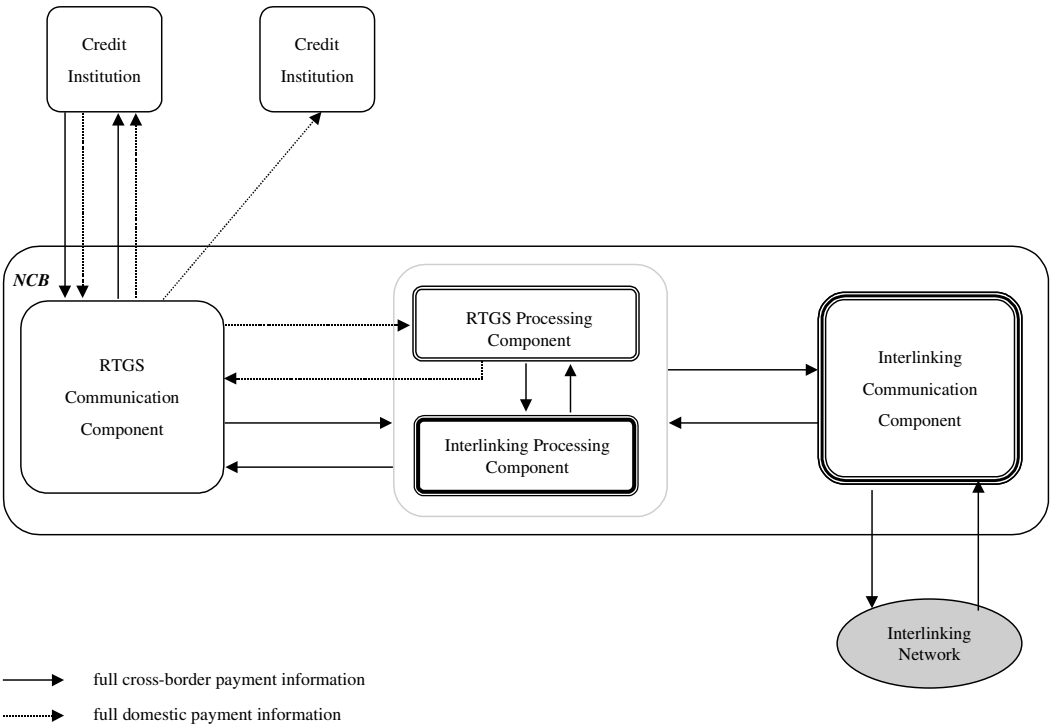

Figure 4-2 - Interlinking payments in a V-shaped topology

4.1.4.2 Y-shaped topology

With a Y-shaped system, domestic payment instructions are sent in the first instance from the sending bank to a data collection point. A settlement request (or a full payment message) is then passed from this collection point to the NCB for settlement. Once settlement is completed, the NCB sends a confirmation of settlement (or the full message) back to the collection point. The full payment message is then routed from the data collection point to the receiving bank.

Within a Y-shaped routing, the NCB has, in principle, two alternatives for submitting cross-border payment data to the Interlinking network.

One possible Y-shaped approach would be to submit the full cross-border payment message via the data collection point to the Interlinking network after processing within the NCB (debiting of the account of the ordering credit institution, crediting of the account of the receiving NCB/ECB etc.) was completed and settlement confirmation was received by the data collection point. Full incoming Interlinking messages would be stripped at the data collection point. The RTGS processor would process the settlement request. The beneficiary bank would receive the full cross-border payment message.

Interlinking payments in a Y-shaped topology via the Data Collection Point

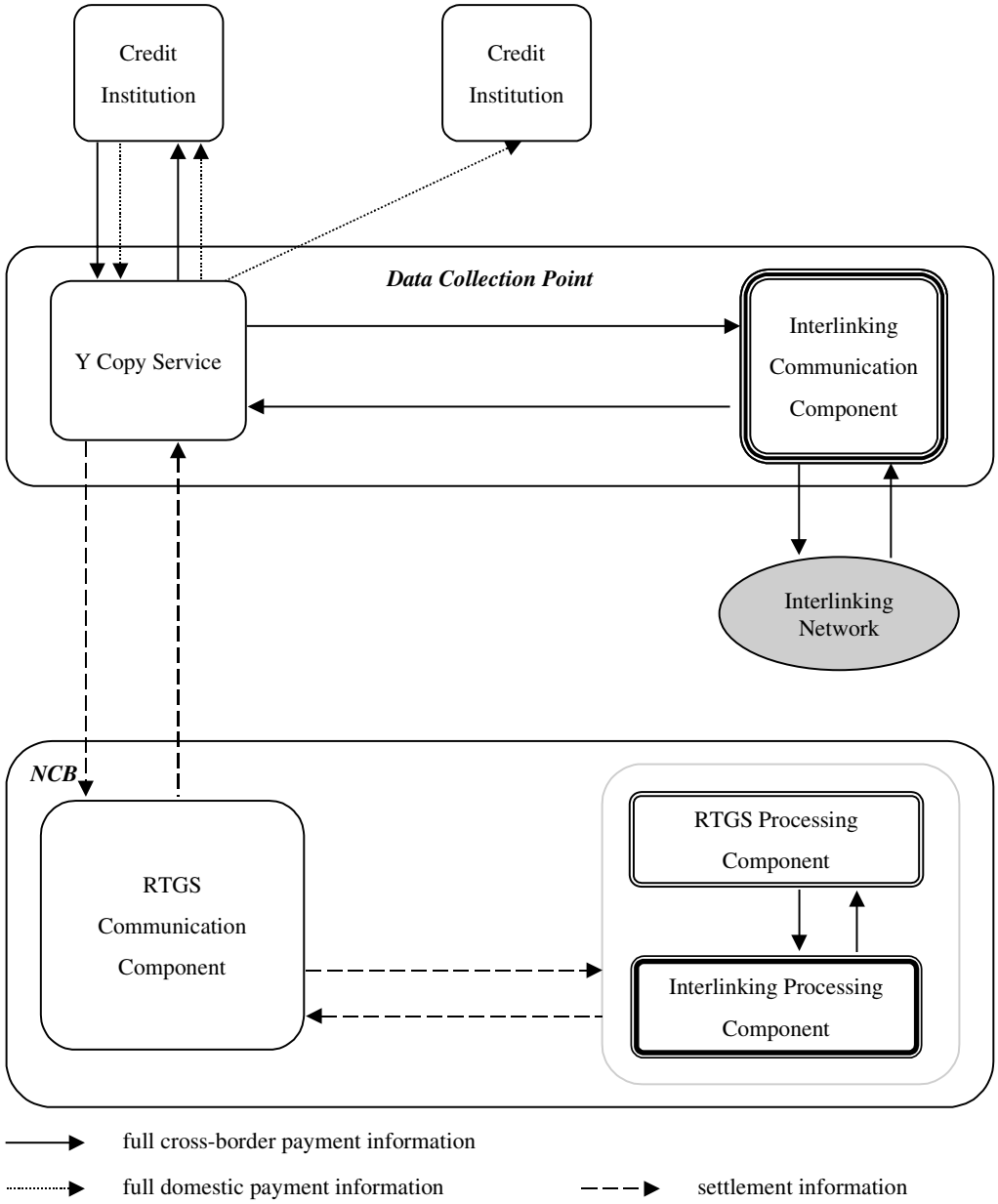

Figure 4-3 - Interlinking payments in a Y-shaped topology via the data collection point

An alternative might be that the data collection point would send, in the case of a cross-border payment, the complete payment order to the NCB for further processing and the NCB would submit (having completed processing as in the case of a V-shaped structure) the whole payment to the

Interlinking network[8]. Full incoming Interlinking payments would be received by the NCB and processed as in the case of a V-shaped topology. The communication to the beneficiary bank would take place via the data collection point.

Interlinking payments in a Y-shaped topology via the NCB

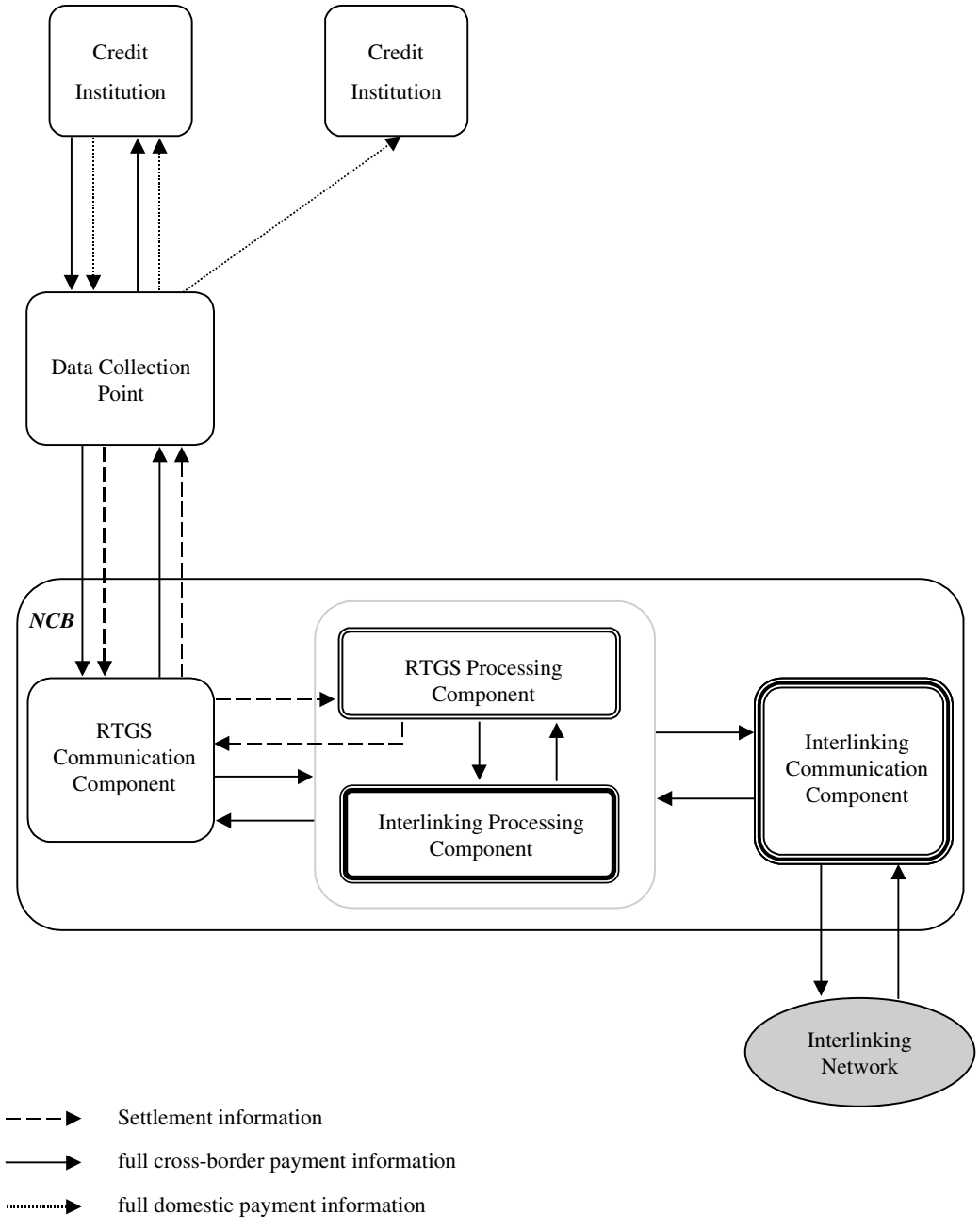

Figure 4-4 - Interlinking payments in a Y-shaped topology via the NCB

[8] In a T-shaped routing, the sending bank passes a full payment message to the receiving bank but at the same time a duplicate is produced and sent to the NCB. The NCB settles the payment on the basis of the information contained in the duplicate message independently of the main message. Because the only participants in the Interlinking are the NCBs and the ECB and the Interlinking conveys only irrevocably and finally settled funds, a T-shape system can be seen, for cross-border payments purposes, as a Y-shaped system.

4.1.4.3 L-shape topology

Under the L-shaped confirmation system, each domestic payment instruction will be settled at the NCB before it is sent to the receiving bank. In this routing, for each payment instruction the ordering credit institution sends to the NCB a settlement request, while the main message is retained in the sending bank's system. Only if the sending bank has sufficient funds on its RTGS account will the NCB settle the transaction, by debiting the account and crediting the receiving bank. The posting to each account will take place simultaneously. The NCB will then return a confirmation to the sending bank. As soon as this is received, the main message, containing the full payment details, will be automatically released to the receiving bank. The receiving bank will then know that it has received final and irrevocable funds on its account at the NCB.

Because only NCBs and the ECB participate in the Interlinking, the sending credit institution has to transmit the full payment details of a cross-border payment to the NCB. Having successfully processed the payment order (syntax check, settlement etc.), the NCB or its operator will submit the full payment instruction to the Interlinking network. Full incoming Interlinking messages as well will be processed in the NCB and transmitted to the receiving credit institution by the NCB or its agent.

Interlinking payments in an L-shaped topology

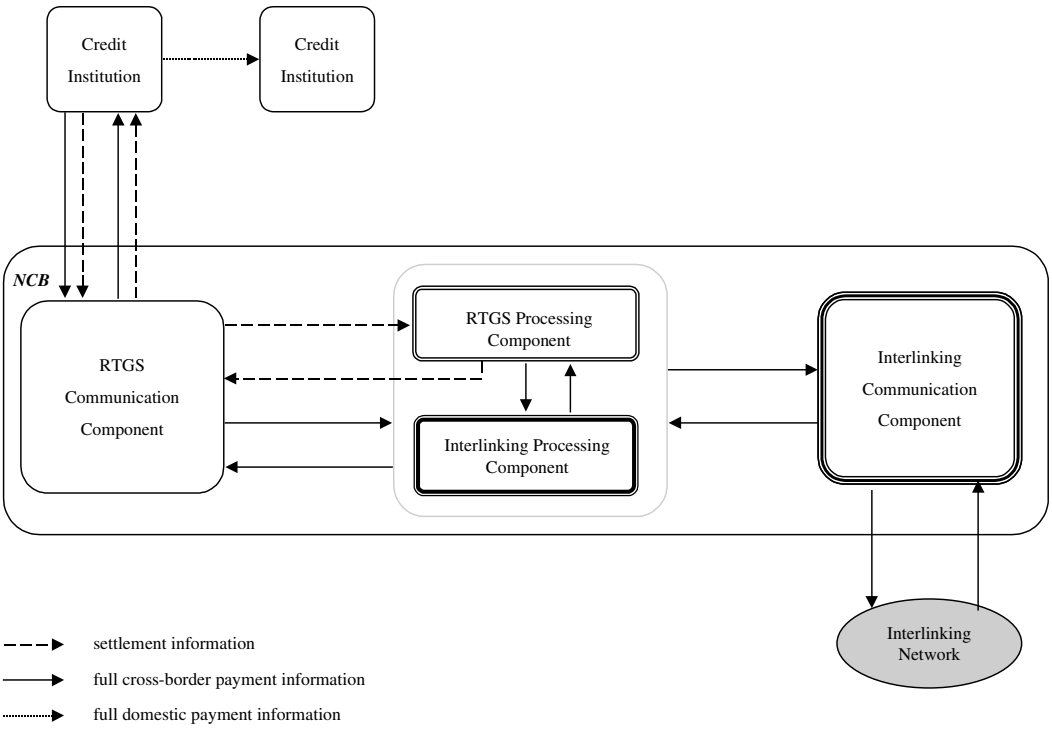

Figure 4-5 - Interlinking payments in an L-shaped topology

4.1.5 The link between different topologies and their interfaces

4.1.5.1 The link between different topologies

Only NCBs and the ECB are directly connected to the Interlinking network, but some or all Interlinking functions may be provided by a third party. In this case, the NCB and/or the ECB is/are responsible for the compliance of the agent with the specifications of the Interlinking System.

Hence, technically the Interlinking is the link between IT systems at the NCBs and the ECB or any agents who work on behalf of the NCB/ECB. The link takes place via Interlinking communication components which have to provide defined functions.

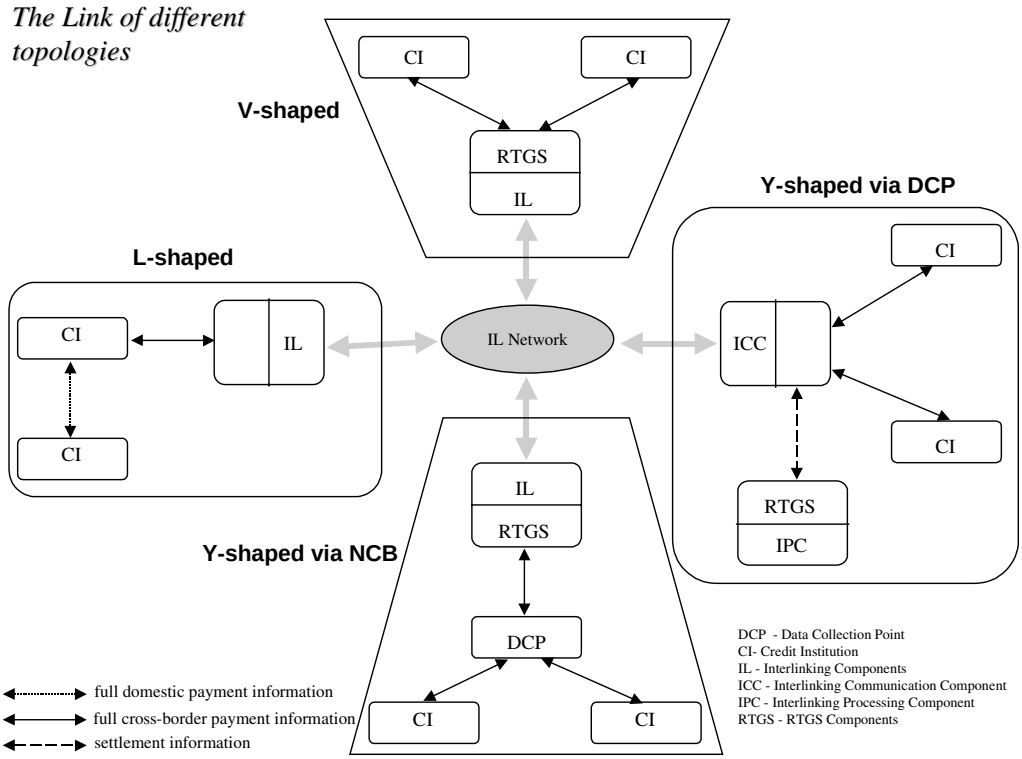

Figure 4-6 - The link of different topologies

4.1.6 Standard and recovery features of the processing and communication components

4.1.6.1 The User Requirement references

(UR. 2.6.2.) *In addition to the processing and transmission time given above, the different systems involved have to fulfil the following criteria:*

In the event of a disruption of the network (including the sending and receiving systems in the NCBs and the ECB) recovery measures have to ensure that a contingency link with adequate capacity is available within four hours.

In addition, TARGET as a whole has to provide facilities capable of completing the business day finally and irrevocably before the start of the next one (i.e. before the domestic RTGS systems open on the next business day), and infrastructure capable of carrying out the operations of the next business day[9].

[9] *Because the NCBs and the ECB are free to implement Interlinking application functions either within domestic RTGS systems or in a separate module, the Interlinking User Requirements do not provide a definition of availability criteria for domestic Interlinking components. This would go beyond Interlinking requirements.*

4.1.6.2 Structure of the required components

Availability of the Interlinking refers to the availability of TARGET as a whole. Hence, this paragraph outlines a structure that includes domestic RTGS processing components as a whole.

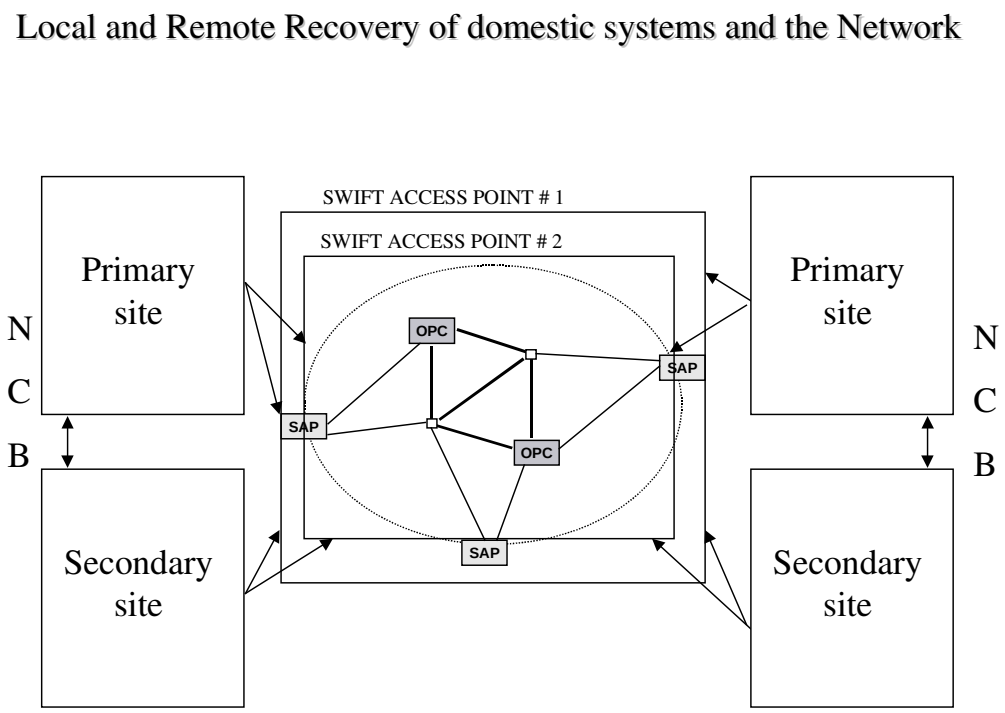

Figure 4-7 - Local and Remote Recovery of domestic systems and the Network (example)

It is a requirement to provide a fully redundant network and processing components to support a large-value payment system capable of completing the business day, in a final and irrevocable position, before the start of the next one and to provide a sufficient infrastructure to conduct the next business day.

It is SWIFT's task to provide a fully redundant network behind the SWIFT Access Points (SAPs) and to fulfil the User Requirements described in the preceding section. The features of the SWIFT Network are set out in '*Evaluation of the SWIFT Network*'[10].

4.1.7 Confidentiality, Integrity, Authentication and Non-repudiation - interface of the components

4.1.7.1 The User Requirement references

(UR. 2.7.2.) The methods used for the communication between Interlinking components should include features protecting against threats to integrity, authentication and non-repudiation. These methods have to be designed so as to be secure and to remain secure for the foreseeable future. They should be implemented and monitored in such a way that makes sure that they will be used properly.

[10] This document has not been published.

(UR. 2.7.3.) Payment data that are communicated between Interlinking components at different NCBs/ECB have to provide an appropriate level of protection against loss of confidentiality. These methods should be designed so as to be secure and to remain secure for the foreseeable future. They should be implemented and monitored in a way that makes sure that they will be used properly.

4.1.7.2 Structure of the required components

4.1.7.2.1 Encryption

The User Requirements allow two different technical solutions to provide confidentiality:

- Line encryption during communication between different systems and plain text on processing systems.
- End-to-end encryption of business data between NCBs/ECB and partial plain text for the routing of data via the network.

The Interlinking will initially use SWIFT FIN standard encryption features. Later on a move to end-to-end encryption can be envisaged.

4.1.7.2.2 Authentication

The equipment for authentication and non-repudiation at the communication level is provided by the CBTs. It is implemented via the SWIFT card reader and the SWIFT CBT. The features of these components are set out in '*Evaluation of the SWIFT Network*'[11].

Because authentication components have to be available under all circumstances, their provision should be fully redundant at the domestic level. If the CBT provides sufficient space to store more than one authentication key, only the messages authenticated with the current key will be considered as successfully authenticated.

4.1.7.2.3 Integrity

Data integrity is assured by SWIFT FIN standard features.

4.1.7.2.4 Non-repudiation

Because SWIFT can be seen as a trusted third party in the store and forward communication process, non-repudiation is available via SWIFT's long-term storage of data.

4.1.8 Performance features of the components and the interfaces

4.1.8.1 The User Requirement references

(UR. 2.5.5.) The standard time for a message to travel through the Interlinking system (transmission between Interlinking communication components) is estimated to be under ten seconds for 99% of transactions per day and less than 15 minutes for the remainder (under normal circumstances).[12] [13]

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[11] This document has not been published.

[12] *The figures in this paragraph should be seen as objectives. If another service provider is chosen, this may have huge effects on costs. Hence, the trade-off between speed and cost will be investigated carefully and these provisions may have to be revised.*

(UR. 2.5.6.) The performance of the Interlinking components, including the interface between the domestic Interlinking components and the RTGS systems/ECB payment mechanism, has to be sufficient to achieve the processing time mentioned above.

(UR. 2.8.) The NCBs and the ECB have to provide adequate interfaces to the domestic RTGS system and/or the ECB system in order to achieve sufficiently fast and secure communication between these components, in line with the requirements stated in this chapter[14].

4.1.8.2 Performance of the network

The communication network for the link between NCBs, and between NCBs and the ECB, is divided into two parts:

- The link between the NCB/ECB CBT and the SAP
- The internal link between different SAPs.

SWIFT has to provide adequate capacity for the link between SAPs (which includes all components within the network). These are investigated in '*Evaluation of the SWIFT Network*'[15]. The NCBs, and the ECB, have to assess individually their needs and have to provide individually an adequate performance level for the link between their CBT and SAP (together with SWIFT).

4.1.8.3 Performance of the domestic components

The NCBs, and the ECB, have designed and implemented the relative systems, ensuring there is adequate capacity for all systems linked to the CBT.

4.2 Accounting framework for the Interlinking

4.2.1 The User Requirement references

(UR. 2.3.) To meet the technical requirements for the daily processing of payments, each participating NCB has to open one account for each other NCB and the ECB. The ECB should open accounts for all NCBs.

4.2.2 Accounting functions related to the Interlinking

Two accounting functions are provided in TARGET:

- Irrevocable and final debiting and crediting of payments (RTGS function);
- Record keeping on inter-NCB/ECB accounts (Interlinking function).

Irrevocable and final debiting or crediting take place on the accounts within a domestic RTGS system, or the ECB payment mechanism. In addition, there may be some further payments stemming from

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[13] *The time it takes to process and transmit time a payment from one RTGS system to another (which is not an Interlinking requirement) was also defined by the Interlinking Task Force. It was proposed that this should be the sum of the time required in the sending and the receiving RTGS systems including the communication between the RTGS system and the domestic Interlinking component (7.5 minutes each) plus Interlinking time as defined above, i.e. a total maximum time of 30 minutes (this definition covers the time between the debiting of the account of the ordering bank by the sending RTGS system and the crediting of the account of the beneficiary bank at the receiving NCB).*

[14] *This solution gives the NCBs and the ECB maximum independence with regard to implementation.*

[15] This document has not been published.

trading activities of the NCBs and the ECB on their own behalf, when a credit institution is involved. These transactions should also be mirrored in the inter-NCB accounts.

5. THE BUSINESS FUNCTIONS OF THE SYSTEM

5.1 Cross-border single payment transfer

5.1.1 The User Requirement references

(UR. 2.2.1.) Payment data transmitted across the Interlinking system represent payments, expressed in euro, that have been finally and irrevocably debited from the account of the originator's bank in the originating national RTGS system.

(UR. 2.2.3.) Each payment passing through the Interlinking must have a unique identifier to allow message identification and facilitate error handling.

(UR. 2.2.4.) The sending NCB/ECB has to check the syntax of the data according to the appropriate standard, the value date of the payment order (checking it is the same day[16]) and the availability of the receiving NCB/ECB. If syntax errors or other reasons for rejection are detected, the sending NCB/ECB should handle the data according to domestic rules[17].

The receiving NCB/ECB has to check all parts of the data (including a unique identifier to avoid double-crediting) to ensure that they comply with national rules, so that the account of the beneficiary bank can be properly credited.

(UR. 2.2.5.) If it is impossible to credit a beneficiary, the receiving NCB/ECB will immediately inform the sending NCB/ECB by means of a negative acknowledgement, stating the reason for not executing the payment. Reasons can be:

- *impossible to identify the receiving institution;*
- *other problems stemming from the content of the message;*
- *receiving system unavailable.*

The sending NCB/ECB handles the data according to domestic rules[18].

(UR. 2.5.4.) The receiving NCB/ECB has to send an automatically generated acknowledgement to the sending NCB/ECB for each payment message received.

If the beneficiary bank in the RTGS system has been successfully credited, the acknowledgement will be positive. If the processing cannot be completed due to the occurrence of an error, a negative acknowledgement will be sent to the sending NCB/ECB, stating the reason.

Responsibility for the payment is only passed on to the receiving NCB/ECB following the reception of a positive acknowledgement from the receiving NCB/ECB. For the sender, the acknowledgement is the proof of receipt of the payment and successful crediting of the beneficiary bank's account in the receiving NCB/ECB.

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[16] *The value date is a feature of some domestic RTGS systems. The only value date in the Interlinking system is "today".*

[17] *The sending NCB may decide, for example, to re-credit the account of the originator and re-route the data or to credit an offset account for correcting the payment data and repeat the transmission via the Interlinking.*

[18] *The sending NCB may decide, for example, to re-credit the account of the originator and re-route the data or to credit an offset account for correcting the payment data and repeat the transmission via the Interlinking.*

If an acknowledgement has not arrived within 30 minutes[19] of the debiting, the sending NCB must start error detection procedures.

5.1.2 The functions of the cross-border single payment transfer

These functions are set out comprehensively in the User Requirements.

5.1.3 Settlement message flow

5.1.3.1 Payments between credit institutions

The flow of messages relating to the settlement of a cross-border payment can be seen from the following diagram. Each 'box' represents those components that were identified and described in 5.1.

The figure represents one of the many possible ways of implementing this procedure. Several scenarios are feasible, depending on how each component will be implemented.

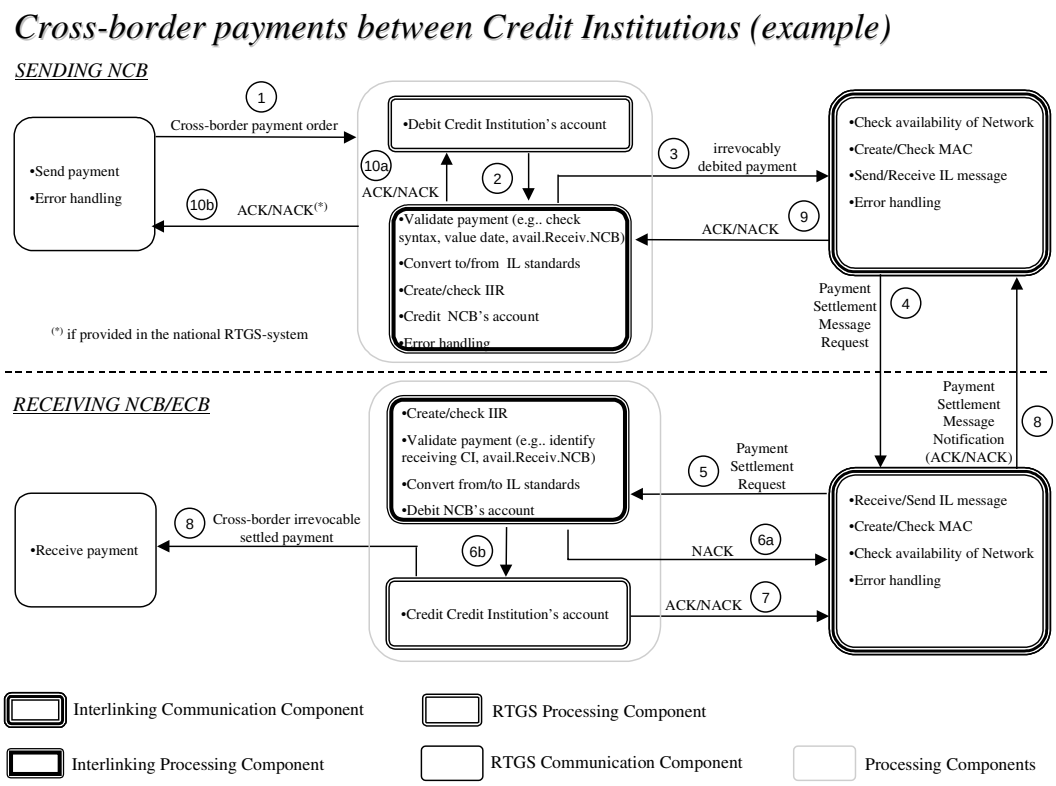


Figure 5-1 - Cross-border payment between credit institutions

On the sender's side

One credit institution issues the cross-border payment via the RTGS system, or the NCB/ECB makes a payment from an internal account. The RTGS Communication Component (RCC) conveys the cross-border payment order to the Processing Components.

[19] *30 minutes should be considered as a maximum: it could be lowered in future if this proves advisable/possible.*

The payment order is processed by the RTGS Processing Component and by the Interlinking Processing Component (IPC). The payment is validated (e.g. availability of the receiving NCB/ECB), the amount is debited[20] from the sending credit institution's account, and the receiving NCB's/ECB account is credited. At this stage the cross-border payment is considered as being irrevocably debited. The IIR (Interlinking Internal Reference) is created and the domestic message is converted to an Interlinking standard message. The payment is then routed to the Interlinking Communication Component (ICC). The sequence of events and the components responsible for these procedures may differ from NCB to NCB.

The next step is to issue the cross-border payment order to the Interlinking Network, via the Interlinking Communication Component (ICC). This component has to check the availability of the network, create the MAC (Message Authentication Code, which identifies and authenticates each message in the system) and send the *Payment Settlement Message Request* (PSMR) to the addressee NCB/ECB.

On the receiver's side

The Interlinking Communication Component (ICC) receives the *Payment Settlement Message Request* (PSMR). After checking the MAC against the current authentication keys, it sends it to the Processing Component.

The cross-border settlement order is then processed by the Interlinking Processing Component (IPC) and by the RTGS Processing Component (RPC). The message is converted into a domestic format, data are validated (e.g., the IIR is unique, the receiving credit institution exists), the sending NCB's/ECB account is debited, and the beneficiary's credit institution's account credited. If this procedure is successful, the Processing Component sends a positive *Payment Settlement Message Notification* to the sending NCB/ECB via its Interlinking Communication Component (ICC), and communicates the settlement to the credit institution in its RTGS system. If not, a negative *Payment Settlement Message Notification* is sent to the sending NCB/ECB. The sequence of events and the components responsible for these procedures may differ from NCB to NCB.

On the sender's side

When the sending NCB receives an acknowledgement (PSMN) for a PSMR that was sent previously, depending on domestic practices, a debit/credit advice may be sent to the ordering credit institution[21]. For negative PSMNs, the NCBs should make the error code or a meaningful description of the error code available to the credit institutions.

5.1.3.2 Payments between the NCBs/ECB and credit institutions

For the Interlinking System, only one difference exists between cross-border payments between credit institutions and payments between NCBs/ECB and credit institutions. The difference is that in the latter case there will only be a movement in a credit institution's account at either the receiving or the sending NCB/ECB, but not at both. The PSMR indicates that either the ordering party or the beneficiary party of the payment is a credit institution and the other party involved is an NCB/ECB. Therefore, the previous information flow applies in all cases (figure 6-1). Depending on the architecture of the payment system applications at the NCBs/ECB, the "internal" accounts of the NCB/ECB will be held either directly in the RTGS system or in another application. Nevertheless, the

[20] In some RTGS systems, the debiting of an account takes place only after a positive acknowledgement is received. In that case, funds will be blocked on the account of the ordering credit institution.

[21] If the funds were blocked on the ordering credit institution account and a positive acknowledgement is received, then the sending NCB must process the final debiting of the account.

application connected to the Interlinking (RTGS or "internal" application) has to comply with the features required by this specification.

5.1.3.3 Payments between the NCBs/ECB

Payments among NCBs/ECB follow the same structure and message flow as described for payments between NCBs/ECB and credit institutions. The only difference is that both end-points of the transaction are either at an account belonging to an NCB or the ECB. Inter-NCB transfers can only be made between "IN" NCBs[22]. For inter-NCB –transfers, as in the case of all other interbank payments, the Interlinking MT 202 will be used. A published BIC code of the receiving NCB will be put into the field 58A (beneficiary institution) of the MT 202. For the internal routing of the messages in NCBs/ECB a specific code word "INTERNCB" (between slashes ('/')) will be put in field 72 of the Interlinking message. In order to differentiate categories of payments, this code word will be followed by a 4 character code. These codes have been defined by accounting experts.

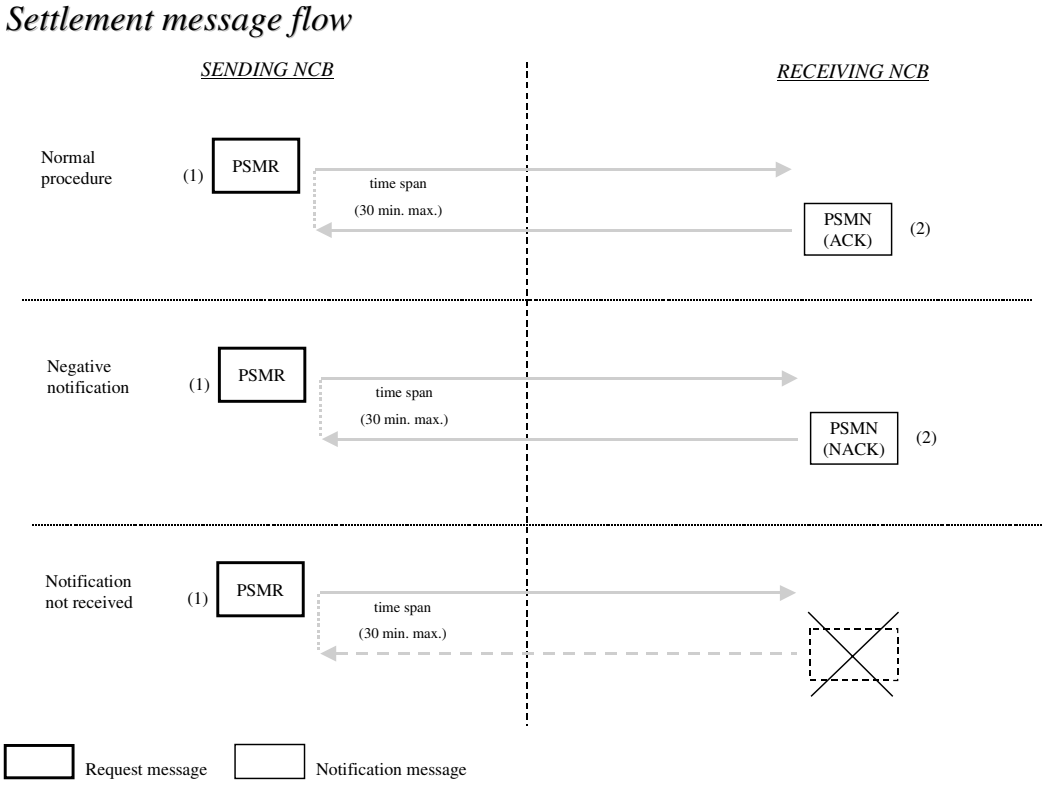


Figure 5-2 - Settlement message flow

5.1.3.4 Normal procedure

Payment Settlement Message Requests (PSMR) are used to transport cross-border payments.

The payment will remain the responsibility of the sending NCB/ECB until it has received the receiving NCB's/ECB's acknowledgement.

[22] "IN" NCBs are those NCBs participating in EMU.

5.1.3.5 Negative notification

If an error occurs during processing (validation, crediting) of the payment settlement message, the receiving NCB/ECB issues a negative PSMN containing the reason for rejection. Additional error information is provided in field 72 of the PSMN containing the reason code, the field where the error occurred, and optionally the line number and the field occurrence. The NCB/ECB has to return the error information or a meaningful description of the error code to the credit institution. This message ensures that the responsibility for the payment remains with the sending NCB/ECB. The sending NCB/ECB may decide, depending on the type of error, to reverse the payment or format a new payment message[23].

A PSMN is also returned to the sending NCB/ECB in the case of receipt of a message whose message sub-type is not recognised.

5.1.3.6 Notification not received

If the PSMN message is not received within 30 minutes, the sending NCB/ECB has to initiate error detection procedures[24]. If the PSMN was sent but never received, the receiving NCB/ECB has to be able to re-send a duplicate of the PSMN at the request of the sending NCB/ECB.

Under some specific circumstances (e.g. disaster situation), an NCB/ECB may no longer be in a position to re-send duplicates of a PSMN before the start of the next business day. Therefore, in order to allow the sending NCB/ECB to close the cycle of a pending PSMR, it must have the means to simulate the reception of a PSMN. This procedure has to be formally agreed by both parties and should be conducted by the most suitable means (preferably an authenticated message).

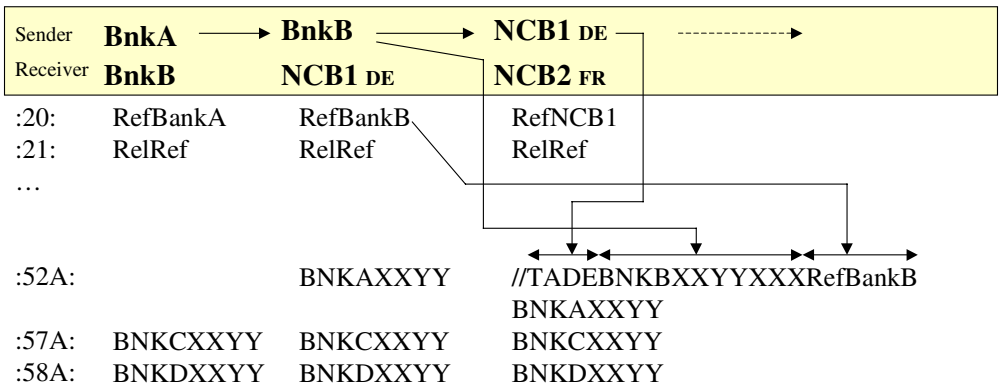
5.1.4 Return payments : the sending side

If, for any reason, a beneficiary bank is unable to apply a payment order that it has received via TARGET, then it should be returned to the ordering institution via the original route. TARGET facilitates this process and recommends that 'return payments' are handled in the way described below, although NCBs cannot take responsibility for this procedure not being followed by one or other individual institution. Full details are contained within the originating Interlinking payment message, allowing the beneficiary institution to clearly identify the return route.

23 The sending NCB may decide, for example, to re-credit the account of the originator and re-route the data or it may opt to credit an offset account to correct the payment data and repeat the transmission via the Interlinking.

24 These procedures are described in a separate non-legally binding internal paper.

On the sending side, the following messages are sent:



The steps for the information flow are as follows

- The original sender of the payment may not be the RTGS participant. In this case, the RTGS participant may replace the original TRN of Field 20 and insert the sending institution BIC in Field 52A of the payment order, following normal SWIFT standards.
- The payment order is forwarded by the sending RTGS participant to the RTGS system of the sending NCB, where the previous TRN of Field 20 may be replaced. However, the TRN of the Field 20, as supplied by the RTGS participant, is not lost as in all cases this TRN is included in the "return key" of the TARGET Interlinking message. The "return key"(see 5.1.4.1) is a code line which contains all the information a receiving TARGET RTGS participant needs to be able to return the funds to the sending TARGET RTGS participant. In the Interlinking message, this information is contained in the account number line of Field 52.

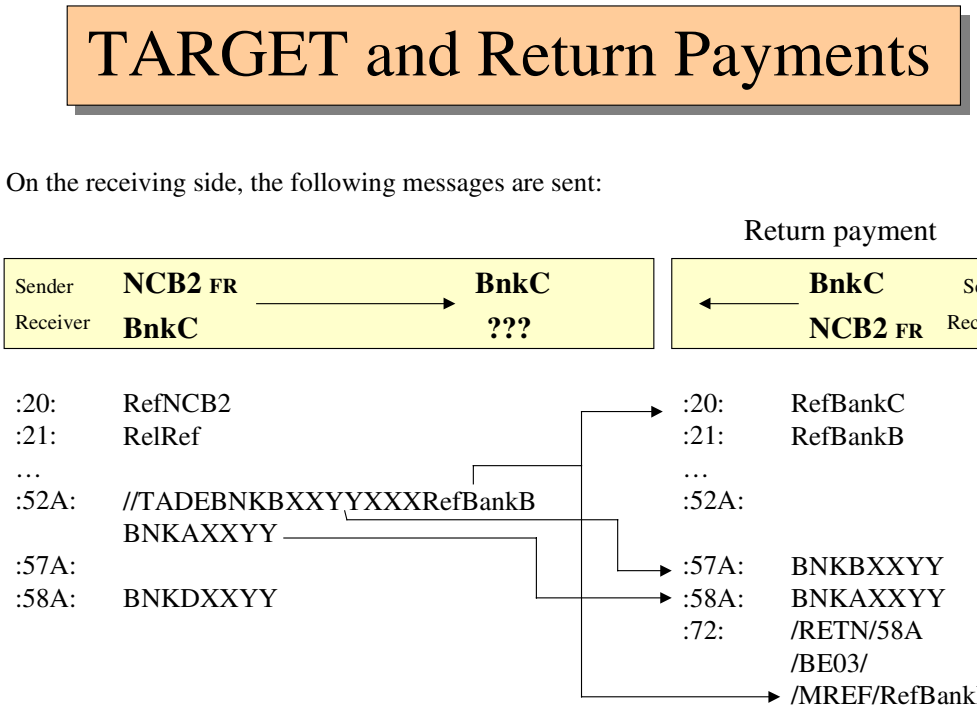
5.1.4.1 The Return Key

Each Interlinking payment will, in addition to the BIC of the ordering institution, include a return key (specified by the sending NCB), transmitted in the account number line of field 52A of the Interlinking message. The return key will comprise:

- The prefix //TA
- The country code of the sending NCB (EU for the ECB);
- The BIC (11 characters i.e. including the branch code or "XXX") of the bank that has sent the payment message to the sending NCB.
- The Transaction Reference Number (TRN) as provided by the sending credit institution.
- This information is forwarded to the receiving credit institution according to local rules and standards.

The second line of field 52A will be filled in with the BIC of the ordering credit institution, if provided. Otherwise the sending NCB will put the ISO BIC of the sending credit institution.

5.1.5 Return Payments: the receiving and returning side



- The receiving NCB forwards the payment message to the receiving RTGS participant according to domestic standards. Therefore, if the receiving NCB uses a SWIFT based system domestically, the TRN of Field 20 as received from the sending NCB may be changed. However, the TRN of the sending RTGS participant is preserved in the "return key" and this information will be forwarded to the receiving RTGS participant according to domestic standards.
- This means that the information is not necessarily forwarded either in the format or the field used for the Interlinking message. However, the full content is made available to the receiving RTGS participant.
- If the receiving RTGS participant needs to forward this information to a third party, the TRN of Field 20 may be altered. In addition, TARGET does not have any control over whether or not the "return key" information is passed on.

5.1.5.1 Recommendations:

- The payment should be returned, at the latest, by 12.00 noon on the next business day. It is recommended that a payment successfully returned by that time will not be subject to interest claims.
- When a credit institution returns funds it is advised to send a new MT202 TARGET payment, which follows the normal formatting rules for TARGET payments.
- The Related Reference Number (RRN) containing the original TRN (as supplied in the "return key") should be inserted into field 21. In this way, the original sender will be able to match up returned payments to original payments sent.
- Field 72 of a returned payment should be completed according to the guidelines of SWIFT for returned/rejected payments.

5.1.6 Message types

5.1.6.1 MT198 sub 100 - Customer Transfer

5.1.6.1.1 Scope

This message is sent through the Interlinking by an NCB/ECB on its own behalf, or at the request of a credit institution, to another NCB/ECB, either for its own account or in favour of a credit institution.

It is used to convey a fund-transfer instruction in which the ordering customer or the final beneficiary, or both, are non-financial institutions.

The following guidelines apply when sending an MT198/100:

- Either field 50 (ordering Customer) or field 59 (Beneficiary Customer) must be a non-financial institution.
- Field 52A, optional for SWIFT, is mandatory for the Interlinking. The sending NCB/ECB should ensure that the original ordering institution is mentioned in field 52A (or the domestic equivalent). If this information is not provided by the sending institution and the sending NCB is not able to provide the information, the payment must be rejected by the sending NCB/ECB.
- Field 57A, optional for SWIFT, is mandatory for the Interlinking. If this field is missing, the sending NCB/ECB should reject the payment order.
- If the first field containing a bank's identifier (see scope of the message) cannot be used to identify an (in)direct participant in the receiving RTGS system, the receiving NCB/ECB must reject the PSMR. The negative acknowledgement will show the appropriate error code.
- The sending NCB/ECB should ensure that the bank of the beneficiary is mentioned in field 57A, and the beneficiary's account number is present in field 59. If either one of these items of information is not available, the payment should be rejected by the sending NCB/ECB.
- If field 56A is filled in, and the receiving NCB/ECB is able to identify the bank as a direct or indirect participant in its RTGS system, the payment should be forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.
- If field 56A is not present but the receiving NCB/ECB is able to identify the bank in field 57A as a direct or indirect participant in its RTGS system, the payment should be forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.
- In addition, both the sending and receiving NCB/ECB must ensure that all BIC codes are valid. The current release of the SWIFT BIC Directory has to be taken as a reference.

5.1.6.1.2 General Format

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number (TRN) of sending NCB	16x
M	12	Sub-message type **100**	3n
M	77E	Proprietary message	73x [n*78x]
M	*900*	*Interlinking internal reference*	*<IIR>*
M	*913*	*Time stamp*	*<DT>*
M	*20*	*Transaction reference number of sending credit institution*	*16x*
M	*32A*	*Value date* *Currency code* *Amount*	*6n* *3a* *15n*
M	*50*	*Ordering customer*	*4*35x*
M	*52A*	*Ordering institution*	*//TA<CC><BIC11><TRN>* ***<BIC>***
O	*56A*	*Intermediary*	*[/1a][/34x]* *<BIC>*
M	*57A*	*Account with institution*	*[/1a][/34x]* *<BIC>*
M	*59*	*Beneficiary customer*	*/34x* *4*35x*
O	*70*	*Details of payments*	*4*35x*
O	*71A*	*Details of charges*	*3a*
O	*72*	*Sender to receiver information*	*6*35x*

5.1.6.2 MT198 sub 103 – Single Customer Transfer

5.1.6.2.1 Scope

This message is sent through the Interlinking by an NCB/ECB on its own behalf or at the request of a credit institution, to another NCB/ECB either on their own account or in favour of a credit institution.

It is used to convey a fund-transfer instruction in which the ordering customer or the final beneficiary customer, or both, are non-financial institutions.

The following guidelines apply when sending an MT198 sub 103:

1. If fields 32A and 33B have different currencies, then field 36 must be present.

2. If field 71A contains OUR, field 71F is not allowed and field 71G is optional.

3. If field 71A contains SHA, field 71F (multiple occurrences) is optional and 71G is not allowed.

4. If field 71A contains BEN, at least 1 field 71F is mandatory and field 71G is not allowed.

5. Either field 50 (ordering Customer) or field 59 (Beneficiary Customer) must be a non-financial institution.

6. Field 52A, optional for SWIFT, is mandatory for the Interlinking. The sending NCB/ECB should ensure that the original ordering institution is mentioned in field 52A (or the domestic equivalent). If this information is not provided by the sending institution and the sending NCB is not able to provide the information, the sending NCB/ECB should reject the payment order.

7. Field 57A, optional for SWIFT, is mandatory for the Interlinking. If this field is missing, the sending NCB/ECB should reject the payment order.

8. If the first field containing a bank's identifier (see scope of the message) cannot be used to identify an (in)direct participant in the receiving RTGS system, the receiving NCB/ECB must reject the PSMR. The negative acknowledgement will show the appropriate error code.

9. The sending NCB/ECB should ensure that the bank of the beneficiary is mentioned in field 57A, and the beneficiary's account number is present in field 59. If either one of these items of information is not available, the payment should be rejected by the sending NCB/ECB.

10. If field 56A is filled in, and the receiving NCB/ECB is able to identify the bank as a direct or indirect participant in its RTGS system, the payment should be forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.

11. If field 56A is not present but the receiving NCB/ECB is able to identify the bank in field 57A as a direct or indirect participant in its RTGS system, the payment should be forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.

12. In addition, both the sending and receiving NCB/ECB must ensure that all BIC codes are valid. The current release of the SWIFT BIC Directory has to be taken as a reference.

13. If field 23B is SPRI, then field 23E is optional, and if used, can only contain SDVA, or INTC.

14. If field 23B is SSTD or SPAY, then 23E is not allowed.

15. If field 23B is SPRI, then field 56A is not allowed.

16. A code word in field 23E can only be used once.

17. If field 119 is present, and is equal to "STP" then if the code word /INS/ is used at the beginning of a line in field 72, it can only be followed by a valid BIC. In addition, it cannot be used again at the beginning of any other line in field 72.

18. If field 119 is present, and is equal to "STP", then /RETN/ and /REJT/ code words are not allowed.

19. If field 119 is present, and is equal to "STP" then the code word /OCMT/ is not allowed in field 72.

5.1.6.2.2 General Format

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **103**	3n
M	77E	Proprietary message	73x [n*78x]
M	*900*	*Interlinking internal reference*	*<IIR>*
M	*913*	*Time stamp*	*<DT>*
O	*119*	*STP flag*	*8x*
M	*20*	*Transaction reference number of sending credit institution*	*16x*
M	*23B*	*Bank operation code*	*4b*
O	*23E*	*Instruction code*	*4b*
O	*26T*	*Transaction type code*	*3a*

M/O	Field Tag	Field Name	Interlinking Format
M	*32A*	*Amount*	*6n3a15n*
M	*33B*	*Currency/instructed amount*	*3a15n*
O	*36*	*Exchange rate*	*12n*
M	*50K*	*Ordering customer*	*[/34x]* *4*35x*
or	*50A*		*[/34x]* *<BIC/BEI>*[25]
M	*52A*	*Ordering institution*	*//TA<CC><BIC11><TRN>* ***<BIC>***
O	*56A*	*Intermediary institution*	*[/1a][/34x]* *<BIC>*
M	*57A*	*Account with institution*	*[/1a][/34x]* *<BIC>*
M	*59*	*Beneficiary customer*	*/34x* *4*35x*
or	*59A*		*/34x* *<BIC/BEI>*
O	*70*	*Remittance information*	*4*35x*
M	*71A*	*Details of charges*	*3a*
O	*71F*	*Sender's charges*	*3a15n*
O	*71G*	*Receiver's charges*	*3a15n*
O	*72*	*Sender to receiver information*	*6*35x*
O	*77B*	*Regulatory reporting*	*3*35x*

5.1.6.3 MT198 sub 202 - General Financial Institution Transfer

5.1.6.3.1 Scope

This message is sent through the Interlinking by an NCB/ECB on its own behalf or at the request of a credit institution, to another NCB/ECB either for its own account or in favour of a credit institution.

It is used to order the movement of funds between credit institutions or NCBs/ECB via the Interlinking.

The following guidelines apply when sending an MT198 sub 202:

- The sending NCB/ECB should ensure that the original ordering institution is mentioned in field 52A (or the domestic equivalent). If this information is not provided by the sending institution and the sending NCB is not able to provide the information, the payment must be rejected by the sending NCB/ECB.
- All parties to the transaction must be financial institutions.
- If field 56A is filled in, field 57A must be present too.
- If field 56A is filled in, and the receiving NCB/ECB is able to identify the bank as a direct or indirect participant in its RTGS system, the payment should be forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.
- If field 56A is not present, but field 57A is filled in, and the receiving NCB/ECB is able to identify the bank in field 57A as a direct or indirect participant in its RTGS system, the payment should be

[25] Business Entity Identifier. Part of the ISO draft Standard (ISO-13735) to identify non-financial institutions.

forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.

- If neither field 56A nor field 57A is present, and the receiving NCB/ECB is able to identify the bank in field 58A as a direct or indirect participant in its RTGS system, the payment should be forwarded to that bank or its representative/correspondent, otherwise the payment should be rejected.
- In addition, both the sending and receiving NCB/ECB must ensure that all BIC codes are valid. The current release of the SWIFT BIC Directory has to be taken as a reference.
- For an inter-NCB-payment the non-TARGET BIC code of the receiving NCB has to be put into field 58A of the message. In field 72 the codeword "INTERNCB" (between slashes ('/')) has to be mentioned.

5.1.6.3.2 General Format

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **202**	3n
M	77E	Proprietary message	73x [n*78x]
M	*900*	*Interlinking internal reference*	*<IIR>*
M	*913*	*Time stamp*	*<DT>*
M	*20*	*Transaction reference number of sending credit institution*	*16x*
M	*21*	*Related reference*	*16x*
M	*32A*	*Value date* *Currency code* *Amount*	*6n* *3a* *15n*
M	*52A*	*Ordering institution*	*//TA<CC><BIC11><TRN>* ***<BIC>***
O	*56A*	*Intermediary*	*[/1a][/34x]* *<BIC>*
O	*57A*	*Account with institution*	*[/1a][/34x]* *<BIC>*
M	*58A*	*Beneficiary institution*	*[/1a][/34x]* *<BIC>*
O	*72*	*Sender to receiver information*	*6*35x*

5.1.6.4 MT198 sub 110 - Payment Settlement Message Notification (PSMN)

5.1.6.4.1 Scope

This is the response to a Payment Settlement Message Request. This message can be either a positive or a negative acknowledgement. A positive acknowledgement indicates that the receiving NCB/ECB of the PSMR has successfully credited the payment to the receiving institution's settlement account. If the acknowledgement is negative, the message must also indicate the reason for not executing the payment by including the appropriate code word.

As long as the sending NCB has not received the related PSMN, the payment remains its responsibility.

A negative PSMN is also returned to the sending NCB/ECB in the case of receipt of a message whose message sub-type is not supported or not recognisable.

5.1.6.4.2 General Format

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **110**	3n
M	77E	Proprietary message	73x [n*78x]
M	*900*	*Interlinking internal reference*	*<IIR>*
M	*913*	*Time stamp*	*<DT>*
M	*901*	*Referred interlinking internal reference*	*<IIR>*
M	*910*	ECB date and time of receipt	*<DT>*
M	*990*	Acceptance code	*1n* *accepted = 0, rejected = 1*
O	*991*	Reason code for rejection	*1a2n*
O	*72*	*Sender to receiver information*	*6*35x*

5.2 End-of-day Control Operations

5.2.1 The User Requirement references

(UR. 2.4.) At the end of the day, but before the final closing of the Interlinking system, each NCB sends the ECB a message with end-of-day information to check whether all payment messages have been exchanged correctly.

The end-of-day control procedures have to be finalised by a positive answer from the ECB. If it replies in the negative, the NCBs/ECB in question must initiate and finalise error detection procedures within 30 minutes (the standard end-of-day operation time).

No participating NCB may end its TARGET business day before it has established final positions with its bilateral partners[26].

5.2.2 The function of the end-of-day control operation

Bearing in mind the general design of the Interlinking network, particularly in relation to the function of acknowledgements, the end-of-day control operations will ensure, on a technical basis, that all bilateral operations conducted during the day match each other. Therefore, an ECMR can only contain information relating to counterparties with whom no known PSMRs/PSMNs are still pending. The ECB will :

- check that the highest IIR sent by an NCB/ECB to another NCB/ECB has been received and vice versa;
- check that the total credit turnover and the total debit turnover of the cross-border payments, positively acknowledged between the NCBs/ECB during the business day, match each other;
- ensure that the next three business dates and times are correct.

The controls are performed by the ECB.[27]

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[26] *NCBs/ECB could decide to end the business day and solve the technical problem "off-line".*

[27] The IIR entered in the ECMR is the highest on a PSMR sent by or received from the NCB/ECB, whether this highest IIR was on a rejected or successful PSMR. Invalid IIRs (invalid date, invalid characters, wrong application code, …) are excluded. Debit turnover represents debits to Inter-NCB accounts held at NCBs/ECB, which result in credits to their accounts at the NCB/ECB and vice versa.

5.2.3 Flow of messages

5.2.3.1 The procedures

- For the TARGET end-of-day procedures[28], the NCBs/ECB will gather daily information concerning Interlinking messages sent and received (highest PSRM IIR, whether positively or negatively acknowledged), as well as bilateral turnover (debit and credit) resulting from positively acknowledged payments. Account can only be taken of completed payments cycles; if any NCB/ECB has cycles which are incomplete, this must be resolved before TARGET end-of-day procedures can be initiated by this NCB/ECB.
- Based on these figures, each NCB/ECB will send **an Interlinking standard message, the End-of-day Check Message Request (ECMR)**, to the ECB with figures concerning the NCB/ECB from which they have received all the expected PSMNs and to which they have sent all known PSMNs. If no transactions have been exchanged with a NCB/ECB, the ECMR should nevertheless include a reference to this party. The information reported to the ECB will ensure that the cross-border payments sent from the closing NCB(s)/ECB to the other NCBs/ECB, as well as traffic from the other NCBs/ECB to the closing NCB(s)/ECB, match each other.
- On receipt of an ECMR, the ECB will perform the end-of-day matching procedure. The matching process consists of a comparison between bilateral figures received from each central bank, after which the ECB sends an **End-of-day Check Message Notification (ECMN)** to each NCB/ECB which has sent an ECMR.[29] The ECMN will comprise details of successfully matched data, unsuccessfully matched data, or both. If the message mentions unmatched data, bilateral error detection procedures have to start between the NCBs/ECB involved. After establishing common closing figures, both NCBs/ECB should send a new ECMR to the ECB, this time relating only to the previous unmatched figures. All ECMNs should be sent to NCBs/ECB no later than 30 minutes after receiving ECMRs. One ECMR sent may result in one or several ECMNs being received.
- The closing NCBs/ECB can only terminate their business day after receiving a positive ECMN for the ECB for all bilateral checks.

If an NCB receives a payment order through the Interlinking after the start of the end-of-day procedure, but before sending the ECMR for the sending NCB, it processes the payment and sends the appropriate acknowledgement and then sends the ECMR to the ECB. If the payment is received through the Interlinking after the ECMR has been sent, the receiving NCB processes the payment and sends the appropriate acknowledgement and waits for the negative End-of-day Check Message Notification (ECMN) from the ECB. It then sends the correct ECMR. A PSMR may not be rejected on the basis of a time stamp with a later time than the closing time. This should however give rise to an operator error and lead to further investigation afterwards. A sending NCB/ECB which knows that a PSMR has been created but not forwarded to the receiving NCB/ECB after closing time (e.g. in case of CBT problems) should inform the receiving NCB/ECB if possible to expect this late event. If the payment is received through the Interlinking after the end-of-day position with the sending country has been already closed with a positive ECMN, then the receiving NCB has to reject the payment.

In the event of a disaster the enforced closing procedure is activated, then all "unaffected" NCBs (and the EPM) send their ECMR to the ECB as normal (including figures for the NCB in trouble). The NCB experiencing the disaster also sends to the ECB, if possible, its figures (e.g. by fax or other communication). The ECB will then match the figures of the non-affected NCBs as normal and, if possible, check the matching of the data provided by the affected one. The figures provided by the

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[28] TARGET end-of-day procedures normally start 10 minutes after the external closing of TARGET, in order to allow the settlement of pending PSMRs.

[29] An ECMR with a syntax error will be rejected by EDA. NCBs/ECB should have a mechanism for alerting the operator when such an error is returned.

non-affected NCBs in relation to the affected NCB will be stored by the ECB in order to allow these to be checked against data provided by the affected NCB once it has recovered. In case it is not possible to get end-of-day figures from one NCB, then the ECB manually introduces figures for the missing NCB, relying in particular on the bilateral figures provided by other NCBs.

If it is the ECB that experiences the disaster, then either the end-of-day matching should be postponed until the ECB has recovered, or the ECB could use a back-up system that is capable of conducting the matching.[30]

If the ECB receives an ECMR which contains incorrect next business dates (compared with the calendar held in the EDA), it immediately returns a negative ECMN and contacts the sending NCB/ECB. If the dates and times are incorrect, the participant has to send a new ECMR after correcting the relevant data. If the participant is no longer capable of doing so, the ECB may update the calendar directly based on an authenticated request of the participant[31]. However, if the information contained in the ECMR is correct, but inconsistent with what was recorded by the ECB (and the NCBs), the ECB will forward the correct information in the ECMN. This information will then prevail.

Flow of messages: end-of-day control operations

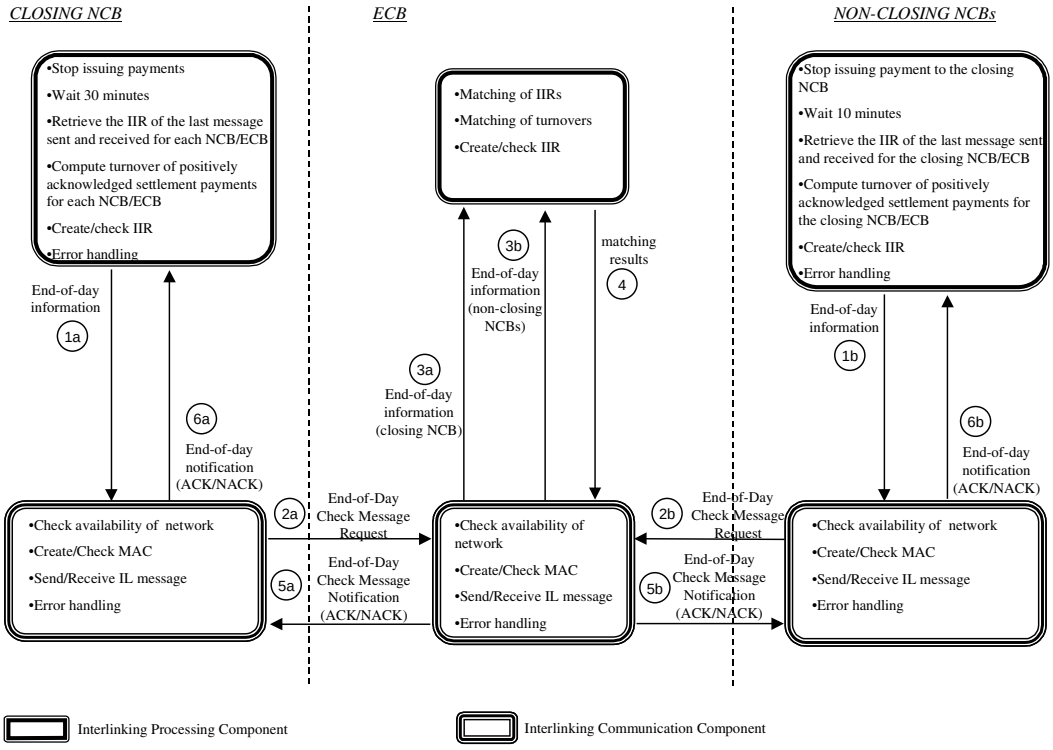


Figure 5-3 - End-of-day control operations

[30] If necessary, and unless otherwise agreed, the procedure can be performed manually by the ECB.

[31] Authenticated messages should be understood as an Interlinking message, including IFFM, or other authenticated means, e.g. authenticated FAX (only in cases in which all of these tools are not available, a non-authenticated transmission should be accepted).

5.2.3.2 The notification

The ECMN can be either:

- successful, for matching figures;
- unsuccessful, for non-matching figures; or
- negative.

The End-of-day Check Message Notification (ECMN), issued by the ECB, includes the result of the matching for one or more NCBs. The ECMN should reach the NCBs not later than 30 minutes after the ECMRs were sent. Unsuccessful matching will be communicated as soon as possible to both NCBs. Therefore, the ECB could send more than one ECMN to any NCB(s) if it detects non-matching figures but has not yet received them all.

A negative ECMN containing a syntax error block only will be returned to the issuer of the ECMR either in case of syntax error or if the business dates and times do not match with those held by the ECB.

5.2.3.2.1 Unsuccessful matching

In the case of unsuccessful matching, the relevant NCBs/ECB will be notified by the ECB and given the unmatched figure(s) of the other NCB/ECB. Upon receipt of this notification, each party must initiate Error Detection Procedures. When all the required actions have been undertaken, the involved NCBs will re-calculate their end-of-day figures and send a new End-of-day Check Message Request (ECMR).

In order to help to determine the payment(s) causing the unsuccessful matching, the following algorithm has to be implemented:

1. The procedure is always defined for one direction of a bilateral relationship. In case of errors in both directions the problems have to be investigated and solved separately for the sent and received PSMRs.

2. All PSMRs with a valid IIR (i.e. application code 'A', the current business day's date, the correct country codes for the bilateral relationship and a numeric bilateral sequence number, which is not '00000') have to be sorted by ascending bilateral sequence number.

3. The bilateral sequence number of the PSMR with the highest IIR has to be divided by two and rounded down to the nearest whole number. In case of an odd number, the first group will contain one bilateral sequence number less than the second group. The upper limit of the first group (n) is calculated as follows:

   If h is the highest bilateral sequence number in the selected range and 1 is the lowest bilateral sequence number in the selected range,

   then: $n = \text{int}((h + 1 - 1) / 2)$

   The lower limit of the second half is n + 1.

   Example: '00123' will be divided into '00001' to '00061' and '00062' to '00123'. For this splitting and the definition of the lower and upper limit it is not relevant whether PSMRs with such a bilateral sequence number really exists or not. In the example, the next split will always be done from '00001' to '00030' and from '00031' to '00061', although IIRs '00060' and '00061' may not exist.

4. The total of the amounts of the first group and second group has to be calculated separately. Only the amounts of those PSMRs which have been positively acknowledged are taken into account.

5. As a result of this calculation for each group, the following information has to be provided: (i) the lower and upper limit for the bilateral sequence number of the IIRs taken into account (see 3); (ii) the total of amounts (see 4).

6. After comparing these figures with the information from the counterpart, the user of the algorithm must be able to decide to repeat the process described in 3 and 4 with the first group or the second group, depending on which side is the error. Thirteen iterations of this procedure are sufficient to identify the payment if there are a total of 10,000 payments, and 17 iterations if there are 100,000 payments. If both halves are in error, the relevant NCBs/ECB have to agree bilaterally on the side which is to be investigated first.

Although it is assumed that differences in the highest IIR sent/received are resolved before using the error detection algorithm itself, there may exist situations in which both parties want to use a differing highest IIR for the error detection procedure. Implementations should therefore allow for a manual change of the highest IIR sent or received, which is used in the algorithm and which may not be the same as the highest IIR provided in the ECMR/ECMN.

In addition, the sending NCB/ECB should be able to justify any gaps in the IIRs received by the receiving NCB/ECB which were caused by special action on the part of the sending NCB/ECB, e.g. a PSMR has been cancelled after the IIR has been generated, but before the message was sent.

5.2.3.2.2 Open matching

If the ECB has not received an ECMR relating to a closing NCB, either from the closing NCB itself or from another NCB, 15 minutes after the start of end-of-day control procedures, it contacts the relevant participant, by telephone, teleconference or using the Information Tool, reminding it that the information has not been received yet.

The same procedure applies if 15 minutes after the ECB receives information concerning a bilateral relationship between NCBs from one NCB, it has not heard from the other NCB concerned. For example, if NCB A provides figures concerning NCB B to the ECB at 18.30, the ECB contacts NCB B at 18.45 if it has not received from NCB B its figures relating to NCB A.

5.2.4 Message types

5.2.4.1 MT198 sub 111 - The End-of-day Check Message Request (ECMR)

5.2.4.1.1 Scope

This message is sent to the ECB by an NCB/the ECB to initiate end-of-day control procedures. The message will contain information concerning the PSMRs exchanged during the current business day with other NCBs and the ECB.

It also includes the next three TARGET business dates and times.

5.2.4.1.2 Message format.

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **111**	3n
M	77E	Proprietary message	73x [n*78x]
M	*900*	*Interlinking internal reference*	*<IIR>*
M	*913*	*Time stamp*	*<DT>*
M	*998*	*Action on behalf*	*1n 0 – closing NCB* *1 – non-closing NCB*
M	*994*	*Counterparty*	*<CC>*
M	*902*	*Highest bilateral IIR sent*	*<IIR>*
M	*903*	*Highest bilateral IIR received*	*<IIR>*
M	*996*	*Debit turnover*	*<CC><CC>18n*
M	*997*	*Credit turnover*	*<CC><CC>18n*
M	*912*	*Next 3 business dates-times*	*<DTT>* *<DTT>* *<DTT>*

5.2.4.2 MT198 sub 112 - The End-of-day Check Message Notification (ECMN)

5.2.4.2.1 Scope

This message is sent by the ECB to the NCBs to notify them of the result of the end-of-day control procedures, to report on any syntax validation error in the ECMR, or to inform them that the business dates and times included in the ECMR do not match those held by the ECB.

The notification ECMN can be:

- Successful, for matching figures; or
- Unsuccessful, for non-matching figures; or
- Negative.

The ECMN should reach the NCBs/ECB not later than 30 minutes after the ECMRs were sent. Unsuccessful matching will be notified as soon as possible to both NCBs/ECB. Therefore, the ECB (EDA) could send more than one ECMN to any NCB/ECB if it detects non-matching figures but has not yet received all ECMRs. Alternatively, the ECMN may contain result information for one or several NCBs/ECB.

It also includes the next three business dates and times. These dates supersede any other dates exchanged previously. A negative ECMN containing a Syntax Error block only will be returned to the issuer of the ECMR either in case of a syntax error or if the business dates and times do not match those held by the ECB. If a negative ECMN is returned, the ECMR needs to be resent as none of the data contained in the previous ECMR will have been taken into account by the EDA.

5.2.4.2.2 Message format.

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending ECB	16x
M	12	Sub-message type **112**	3n
M	77E	Proprietary message	73x [n*78x]
M	*900*	*Interlinking internal reference*	*<IIR>*
M	*913*	*Time stamp*	*<DT>*
M	*901*	*Referred interlinking internal reference*	*<IIR>*
		Syntax error block	
M	*990*	*Acceptance code*	*'1'*
M	*991*	*Reason code for rejection*	*1a2n*
O	*72*	*Sender to receiver information*	*6*35x*
		Successful block	
M	*990*	*Matching status*	*1n 0 - successful*
M	*994*	*Counterparty*	*<CC>*
M	*902*	*Highest bilateral IIR sent*	*<IIR>*
M	*903*	*Highest bilateral IIR received*	*<IIR>*
M	*996*	*Debit turnover*	*<CC><CC>18n*
M	*997*	*Credit turnover*	*<CC><CC>18n*
M	*912*	*Next 3 business dates-times*	*<DTT>* *<DTT>* *<DTT>*
		Unsuccessful block	
M	*990*	*Matching status*	*1n 1 - unsuccessful*
M	*994*	*Counterparty*	*<CC>*
M	*902*	*Highest bilateral IIR sent*	*<IIR>*
M	*903*	*Highest bilateral IIR received*	*<IIR>*
M	*996*	*Debit turnover*	*<CC><CC>18n*
M	*997*	*Credit turnover*	*<CC><CC>18n*
M	*912*	*Next 3 business dates-times*	*<DTT>* *<DTT>* *<DTT>*

5.3 Delay Closing Time operations

5.3.1 The procedures

Problems in finalising the business day are considered as abnormal situations. Normally, it should not be necessary for an NCB/ECB[32] to request other NCBs to delay the closing time of their Interlinking and RTGS components. This might arise, however, when an NCB has had technical problems during the day[33] and needs extra time to send payment messages which are pending. All payments debited in one NCB/ECB need to be credited on the same day in another NCB/ECB.

[32] The ECB will act like any other participant through its ECB Payment Mechanism.

[33] Due to the number of communication and operational systems involved, this situation is not at all unlikely, even if backup systems are available.

The delayed closing time procedure can be initiated when an NCB or the ECB needs to allow new (critical) payments to be received and debited after the TARGET 6 p.m. closing time and, as a result, to request all other NCBs to postpone their closing time.

The ECB, on behalf of the NCB/ECB which has requested the delayed closing, will send a **Delay Closing Time Request (DCTR)** message to all NCBs/ECB. If the ECB is unable to send a DCTR, this can be sent by another NCB. A DCTR requests all NCBs and the ECB to stay open to send and receive any critical payments to and from all NCBs/ECB. Bilateral delayed closing time is not allowed. This message is similar to a Payment Settlement Message Request (PSMR) in that it **requires an acknowledgement**.

- DCTRs have to be sent at the latest 15 minutes before the current closing time (original or delayed time). Any need for a (further) delay in the closing time within this 15-minute period has to be communicated immediately to the TARGET Co-ordinator, who will start a teleconference to inform all NCBs and will send the DCTR on behalf of the NCB requesting the delayed closing.
- As long as DCTRs are in line with the defined authorisations (NCBs: delay request until 7 p.m.; ECB: delay request until 8 p.m.), they always have to be accepted. Therefore all NCBs/ECB must change their closing time parameter as soon as the delay closing is agreed.
- Only the ECB is authorised to delay the closing time. This will be agreed by teleconference and be confirmed by a DCTR, which will overwrite any previous delay closing time request. To avoid confusion in the market, this will only be used in very rare cases.
- The ECB is entitled to postpone the TARGET closing time until 8 p.m. at the latest. If the problem has not been resolved by then, a disaster management procedure is to be initiated by the ECB.[34] If the request is approved, the ECB will request the other NCBs to postpone the closing time by sending a delay closing time message. A request to postpone the closing time must be accepted if the request is received from the ECB.

A DCTR received from the ECB overrides any delay closing time request received earlier.

The end-of-day control functions will start 10 minutes after the new closing time indicated in (field 914 of) the DCTR message, unless the ECB decides to shorten this time period (by sending a new DCTR to all NCBs or, where appropriate, informing all NCBs through another communication channel), taking due account of the time lag needed for PSMNs for all PSMRs to be sent and received by the NCBs.

[34] Unless the majority of the settlement managers of the NCBs and the TARGET co-ordinator have agreed otherwise.

Flow of messages: end-of-day delay procedures

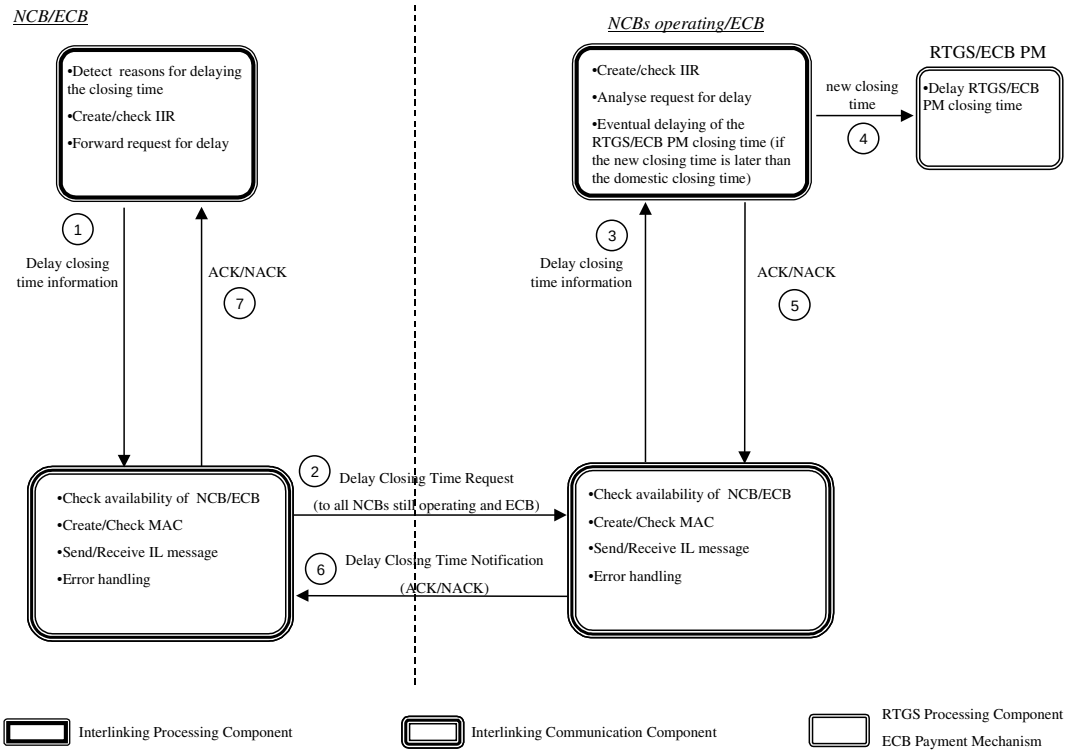


Figure 5-4 - End-of-day delay procedures

5.3.2 Message types

5.3.2.1 MT198 sub 113 – Delay Closing Time Request (DCTR)

5.3.2.1.1 Scope

This message is sent by the ECB, on behalf of an NCB facing problems, to all other (still operating) NCBs to request them to delay the start of the end-of-day procedures. A DCTR requests all NCBs and the ECB to stay open to make and receive any critical payments to and from all NCBs/ECB. A Delay Closing Time Notification (DCTN) reply must be sent to this message.

5.3.2.1.2 Message format.

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **113**	3n
M	77E	Proprietary message	73x [n*78x]
M	*20*	*Sender reference*	*16x*
M	*913*	*Time stamp*	*<DT>*
M	*914*	*New closing time*	*< DT>*
M	*991*	*Reason code*	*1a2n*
O	*72*	*Sender to receiver information*	*6*35x*

5.3.2.2 MT198 sub 114 - Delay Closing Time Notification (DCTN)

5.3.2.2.1 Scope

This message is the response to a Delay Closing Time Request (DCTR). It can be either a positive or a negative acknowledgement. A positive acknowledgement implies that the receiver agrees to the new closing time. This should normally be the case, as a valid DCTR cannot be rejected. If the notification is negative, the returned error code should state the reason for not agreeing to the request. This should only occur in cases such as syntax error. As with any other notification, this message should be received by the requesting NCB within 30 minutes of the dispatch of the DCTR.

5.3.2.2.2 Message format.

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **114**	3n
M	77E	Proprietary message	73x [n*78x]
M	*20*	*Sender reference*	*16x*
M	*21*	*Related reference*	*16x*
M	*913*	*Time stamp*	*<DT>*
M	*910*	*ECB date and time of receipt*	*<DT>*
M	*990*	*Acceptance code*	*1n* *accepted = 0, rejected = 1*
O	*991*	*Reason code for rejection*	*1a2x*
O	*72*	*Sender to receiver information*	*6*35x*

5.4 General Purpose Messages

5.4.1 Message types

5.4.1.1 MT198 sub 115 - Interlinking Free Format Message (IFFM)

5.4.1.1.1 Scope

This message is used to carry any kind of data or information which is not covered in sections 5.1.6.1, 5.1.6.2, 5.1.6.4, 5.2.4.1, 5.2.4.2, 5.3.2.1 or 5.3.2.2. It could be used e.g. by the ECB to warn a participant that end-of-day information is missing.

The content of the message is not standardised and therefore cannot be handled automatically. It is however recommended that systems raise an alarm when an IFFM is received.

5.4.1.1.2 Message format

M/O	Field Tag	Field Name	Interlinking Format
M	20	Transaction reference number of sending NCB	16x
M	12	Sub-message type **115**	3n
M	77E	Proprietary message	73x [n*78x]
M	*20*	*Sender reference*	*16x*
M	*21*	*Related reference*	*16x*
M	*999*	*Free format text*	73x [n*78x]

5.5 The Ability To Re-send Messages

Circumstances have been identified in TARGET under which a sending NCB needs to re-send a previously sent message. This is the case, for example, if a PSMR was sent but never received and is therefore still open at the sending NCB. For this reason, each NCB has to be capable of re-sending an exact copy of a previous message. Because this is a duplicated message, the same IIR has to be re-used. After processing, if relevant, a notification is returned to the sending NCB.

Because the original message and the duplicated ones use the same IIR, NCBs/ECB have to ensure that only one copy of the message is processed and, if relevant, notification sent. Therefore, any incoming message carrying an IIR which has already been processed will be ignored. Nevertheless, any duplicate message received should be stored by the receiving NCB/ECB for audit trail purposes.

NCBs/ECB are free to implement the re-send function in their Interlinking component or to use the functionality offered by their CBT.

5.6 The Ability To Simulate Notifications

Under normal circumstances, the life cycle of a PSMR/ECMR is closed when the sending NCB/ECB receives a (positive or negative) notification for that message. However, in some cases, mainly in disaster situations or in an enforced closing of TARGET, the receiving NCB/ECB may no longer be in a position to send those notifications. Therefore, each NCB/ECB has to be capable of simulating on its system the reception of a PSMN/ECMN.

This procedure has to be used with great care, and needs a formal agreement by both the sending and the receiving NCB/ECB.

5.7 The Ability To Stop Sending Payments

In the event that an NCB or the ECB has technical problems (e.g. inability to process payments or system slowdown) and has to close down its systems during the business day, it $^{\text{inform}}$s the other Interlinking participants and the ECB as soon as possible. The receiver of this information then has to stop sending payments to that participant. In addition, according to national rules, the receiver informs its credit institutions, and may decide to: i) stop debiting payments bound for the failing NCB; ii) stop accepting cross-border payments bound for the NCB facing problems. In any case this will be published on the ECB's pages on the wire services.

After successful recovery, all NCBs and the ECB have to be informed immediately.

6. INTERLINKING STATISTICS

6.1 The need for statistics

The aim of the Interlinking statistics is to provide information needed to support management decisions concerning the TARGET system. This information is relevant for the ECB as well as the NCBs. Data on payment traffic processed via the Interlinking needs to be obtained quickly and to be updated frequently in order to monitor the development of the system and to adjust, if necessary, earlier management decisions taken in an environment characterised by huge uncertainties (e.g. capacity planning).

Although the ECB can obtain some information on the total value of payment traffic in the Interlinking using the end-of-day reports, it will not be possible for the ECB to differentiate between types of messages or to obtain data about the volume of payments settled, because the highest reference number (IIR) reported in the End-of-Day Check Message Request also includes rejected messages. Therefore, it is absolutely essential that NCBs provide information for the compilation of the IL statistics.

The information will be provided to the ECB on a daily basis (or within 5 business days after the reported business date) in a standardised way (described in the following sections) in order to ease the handling of the data and to produce up-to-date information about TARGET traffic. The ECB will also provide statistics on the basis of the received information to all NCBs at an agreed period.

6.2 Statistics Messages

Because for the ECB the collection of information concerning exchange of payment messages in TARGET will be a daily task, a standardised data format needs to be used by all NCBs participating in TARGET. There are two ways for the NCBs to transmit the required information, namely by:

1. SWIFT/FIN, sending the Interlinking message MT198/995 (ISIM), or by

2. CEBAMAIL[35], sending an ASCII text file in a standardised format.

Both types are described in the following sections. Each NCB has to decide on the preferred method to be used for transmitting the information.

Data should be transmitted to the ECB either on a daily basis, or, within 5 business days of the date concerning the reported information in order to provide the management with up-to-date and accurate information on the performance of the TARGET system.

The data format used is similar to the one used for other Interlinking messages such as the PSMR. It remains valid for any telecommunication channel used, e.g. in a new Interlinking messages data item it would fit inside field 77E.

The data format of the file used in the case of the CEBAMAIL transmission is a subset of the message data format used for the SWIFT/FIN transmission.

[35] Central Bank (secure) Mail system

6.2.1 MT198/995 - Interlinking Statistical Information (ISIM)

6.2.1.1 Scope

The ISIM is a SWIFT/FIN message used to provide the ECB with statistical data in a predefined format. The information contained describes the volume and value of the successful and rejected payments sent by the NCB to each of the other NCBs/ECB on a specific business day. Each line of information is categorised according to its type of payment, the time period that the payment was made and the code of the receiving NCB or the ECB.

6.2.1.2 Format of the SWIFT message MT198/995

The following gives the general format of the ISIM message. A full description of all code words used is provided in the Interlinking Data Dictionary.

M/O	Field Tag	Field Name	Interlinking Format
M	*20*	*Sending NCB code*	*16x*
M	*12*	*Sub-message type **995***	*3n*
M	*77E*	*Proprietary message*	
M	*994*	*Counterpart (sending NCB ISO country code)*	*2a*
M	*28*	*Statement number / sequence number*	*5n[/2n]*
O	*915*	*Information line*	*8a2a3a2a5a18n*

Note: If there is no Interlinking traffic for a specific business date a message containing one row only with the business date and 99 as the time period should be sent as normal. The rest of the subfields in the information line (field 915) should be blank or set to a default value if that is more convenient for the NCB application.

6.2.2 Interlinking Statistical Information File (ISIF)

6.2.2.1 Scope

When CEBAMAIL is used as the preferred communication channel for transmitting to the ECB the required information, the format of the data contained in the file is similar to a message sent via SWIFT.

NCBs are requested to send a different file for every business date. Each file should contain both information related to successful payments sent to other NCBs/ECB and also rejected payments received from other NCBs/ECB.

6.2.2.2 Format of the CEBAMAIL file

The filename given should indicate the reporting business date of the NCB/ECB. The format of a valid filename is CCYYMMDD, where:

- CC is the ISO country code of the sending NCB
- YYMMDD is the year, month and day of the reported business date in the file.

Whenever there is a need to resend a file, the reporting NCB has to inform the ECB about the problem and that a new file is to be delivered. An example of a filename is GB990131, which indicates that the reporting NCB is the Bank of England and the business date reported in the file is 31/01/1999.

In case of a CEBAMAIL transmission, the report number is used only by the NCB/ECB as an internal reference code. The format of the lines contained in the file is described in the following table.

M/O	Field Name	Interlinking Format
M	*Report number/sequence number*	*5a[/2a]*
M	*Information line*	*8a2a3a2a5a18n*

Note: If there is no payment traffic for a specific business date (other than a holiday) a new file containing one row only with the business date, 99 as the time period and no other data should be sent as normal. The rest of the subfields in the information line (field 915) should be blank or set to a default value if that is more convenient for your application.

7. RESPONSIBILITIES

7.1 RTGS systems and the Interlinking within TARGET

TARGET as a whole is composed of national RTGS systems, the ECB payment mechanism and the Interlinking.

National RTGS systems and the ECB Payment Mechanism comprise:

- an IT system which provides final and irrevocable debiting and crediting functions along with some optional features like queue management, debit advice, credit advice; and
- telecommunication facilities for the real-time transmission of payment orders and additional information between banks and the NCBs/ECB.

The Interlinking comprises:

- an IT system which provides inter-NCB/ECB accounts for recording mutual claims and liabilities stemming from payment transfers; and
- a telecommunication network for the real-time transmission of Interlinking data.

7.2 Responsibility of the NCBS/ECB and SWIFT

7.2.1 Communication functions

7.2.1.1 Availability of systems and link facilities

- SWIFT is responsible for the provision of a reliable telecommunications network (including the FIN service);
- NCBs and the ECB are responsible for the provision of a reliable RTGS system and a reliable link to SWIFT SAPs.

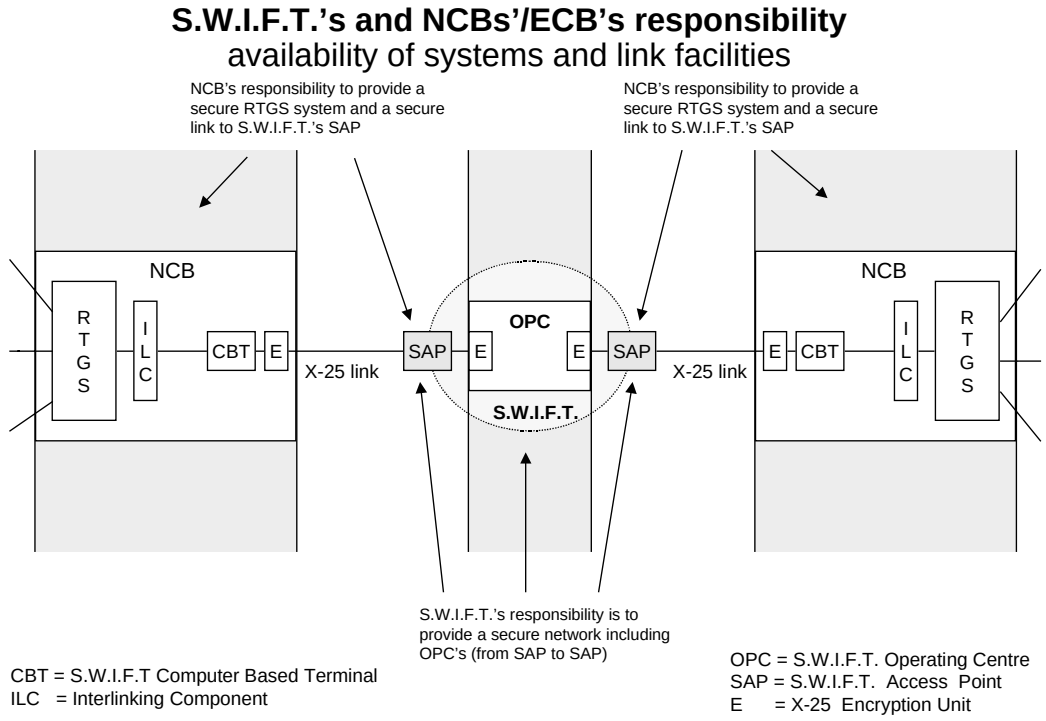


Figure 7-1 - Availability of systems and link facilities

7.2.1.2 Physical and logical access control

- SWIFT is responsible for the provision of adequate access control for their telecommunication services on all layers.
- NCBs and the ECB are responsible for access control to their CBTs and encryption units (Interlinking front end components) and all other kinds of access to their RTGS system/the Interlinking component.

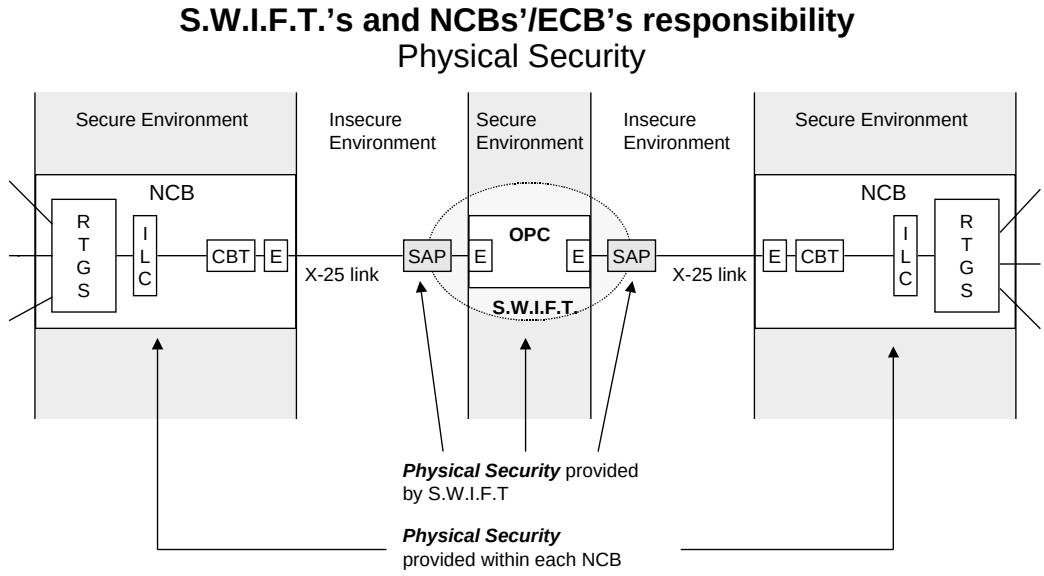


Figure 7-2 - Physical security

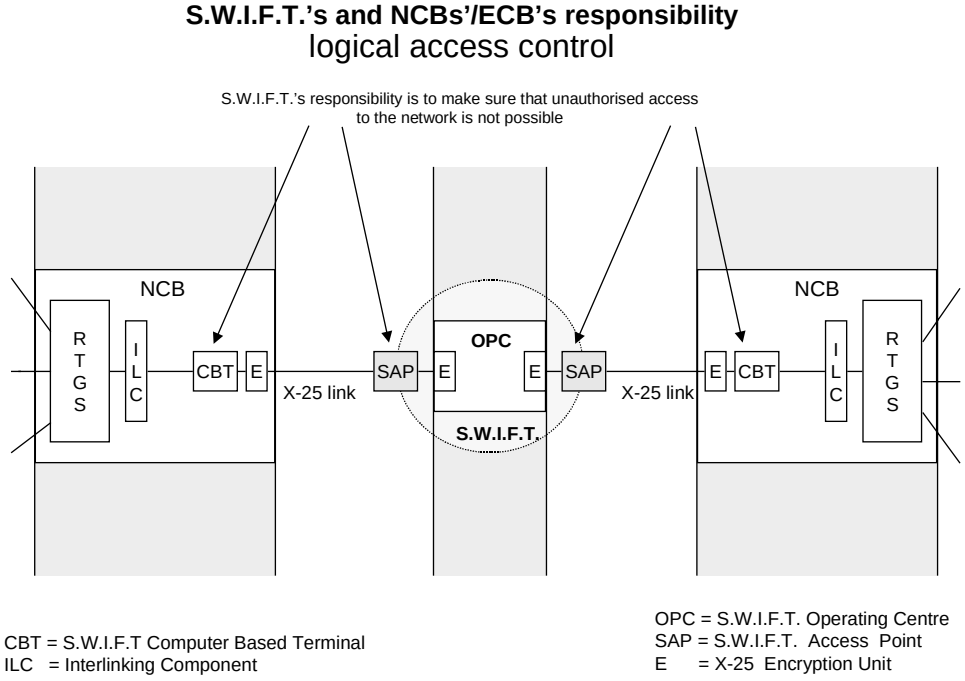


Figure 7-3 - Logical access control

7.2.1.3 Message delivery

- SWIFT's responsibility starts when a message is acknowledged by the OPC and finishes when the OPC has received an acknowledgement from the receiving CBT.

- NCBs and the ECB are responsible for reliable data management (including delivery and processing time-span monitoring) outside this network functionality.

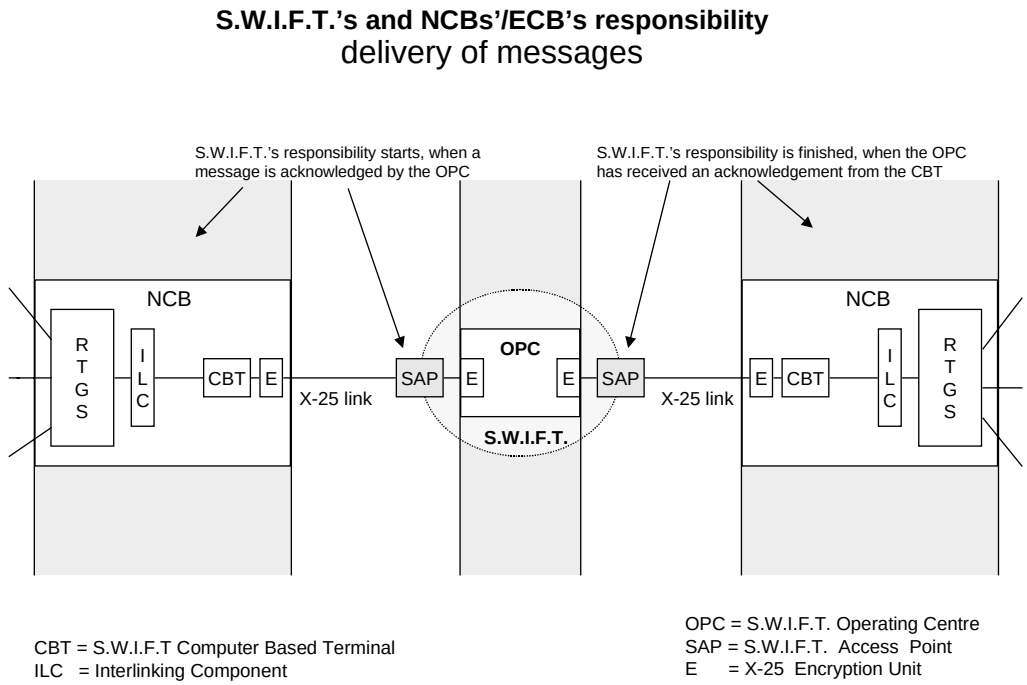
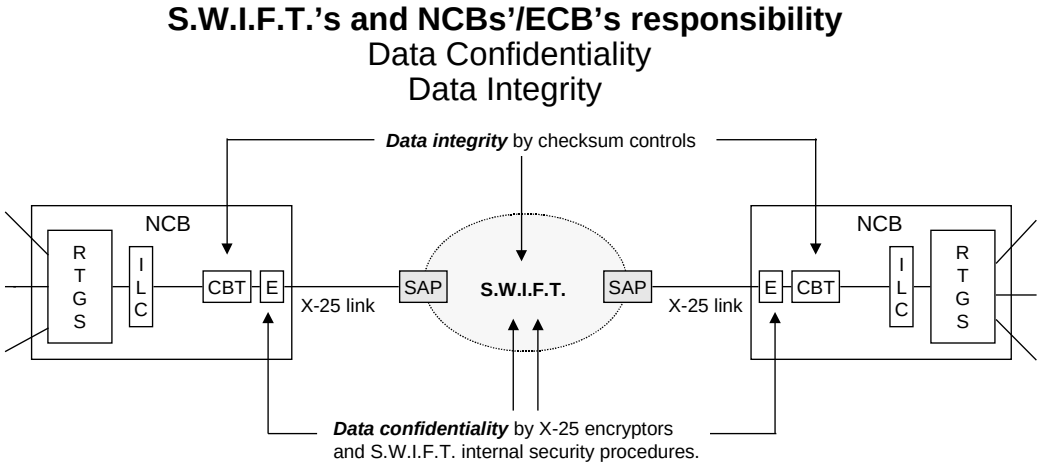


Figure 7-4 - Delivery of messages

7.2.1.4 Data confidentiality during communication

- SWIFT is responsible for the provision of secure encryptors (including key management facilities);
- NCBs and the ECB are responsible for the secure installation of the encryptors and the provision of technical facilities capable of ensuring sufficient confidentiality for the data at a national level.



CBT = S.W.I.F.T. Computer Based Terminal
SAP = S.W.I.F.T. Access Point
ILC = Interlinking Component
E = X-25 Encryption Device

Figure 7-5 - Data confidentiality and Integrity

7.2.1.5 Data integrity

- SWIFT is responsible for the provision of a secure method for checking data integrity between the CBT and OPC and vice versa;
- NCBs and the ECB are responsible for protection of data integrity outside this telecommunication link (see Figure 7-5).

7.2.1.6 Data authenticity

- SWIFT is responsible for the provision of a secure method which allows data authenticity checks between the sending NCB/ECB and receiving NCB/ECB.
- NCBs and the ECB are responsible for the secure implementation of the method and protection of data authenticity outside this telecommunication link.

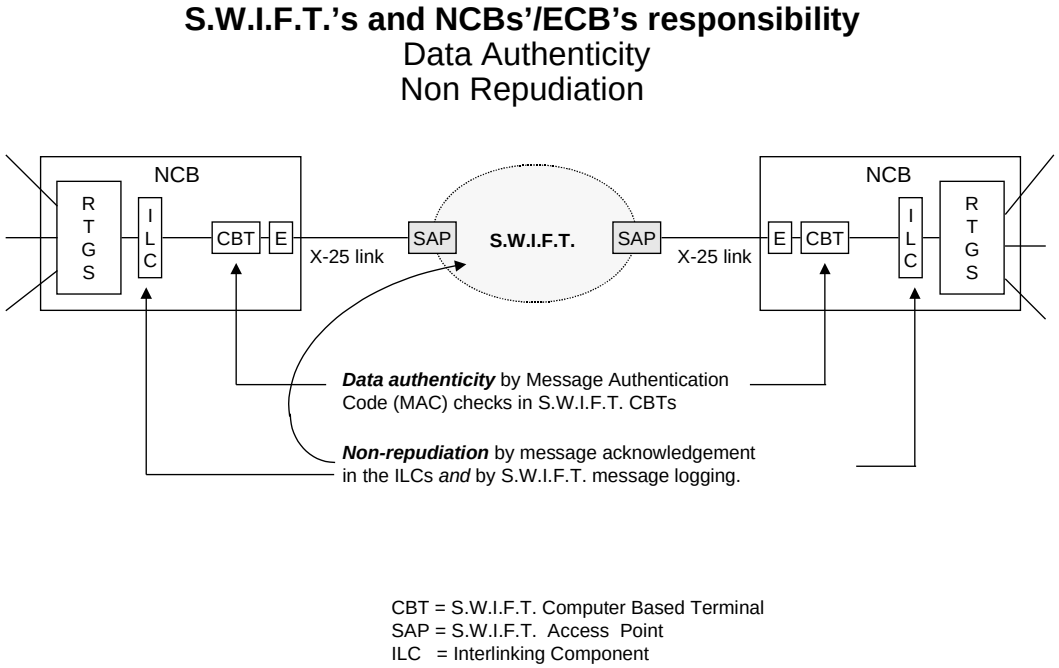


Figure 7-6 - Data Authentication, Non-repudiation

7.2.1.7 Non-repudiation between sending NCB/ECB and receiving NCB/ECB

- SWIFT is responsible for the provision of secure long-term storage of data, to act as a 'trusted third party' in the case of a dispute between the sending NCB/ECB and receiving NCB/ECB (see Figure 7-6).

7.2.1.8 Tools for a secure authentication key exchange

- SWIFT is responsible for the secure design of the methods (Bilateral Key Exchange), the provision of secure tools (card reader) and the reliability of its work as a 'certification authority';

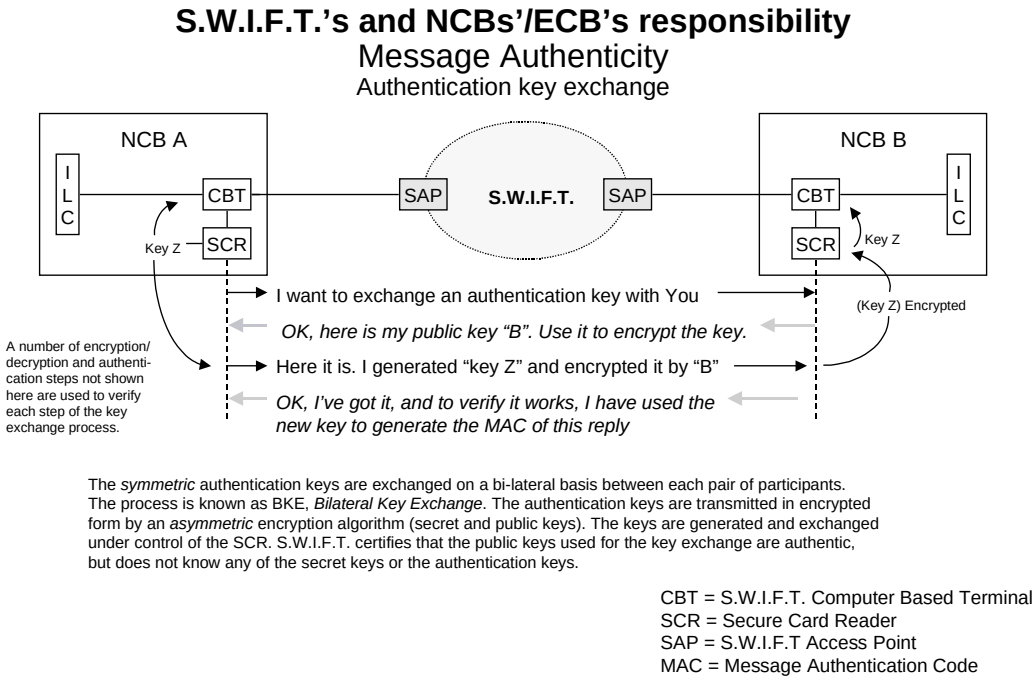


Figure 7-7 - Authentication key exchange

- NCBs and the ECB are responsible for the secure implementation and handling of methods and tools (BKE/card reader) and secure key storage on the CBTs.

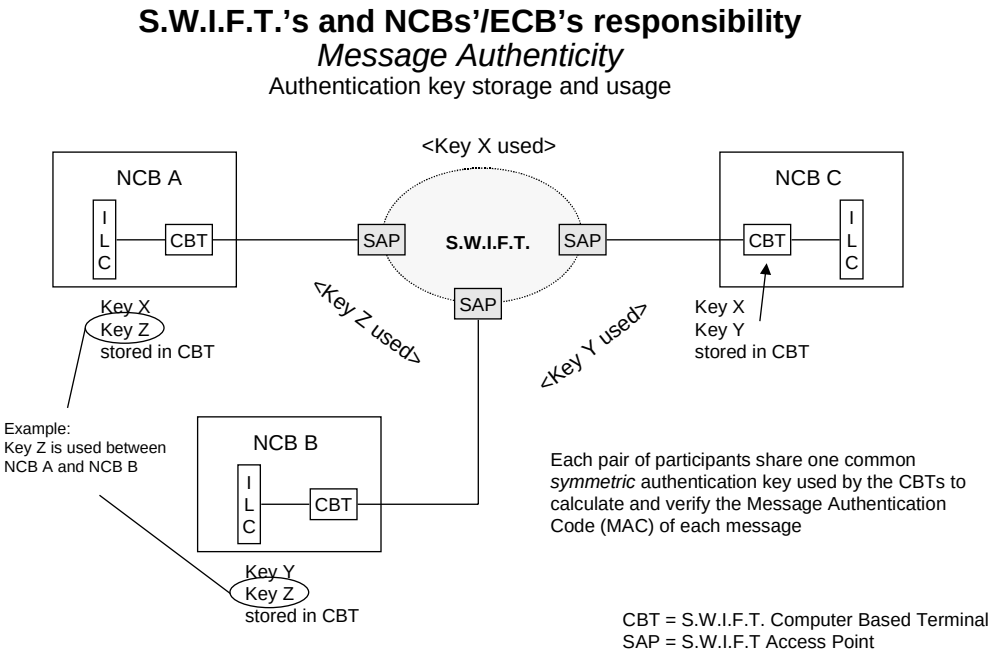


Figure 7-8 - Message authenticity

7.2.2 Business application functions

These functions are described in §5 of this specifications. They are mainly

- logical structure of the communication (e.g. request/acknowledgement structure);
- tasks that have to be fulfilled in a specific time-span (e.g. start of error detection measures);
- data presentation requirements (e.g. definition of message types).

Each NCB and the ECB is responsible for its individual system. Because the application layer of TARGET is completely independent of the underlying network, no further entity takes responsibility.

The application functions will have to be embedded in a set of operational rules. It may be sufficient to provide these rules in the form of handbooks (e.g. similar to SWIFT). These handbooks should clarify in detail the different tasks of the NCBs and the ECB and should distinguish clearly the responsibilities of the parties involved. These handbooks will be internal to the NCBs/ECB. They will provided during the development and implementation phase of the Interlinking System.

8. OPEN DESIGN ISSUES AND THE CURRENT STAGE OF THE SPECIFICATION PROCESS

8.1 Open design issues

8.1.1 End-to-end confidentiality

SWIFT end-to-end confidentiality might be used in the future.

8.2 Current stage of the specification process

The Interlinking Specifications are based on the User Requirements, which describe the core features required for the smooth functioning of the cross-border settlement of payments via interlinked individual RTGS systems. It provides tools which will be used for core business purposes.

9. GLOSSARY OF TERMS

- A -

AAU - see **Automatic Answer Unit**

ACK - A positive acknowledgement, sent by the receiving system to the sender, after successfully processing a request message.

Asymmetric - An encryption method that allows data to be encrypted using one key and to be de-encrypted with a second unique key.

Authentication - Generic term for a check performed to ensure that two parties are communicating with each other and not with a fraudulent third party. Successful authentication of SWIFT messages also confirms that the message content has remained unchanged during transmission.

Automatic Answer Unit - An automatic answering unit is installed at each RP to provide an up-to-date report on the status of the RP.

Availability - Criterion on which a system is evaluated taking into account back-up facilities and the possibility of switching over to them.

- B -

Bank Identifier Code - A universal method of identifying financial institutions in order to facilitate the automated processing of telecommunication messages in financial environments.

BIC - see **Bank Identifier Code**

BKE - Bilateral Key Exchange

BSC - Proprietary SWIFT communication protocol for the link between CBT and SAP.

Business date/day - The date for which TARGET as a whole, and each RTGS system individually, settle payment orders. Payment orders for a date different from the business date will be either rejected (in case they are of an earlier settlement date) or if the RTGS system allows, stored for settlement on another business date. The business date is under normal circumstances the date of the receipt of the payment order, and shall be a valid operating date for TARGET. In exceptional circumstances, the business date may be a previous operating day (e.g. in case TARGET needs to recover from a major malfunction on the previous day).

- C -

CBT - see **Computer Based Terminal**

CEBAMAIL – Central Bank Mail (secure mail between NCBs/ECB)

Checksum - Method used to check that no data have been lost or changed during the communication process.

Computer Based Terminal - A network interface device, provided and operated by the user, consisting of both hardware and software.

Confidentiality - The process of ensuring that data are not disclosed to those not authorised to see them.

Cut-off Time - The latest time of day (by country/time zone) for receiving NCBs/ECB to apply same-day value to effect funds transfers in favour of third parties. It is also the time after which users will receive an end-of-day report.

- D -

DCTN - see **Delay Closing Time Notification**

DCTR - see **Delay Closing Time Request**

Delay Closing Time Request - Request message used when a NCB/ECB faces problems in sending its payment messages in due time. By using this message other NCBs/ECB are asked to stay open to process late payments. A notification from the receiver is required.

Delay Closing Time Notification - Answer to a DCTR. Can be either positive or negative.

- E -

ECB - European Central Bank

ECMN - see **End-of-day Check Message Notification**

ECMR - see **End-of-day Check Message Request**

Encryption - A process whereby the characters which constitute a readable message are encoded using a cipher so as to render that message unintelligible to other parties.

End-of-day Check Message Notification - Response to a ECMR. It can report either successful and unsuccessful matching.

End-of-day Check Message Request - The sender of this message is requesting the initiation of end-of-day procedures. A positive or negative Request Received and Processed Notification must be issued by the receiver of the ECMR (i.e. the ECB).

End-to-end encryption - Method used to assure confidentiality of data at the application level; it means the encryption algorithms are implemented together with the application.

Error detection procedures - Methods used by the NCBs/ECB to detect and solve errors during the business day.

ESCB - European System of Central Banks.

Euro area - Collection of countries which have adopted the single currency.

- F -

Fallback - The process of returning to the mode of operation or of network connection previously used, in the event of serious problems.

FFM – See Free Format Message

Free Format Message - One of the three categories of messages defined for the Interlinking. The FFM are messages referring to payments or any other business activities of the Interlinking. No special action is expected from the receiver of an FFM.

Field - A data element for which the identification, description and value representation has been pre-defined. Each element constitutes an indivisible unit. Where a field consists of more than one element, each forms a sub-field.

Fields may be:

- Fixed or variable length
- Mandatory or optional
- Restricted in the character set that may be used.

A field can appear only once in a message, unless the rules specify otherwise. Some fields consists of several sub-fields.

FIN - see **Financial Application**.

Financial Application - The SWIFT application within which all SWIFT user-to-user messages are input and output. Certain user-to-SWIFT and SWIFT-to user messages may also be sent and received within FIN.

Format - The rules of the layout, e.g., for a message type or field within a message type.

Format Checking - That part of SWIFT processing which checks that a message format conforms to the message-type rules.

The checks include:

- presence of mandatory fields
- absence of forbidden fields
- field length restrictions
- character restriction.

- G -

GPA - see **General Purpose Application**

General Purpose Application - The SWIFT II application which establishes and controls the communication between an LT and SWIFT II. GPA also controls the initiation and termination of FIN sessions. A range of system messages may be input and output within GPA, but there are no user-to-user messages in GPA.

- H -

Header - That part of the message envelope which precedes the message text. Its prime purpose is to identify the receiver to SWIFT and the sender to the receiver. The sender and the receiver are identified only in the header. The information contained in the header is network-dependent.

- I -

ICC - see **Interlinking Communication Component**

IPC - see **Interlinking Processing Component**

IIR - see **Interlinking Internal Reference**

IL - see **Interlinking System**

ISIM – see Interlinking Statistical Information Message

Input Sequence Number - A sequential six-digit sequence number assigned to all SWIFT input messages.

Interlinking Communication Component - Component responsible for implementing communication processes between the network provider and the processing components.

Interlinking Processing Component - Component responsible for implementing validation and other Interlinking processes and for communicating with the domestic RTGS processing component.

Interlinking System - Infrastructure and procedures which are used within each RTGS system or in addition to the RTGS systems to process cross-border payments within TARGET.

Interlinking Statistical Information Message – The ISIM contains information on the Interlinking traffic between NCBs/ECB.

ISN - see **Input Sequence Number.**

ISO - International Organization for Standardization.

Integrity - Security protection aimed at ensuring that data cannot be deleted, changed or otherwise tampered with without detection.

Interlinking Internal Reference - A bilateral mechanism unique messages' referencing system within the Interlinking System.

- L -

Line Encryption - Method used to ensure confidentiality of data at the communication level, which means the encryption algorithms are implemented outside the application (e.g. encryption box).

Logical Terminal - The logical entity through which the users send and receive SWIFT messages. They correspond roughly to SWIFT TID.

Log-in - The process by which an LT establishes a connection and opens a GPA session with the SWIFT system. The first LOG-IN from a CBT establishes the physical connection.

Log-out - The process of terminating the logical connection between an LT and SWIFT. The last LT on a CBT to log-out also terminates the physical connection between the CBT and SWIFT.

LT - see **Logical Terminal.**

- M -

MAC - Message Authentication Code

Message - A collection of data in SWIFT format, consisting of a header (and optionally, text and trailers) sent by a user or by SWIFT.

Message Category - A group of message types relating to a particular class of transaction, as indicated by the first digit of the MT number.

Message Input Reference - A unique reference number assigned to every input message. It consists of message input date, input LT, input session number, and ISN.

Message Output Reference - A unique reference number assigned to every output message. It consists of message output date, output LT, output session number, and OSN.

Message priority - A one-letter code assigned by the sender of a message to indicate the priority of the message. Possible values are: S (System), U (Urgent), N (Normal).

Message Text Standard - The rules laid down for the format and content of a particular message.

Message Type - The specification of each Interlinking message by a three-digit number showing the major area (category), the function (group), and the specific details (format). There is a set of rules for each message type.

Message User Reference - A free-format field in the optional user header, allowing the sender to add his own reference of up to 16 characters.

MIR - see **Message Input Reference.**

MOR - see **Message Output Reference.**

MUR - see **Message User Reference.**

- N -

NACK - see **Negative Acknowledgement**.

Narrative - This field may contain any kind of instruction or information.

NCB - National Central Bank

Negative Acknowledgement - A negative acknowledgement, sent by the system to the sender of an input message, notifying rejection of that message. The reason for rejection is indicated by an error code. In case of a payment message, the sender remains responsible for the payment.

Non-delivery Warning - A system-generated message warning that the message for which the feature of delivery monitoring has been requested was not delivered within the obsolescence period specified for that message.

Non-euro area - Collection of EU-countries which have not adopted the single currency.

Non-repudiation - A principle by which the receiver of a message cannot deny having received that message, nor the sender having sent it.

- O -

Obsolescence Period - A period of time, expressed in five-minute units and specified by the sending user, after which, if that message remains undelivered, a Non-Delivery warning is generated and sent to the sender.

OPC - SWIFT's Operating Center

Business dates and Times - Information exchanged in the end-of-day messages between the ECB and the other participants, in order to confirm the operational involvement of each TARGET participants for the next three business days. The times refer to the moments the participants will be ready for accepting Interlinking payments (start of day) and the final cut-off for sending Interlinking payments (end-of-day).

OSN - see **Output Sequence Number**.

Output Sequence Number - A sequential six-digit number assigned at each attempt to deliver a SWIFT output message.

- P -

Payment Settlement Message Notification - Response to a PSMR, which can be either positive or negative. In the case of a positive PSMN, responsibility is transferred to the receiver, in the case of a negative PSMN, the sender remains responsible for the payment.

Payment Settlement Message Request - The sender of this message is requesting the receiver to process a payment. This message requires a positive or negative response from the receiver.

PDE Trailer - Possible Duplicate Emission trailer. A user trailer used to warn the receiver that the same message may already have been input to SWIFT.

Proprietary Message - This SWIFT message type is used for formats defined and agreed between users, for those messages not (yet) live.

PSMN - see **Payment Settlement Message Notification**

PSMR - see **Payment Settlement Message Request**

PSTN - Public Switched Telephone Network.

- R -

RCC - see **RTGS Communication Component**

Regional Processor - The node of the SWIFT II system that is primarily responsible for input message validation and output message queues.

RP - see **Regional Processor**

RPC - see **RTGS Processing Component**

RSA - Asymmetric encryption algorithm named after its designers, Rivest, Shamir and Adleman.

RTGS system - Real-time Gross Settlement system.

RTGS Communication Component - Component within the RTGS responsible for implementing the communication process with its participants.

RTGS Processing Component - Component within the RTGS responsible for implementing the processing of the payments at the domestic level.

- S -

SWIFT Access Point - The local node of the distributed SWIFT network, primarily responsible for the user's connections, input message validation, and output message queues. Physical connections are made via one of a number of CPs attached to the SAP.

SWIFT Transport Network - The collection of SWIFT-controlled equipment and circuits, located worldwide, which provides the user organisation with access to SWIFT services, by facilitating the physical communication between user CBTs and SWIFT sites.

SAP - see **SWIFT Access Point**

SCC - see **System Control Centre**

SCP - see **System Control Processor**

SCR - see **Secure Card Reader**

Secure Card Reader - tamper-resistant card reader, incorporating a hardware security module, supplied by SWIFT and required for Bilateral Keys Exchanges and Integrated Circuit Card management functions.

Session Number - A sequential four-digit number, used to identify a particular session and increased by one each time a new session is started. A session starts when a log-in/select message is sent and acknowledged, and closes when a log-out/quit message is sent and acknowledged.

Slice Processor - One of the large computers in the SWIFT network which performs the routing and safe storage of messages. Each SP is in control of a number of specific destinations.

SP - see **Slice Processor**.

STN - see SWIFT Transport Network

STP – Straight-Through Processing – supporting end-to-end automatic processing

Subfield - A data element which constitutes the smallest indivisible unit within a field constituting of more than one data element. A group of two or more subfields constitutes a field.

System Control Centre - One of the two manned sites from which the SWIFT system is operated and controlled.

System Control Processor - A large computer, within the SWIFT network, which monitors and controls the entire SWIFT network as well as access to that network.

System Message - A message from a user to SWIFT or from SWIFT to a user.

- T -

Tag - A two-digit identifier of a field, sometimes followed by a letter. It marks the presence and start of the field. A letter indicates the format option chosen for the field.

TARGET - acronym for Trans-European Automated Real-Time Gross Settlement Express Transfer System. The payment mechanism which will include the national RTGS systems and their linkages

Terminal - Any communication equipment approved by SWIFT that is connected to a SWIFT regional processor.

Terminal Identifier - see **Bank Identifier Code (BIC)**

Text - That part (block 4) of a SWIFT message which contains the substance of the message. The text format varies according to the message type in question. It is enclosed between the header and the trailer.

TID - see **Terminal Identifier**

Trailer - The part of a message envelope which follows the text. It provides the receiver with additional information about the message. The information contained in the header are network-dependent.

TRN - see **Transaction Reference Number**

Transaction Reference Number - Field 20 in all messages. The sender's unambiguous identification of the transaction. Its detailed form and content are at the discretion of the sender.

- V -

Validation - The class of check performed by the SWIFT system on data transmitted to ensure that it conforms to the standards laid down in the User Handbook and elsewhere.

- X -

X.25 - Standardised communication protocol for the networked computers.

10. LIST OF FIGURES