BANCA D'ITALIA
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Mercati, infrastrutture, sistemi di pagamento

(Markets, Infrastructures, Payment Systems)

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The papers published in the 'Markets, Infrastructures, Payment Systems' series provide information and analysis on aspects regarding the institutional duties of the Bank of Italy in relation to the monitoring of financial markets and payment systems and the development and management of the corresponding infrastructures in order to foster a better understanding of these issues and stimulate discussion among institutions, economic actors and citizens.

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'Nation states remain a reference point for EU citizens, but in their areas of weakness, they give up part of their national sovereignty in order to gain shared sovereignty. [...]
We must be proud of Italy's contribution to the growth and development of the European Union. Without Italy, there is no EU. However, outside of the EU, this is less the case.
There is no sovereignty in solitude.'

Mario Draghi
President of the Council of Ministers of the Italian Republic
17 February 2021

TARGET2
The European system for large-value payments settlement

by Paolo Bramini,* Matteo Coletti,** Francesco Di Stasio,*
Pierfrancesco Molina,* Vittorio Schina* and Massimo Valentini*

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CONTENTS

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Abstract

The single monetary policy needs a payment system capable of distributing liquidity in all euro-area countries. For this reason, in 1999, together with the adoption of the euro, the Trans-European Automated Real-Time Gross Settlement Express Transfer System (TARGET) was established to connect existing national gross settlement systems through the Interlinking Network. These systems were then harmonized in terms of operating hours, intraday liquidity provision and the pricing of cross-border payments.

The need to move from 'minimum harmonization' to full harmonization of services and costs and to allow for more flexibility to cope with EU enlargement led to the establishment of the TARGET2 system, a single shared platform (SSP) set up by the three central bank providers, namely Banca d'Italia, Deutsche Bundesbank and Banque de France (the 3CB).

By allowing large-value transactions to be settled in real time in central bank money in the euro area, TARGET2 has become the 'keystone' of the European payment system, which is a prerequisite for the smooth functioning of the single currency and a mainstay of the process of financial integration in the euro area.

The establishment of TARGET2 was followed by TARGET2-Securities (T2S), for securities settlement, and TARGET Instant Payment Settlement (TIPS), for the settlement of instant credit transfers; these infrastructures leverage on TARGET2 for access to bank liquidity.

The availability and cost of liquidity are crucial for the smooth processing of payments in real-time gross settlement (RTGS) systems. The efficiency of TARGET2 in this respect is ensured by the prioritization of payments, cut-off times for settlement mechanisms, liquidity pooling mechanisms, limits and optimization procedures.

In addition, banks participating in TARGET2 have access to an 'intraday credit' that is collateralized by the assets allocated to a collateral pool.

From a legal standpoint, the system consists of individual national components; each national central bank operates on a 'decentralized' basis, maintaining its own administrative and operational relations with the participants of the platform belonging to its country.

For TARGET2, Banca d'Italia acts in the dual role of service provider to the Eurosystem central banks and service desk for the national financial community.

As service provider, Banca d'Italia, together with Deutsche Bundesbank and Banque de France, is the single point of contact for all participating National Central Banks (NCBs), acting in the event of a malfunctioning of the system, monitoring compliance with agreed service levels, contributing to its maintenance and development, as well as to the management of administrative, legal and security profiles. In its role as assistant to the national financial community, Banca d'Italia is the single technical and administrative contact point for Italian financial intermediaries, monitoring payment settlement and intervening in the event of malfunctions affecting the system or individual participants.

In 2020, the average number of payments settled each day in TARGET2 was around 350,000; the average daily amount was around EUR 1,812 billion. TARGET2 has a 'market share' of 90 per cent of the sum of large-value payments denominated in euros. In fewer than seven days, TARGET2 processes payments whose total value is similar to that of the euro area's annual GDP; it is one of the largest payment systems in the world.

1. The establishment of gross settlement systems and the TARGET system

1.1 From netting to gross settlement

The payment system as we know it today is a recent phenomenon, developed over the past 30 years. In 1987, in its *White Paper on the Payment System in Italy,* Banca d'Italia 'presented the results of its long-running survey and analyses of the state of the payment system which, in addition to providing a comprehensive and in-depth framework, made it possible to identify the actions needed to adapt the quality and efficiency of payment services to the needs of a modern free market economy'.[1] The *White Paper* marked the beginning of a planning phase that in just over a decade redesigned payment infrastructures, transforming them into modern, secure and reliable 'highways'.

First, a register of accounts opened by banking operators and centralized at Banca d'Italia was created, paving the way for replacing a payment system arranged around correspondent banking relationships only. The original system, in which each participant had a specific and two-way relationship with *n* actors was progressively replaced by a direct relationship with their own central account, with contra entries to the accounts of all other banking operators. In 1989, the clearing system, which allowed the exchange and settlement of cheques and other paper-based payment instruments at the clearing houses set up in Banca d'Italia branches, was reformed and transformed into a national clearing system combining a number of specialized sub-systems 'which handle the exchange and allow the inflow into the national clearing process of both large and small-value payments'.[2]

This first 'revolution' was complemented by the subsequent reform of the minimum reserve regime (October 1990), which introduced the possibility of mobilizing on a daily basis the reserves deposited on centralized bank accounts, making it possible to use reserves at zero cost for payment purposes. In addition, the creation in 1988 of the electronic government securities market and, in February 1990, of the electronic interbank deposit market, with automatic settlement on the bank accounts centralized at Banca d'Italia, further modernized the existing systems.

In the early 1990s, the increase in electronic payments and in their average value put pressure on settlement procedures based on the national clearing system. It soon became apparent that multilateral clearing systems were better suited to the processing of large-volume and low-value payments than large-value payments (typically related to financial transactions). Indeed, multilateral netting systems have the great advantage of offsetting debit and

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1 C.A. Ciampi, 'Presentazione del Libro bianco. Il sistema dei pagamenti in Italia: progetti di intervento', Rome, April 1988.

2 'Large-value payments are managed by the *Electronic Memorandum* process, which deals, among other things, with payments arising from trading on the interbank market for deposits and from the SIPS (interbank system of payments through SIA), operated by SIA on behalf of Banca d'Italia, which deals with foreign account and foreign exchange transactions. The low-value payments are managed by the *Recapiti locale* sub-system, which processes payments submitted by operators via Banca d'Italia's branches and by the *Dettaglio* sub-system , managed by the SIA on behalf of Banca d'Italia, which processes information on low-value payments transmitted via the interbank network.' Tresoldi (2005).

credit positions vis-à-vis all the other participants in the system, creating a single debit or credit position for each of them. However, these systems lead to greater exposure to systemic risk (in the event of an entity having to settle a final debt position in default, see the box: *Gross and net settlement*).

GROSS AND NET SETTLEMENT

Payment systems are traditionally divided into two macro-categories, depending on how payments are settled: net or gross settlement. What distinguishes the two types is whether or not there is a delay between the time of submission of payment orders by participants and the time of their settlement, and the fact that, while in a clearing system only net positions are settled, in gross settlement systems, individual payments are settled one by one, without netting.

In clearing systems, also known as net settlement systems, participants exchange payment orders, agreeing that these are not settled at the time of input; this implies that the payments submitted by participants accumulate over a predefined period of time (i.e. the clearing cycle). At the end of the cycle, each participant will have a net position, i.e. the sum of all its debits (payments submitted) and credits (payments received); only this net position will actually be settled, either by debiting or crediting, depending on its sign, the participant's central bank cash account.[3]

By contrast, in real time gross settlement (RTGS)[4] *systems, all transactions sent by participants are settled individually (and, in general, at the time of entry into the payment system) in central bank money. Each payment order will then generate a debit of the debtor bank's account with the central bank and a corresponding credit on the creditor bank's account.*

Gross settlement therefore requires much more liquidity than that needed to ensure the functioning of a clearing system, considering also the intraday time lag between debits and credits. Indeed, participants in a RTGS system will have to hold the liquidity necessary to settle each individual payment on their account. In clearing systems, by contrast, it is sufficient to hold an amount of liquidity equal to the difference between the payments submitted and those received (i.e. participants with a positive credit-debit balance may also choose not to hold liquidity); moreover, it is not necessary to maintain a certain amount of liquidity on the account throughout the business day, since it will only be used at the end of the clearing cycle.

While clearing and deferred settlement permit considerable efficiency in terms of liquidity management, they expose participants to the risk that, at the end of the clearing cycle, participants with a debit balance will be unable to meet their payment obligations.[5] *This risk, owing to the multilateral netting scheme, also involves all the other participants in the system. Failure to settle just one debit balance could mean that other participants, who would not have experienced liquidity problems if the balances were settled correctly, also become illiquid. In extreme cases, the consequences can spread to the financial system as a whole (systemic risk).*[6]

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3 An account held by a financial institution with its central bank.

4 Real-time gross settlement.

5 The causes of such non-compliance may be of a financial nature, such as a lack of liquidity or default, or of a technical nature.

6 Gross settlement systems thus help to safeguard financial stability by enabling real-time settlement in central bank money. This is why they are generally provided by central banks; in view of the positive externalities arising from the use of the system by financial institutions, the central banks may consider it appropriate to subsidize their operations (see Section 3.2, box: *Cost recovery and the public good factor*).

Looking at their specific features, it is clear that the choice of settlement method entails a trade-off between higher costs in RTGS systems and higher risks in the case of clearing.

A first step towards overcoming this trade-off is the introduction of features to mitigate the less desirable features of both types. With regard to clearing systems, risks are often mitigated by the use of forms of guarantee: for example, all participants may be obliged to deposit a certain amount of funds with the system operator; these funds can be used in the event of a participant defaulting, to ensure the smooth settlement of the clearing cycle. In gross settlement systems, where liquidity needs are high, the central bank providers often grant participants intraday credit[7] *in order to increase the liquidity available for settlement.*

Finally, it should be emphasized that with the evolution of the supply of payment systems, the stark difference between the two ways of settlement has progressively narrowed. A number of intermediate solutions have been identified between the two models, with the creation of the so-called 'hybrid systems'. On the one hand, clearing systems have increased the number of settlement cycles throughout the business day, reducing the risks related to delays between the submission of payment orders and the time of settlement. On the other hand, mechanisms that allow the efficient management of liquidity, such as queuing systems[8] *and offsetting algorithms, are increasingly common in gross* settlement systems.

The desire to minimize systemic risk, while supporting the process of financial deepening of the economy, was one of the reasons for creating a real-time gross settlement system. In 1997, the Italian RTGS system, BI-REL, got underway. The increased pressure on bank liquidity brought about by a gross system was mitigated by the provision by Banca d'Italia of additional liquidity in the two forms of minimum reserves mobilization and intraday liquidity backed by securities. BI-REL also provided a queue system to ensure that payments submitted without immediate coverage of the account to be debited were not rejected by the system and could be resent for settlement when the necessary availability had been restored.

The birth of BI-REL was part of a broader European-wide development: the third stage in the process of Economic and Monetary Union (EMU), which Italy was due to enter on 1 January 1999. To this end, and in line with the decisions taken in the Community fora, the conduct of the single monetary policy in the euro area and the consequent need to minimize systemic risk in the settlement of transactions were designed to rely on fully interrelated national gross settlement systems as the backbone of an incipient European payment system.

1.2 Towards a single monetary policy and an integrated money market

With the start of the third stage of Monetary Union, which coincided with the adoption of the single currency, one of the first problems that the newly-created

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7 Intraday credit is an overdraft granted by the central bank operating the system. This credit can be granted at a price or for free, but it should always be backed by adequate collateral, usually securities (see Section 1.3, box: *Intraday credit*).

8 The presence of queues means that a payment not covered by liquidity is not immediately rejected (as would be the case in a 'pure' RTGS system); the payment is queued (usually until the end of the business day) and is settled when the participant has enough liquidity available on its account.

Eurosystem faced was the effective conduct of monetary policy, which was also necessarily a single policy. The objective of maintaining price stability,[9] represented by a rate of inflation close to but below 2 per cent, is pursued by the Eurosystem by managing the supply and influencing the demand for base money through the minimum reserve system and two types of monetary policy operations: open market operations (OMOs) and standing facilities, consisting of overnight deposits and marginal lending.[10]

An efficient payment system is a necessary condition for the authorities that conduct monetary policy to achieve their objectives.[11] The smooth exchange of central bank money among market participants is essential for the proper functioning of the interbank money market, which in turn is indispensable for the activation of the monetary policy transmission mechanism. A payment system that is unable to settle payments efficiently would risk disrupting, or at least slowing down, the mechanisms through which the effects of monetary policy are transmitted to financial markets.

Since banks demand base money to fulfil their reserve requirements, to settle transactions in central bank money with other counterparties and to meet their customers' demand for cash, the Eurosystem is able to influence the interest rates at which they exchange their reserves in the money market via OMOs and the marginal lending facility. These rates represent the cost of short-term financing faced by banks and a rise or fall in short-term financing rates is therefore reflected in similar developments in the cost of credit offered to the public, based on which households and firms make their consumption and investment decisions. If the euro-area money market did not have a platform on which to securely and efficiently exchange central bank money among market participants, the process described above would be severely impaired or very lengthy.

Indeed, in order for the Eurosystem to be able to transmit monetary policy impulses by setting interest rates in the money market, the latter needs to be able to allocate reserves correctly from surplus to deficit entities in order to balance demand and supply. To achieve this result, it is essential that market participants rely on a payment system that settles interbank transactions within a certain time frame and with high standards of safety and efficiency.

In fact, banks manage the amount of funds they want to hold on their accounts on the basis of the inflows and outflows that they anticipate will be settled over a specific period of time, in order to determine the correct amount of funds to offer or request from the market. If the payment system does not function properly and the transactions are not settled in a timely manner, some banks will hold more or fewer funds than the optimal amount. Moreover, if these

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9 The objective of price stability is set out in Articles 119(2) and 127 of the *Treaty on the Functioning of the European Union*.

10 For more information on the types of monetary policy operations, see the General Documentation Guideline *(EU) 2015/510 of the European Central Bank of 19 December 2014 on the implementation of the Eurosystem monetary policy framework (ECB/2014/60) (recast)*.

11 It is worth emphasizing that the smooth functioning of the payment system is useful for more than simply permitting the effective conduct of monetary policy. For a description of the various purposes of a smooth payment system, see Kokkola (2010).

situations were to occur repeatedly, banks would be faced with deep uncertainty about their expected future cash flows and may be forced to bear higher costs to deal with them. For example, banks with a liquidity deficit owing to expected inflows that have not been settled may agree to borrow funds at a higher interest rate. This would distort the formation of interest rates in the market and undermine the effectiveness of monetary policy actions.

MONETARY POLICY AND THE PAYMENT SYSTEM

A secure and efficient payment system facilitates the smooth functioning of monetary policy transmission mechanisms, avoiding distortions in the setting of interest rates in the markets. This has a positive impact on the consumption and investment choices made by households and firms, and consequently on price stability, which is the objective of the Eurosystem's monetary policy.

1.3 TARGET

Prior to the introduction of the euro (1999) and the advent of the Single Monetary Policy, cross-border payments within the European Union were settled through correspondent banking agreements. In March 1995, the Council of the European Monetary Institute (EMI), the predecessor of the European Central Bank (ECB), approved the establishment of the Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET),[12] a European real-time gross settlement system in central bank money for large-value payments in euro.[13]

The main objectives of TARGET were to:

- help integrate the European money market in order to facilitate the conduct of the single monetary policy;
- improve the security of payment flows by reducing systemic risk;
- increase the efficiency of cross-border payments in euro.

TARGET was launched on 4 January 1999 as a decentralized system consisting of the national RTGS systems of the participating central banks and the ECB's European Payment Mechanism (EPM). It was established by means of common infrastructures and procedures (the Interlinking mechanism).

The scheme could be used for all euro payments, both interbank and customer payments, with no limit on the value of payments. 'Domestic' payments (between banks in the same country) were settled in national RTGS systems, while 'cross-border' payments (between banks in different countries) were processed in national RTGS systems and exchanged, on a bilateral basis, directly between the national

12 Trans-European Automated Real-time Gross settlement Express Transfer system.

13 'Payments, generally of very large amounts, which are mainly exchanged between banks or between participants in the financial markets and usually require urgent and timely settlement.' In 2003, these reserves with the Eurosystem amounted to around EUR 130 billion, while the average daily flows settled in the TARGET system were above EUR 1.6 trillion. The main reason for banks to hold a low level of reserves with central banks is the high opportunity cost of holding reserves, which is typically below market rates.' See Padoa-Schioppa (2004).

central banks (NCBs), reaching the final recipient a few seconds after the debiting of the senders' accounts. All payments became irrevocable as soon as they were debited and final as soon as they were credited to the recipient bank's account.

Since 1999, three areas of minimum harmonization have been introduced, which are indispensable for the conduct of monetary policy, market integration, and the maintenance of a level playing field between participants in the Member States: (i) the provision of free and unlimited intraday liquidity against adequate collateral; (ii) a uniform pricing scheme for cross-border payments;[14] (iii) the same time of operation as for the national RTGS systems.

INTRADAY CREDIT

By settling individual payments, RTGS systems require banks' treasuries to be more liquid than systems that offset, bilaterally or multilaterally, the debit and credit positions of participants. The increased pressure on the availability of liquidity exerted on bank treasuries by gross settlement systems relates not only to quantities, but also to the timeliness with which liquidity needs to be available to enable the settlement of incoming payments. 'At the level of the system as a whole, this means that, with the ratio of available liquidity to the amount of daily transactions, the liquidity profile needed for a payment system on a gross basis during the day varies according to the timing of the payments received. In the event that a 'free riding'[15] of payment transactions prevails on the part of all market participants, this could lead to a gridlock in payment settlement, meaning that any failure of an RTGS system may arise not so much from insufficient liquidity, but from the decision of market participants to put it back into circulation, i.e. its distribution within the system.'[16]

RTGS systems entail greater complexity in banks' liquidity management, which is why they are typically accompanied by measures that facilitate banks' treasuries in this vital function.

The instrument that best serves to meet the liquidity demand arising from different time windows for collection and payment is the provision by the central bank of additional liquidity with a repayment obligation at the end of the day.

This additional liquidity can be used to avoid the late submission of payments or their concentration in specific hours of the day, thereby smoothing the system. The obligation to return during the day also avoids 'a liquidity injection due to the needs of the payment system that could alter the normal monetary management standards.'[17]

The different RTGS systems offer intraday liquidity at different conditions, sometimes limiting the amount of liquidity by increasing the costs of access to liquidity as the business day progresses and requiring a sufficiently high level of collateral.

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14 By contrast, the price of domestic payments continued to be determined autonomously by the national central banks in order to allow the costs of domestic payments to be recovered.

15 This refers to the fact that in order to avoid the opportunity cost of maintaining sufficient liquidity in their accounts to cover payment commitments, market participants expect to receive payments from their debtors before entering them in turn. It is clear that if all participants were to act in this way, the system would tend to stall, not because of a lack of liquidity but because of the overly prudent behaviour of the participants.

16 See Bonaiuti and Valcamonici (2010).

17 See Bonaiuti and Valcamonici (2010).

The Eurosystem, first with TARGET and then with TARGET2, opted to offer unlimited and free intraday liquidity, provided that this is fully covered by adequate collateral provided to the respective central bank. Eligible collateral means marketable assets (securities) and non-marketable assets (bank loans) that fulfil the Eurosystem's eligibility criteria (i.e. eligible assets). As far as Banca d'Italia is concerned, the collateral is acquired using the legal instrument of the pledge. Collateral for monetary policy operations and for intraday credit in TARGET2 is managed using the collateralization technique known as pooling, whereby collateral is pledged by each counterparty into a pool account opened with Banca d'Italia; the overall value of the collateral is tied in direct proportion to outstanding credit operations, and the counterparty can withdraw some collateral from the pool provided that the remainder is sufficient to guarantee outstanding credit operations.

Failure to reimburse intraday credit at the end of the day shall automatically be transformed into a marginal lending facility.

In this way, the 'nature' of the Eurosystem's credit operation, characterized by an obligation to return the funds by the end of the business day, is changed to overnight. Credit granted as a facility of the payment system, with the aim of ensuring the smooth handling of collections and payments during the day, is thus transformed into the provision of bank liquidity (creation of base money); as a marginal lending facility, it is therefore subject to the payment of an interest rate and appropriate monitoring.

TARGET also allowed EU countries that had not adopted the euro to participate, albeit with some limitations, such as the provision of a certain amount of intraday credit against a deposit in euros with the Eurosystem.

It played a key role in the financial system as a mandatory settlement channel for monetary policy operations, fully meeting the objectives for which it had been created. National money markets were successfully integrated following the system's launch. The alignment of short-term interbank rates within the euro area was already achieved in the first few days of operations and allowed the rapid and uniform transmission of monetary policy impulses (see Figure 1).

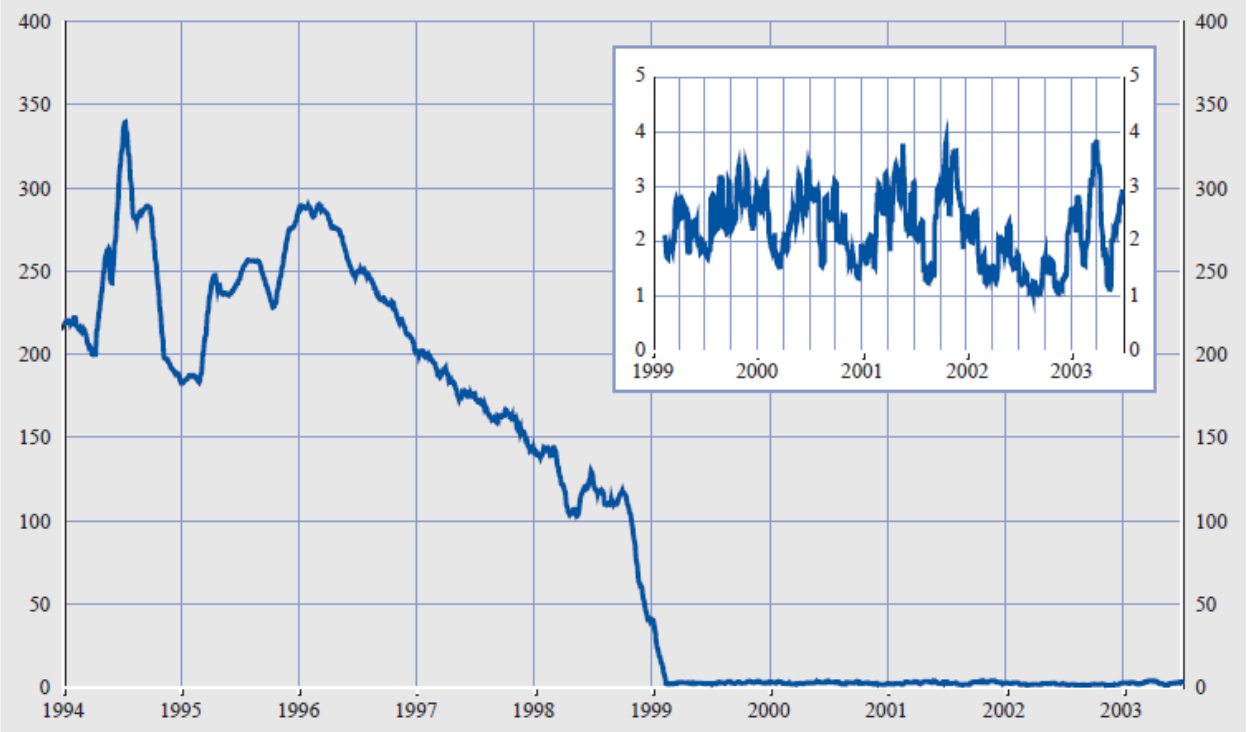
The broad coverage provided by TARGET also permits the harmonization of market practices in the EU, for example with regard to the opening days of the money market and foreign exchange transactions involving the euro.

Also from a technical point of view, TARGET proved secure and reliable. Nevertheless, in a consultation with commercial banks that participate in TARGET some critical issues did emerge, including from a forward-looking perspective and in some cases perhaps warranting structural measures. In particular, the consultation revealed: (i) less than full cost efficiency; (ii) possible difficulties in operating the system in view of EU enlargement; (iii) the limited harmonization of the services offered by different central banks that do not guarantee 'equal treatment' for market participants; (iv) increased demand for more sophisticated liquidity management services; (v) the need for higher security requirements.

Within this framework, in October 2002 the Governing Council of the ECB defined the strategic direction for the future development of TARGET to enable the system to evolve towards: (i) the maximum harmonization of services;

(ii) greater cost-efficiency; and (iii) flexibility with regard to future developments, including the enlargement of the EU and the Eurosystem.

Figure 1 - Integration of the money market in the euro area



Source: Baele *et al.* (2004). Notes: 30-day moving average; basis points. The figure shows the evolution of the cross-sectional standard deviation between average unsecured money market rates across euro-area countries. In an initial phase (1996-98), the decline in cross-country variability of rates was due to the elimination of exchange rate risk and the gradual harmonization of national economic policies. From 1999 onwards, the almost total elimination of interest rate differences has been attributable to the integration of financial markets.

This was how the project to move beyond interlinked domestic infrastructures and to build a single shared platform got under way (see Section 2.1). While the technical management of the system was centralized, the NCBs' relations with their respective banking communities and market infrastructures were intended to be maintained in a decentralized manner – in line with the principle of subsidiarity as laid down in the Maastricht Treaty. 'The agreed solution' wrote Carlo Tresoldi, 'represents a new balance between maintaining the principle of decentralization and a more efficient and cheap operational set-up. Sharing the technical infrastructure will allow central banks to achieve economies of scale and thus reduce transaction costs for the entire community of users.'[18]

[18] See Tresoldi (2005).

2. The backbone of the European payment system: TARGET2

2.1 One technological platform, many national systems

Following the strategic decision taken in October 2002 by the Governing Council of the ECB, the second generation of[19] the TARGET system, called TARGET2, was launched in November 2007.

Unlike TARGET, which established a link between the different national RTGS systems, which nonetheless remained separate entities from both a legal and technical standpoint, TARGET2 used a single shared technology platform (the Single Shared Platform or SSP). In addition to ensuring harmonized and cost-efficient services for users, this made it possible to adapt quickly to the enlargement scenarios of the European Union and the Eurosystem.

TWO REGIONS FOUR SITES

A lasting interruption of TARGET2 operations can have serious impacts on financial markets, with potentially global systemic consequences. To ensure maximum resilience, the infrastructures required to operate the system are replicated in two different European regions (Italy and Germany), each of which in turn hosts a primary and a back-up site. This business continuity model allows TARGET2 to return to full operation within two hours of a shutdown, even in the event of a major disaster.

Although TARGET2 is a single platform from a technological point of view, legally it is still structured as a multiplicity of national payment systems, each under the responsibility of the respective central bank, in accordance with the principle of decentralization. While from an operative standpoint the system is centralized, each central bank retains exclusive ownership of its own account and, more generally, of its relationships with its banking community.

It is important to remember that, while contractually speaking TARGET2 participants interact exclusively with their own NCB, the Governing Council has made provision that the general terms and conditions for offering TARGET2 services should be harmonized as far as possible. This is why it has adopted the TARGET2 Guideline, which is binding on all NCBs of the Eurosystem.[20]

TARGET2 is the Eurosystem's response to developments in the external environment (technological innovation, consolidation of the banking system, changing business practices) and the requirements reported by commercial

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19 The migration of the various European financial communities to TARGET2 was organized in stages (the so-called 'migration windows'), ending in May 2008.

20 2013/47/EU: Guideline of the European Central Bank of 5 December 2012 on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET2) (ECB/2012/27). For further details, see Section 3.2. The NCBs of the European Union countries that do not adopt the euro may also join TARGET2 to settle payments in euro, subject to the approval of the Governing Council and the conclusion of an ad hoc agreement.

banks that use TARGET. The system architecture, services provided, technical and business continuity solutions adopted, are the essential elements of this response, the essential elements of TARGET2.

The architecture of TARGET2, which is based on a single platform, reduces the operating costs related to the maintenance of *n* platforms as well as those stemming from the evolution of the system (as any changes are made to a single platform).

The new platform focuses on the functions that promote the centralized management of intraday liquidity and the implementation of optimization mechanisms that make it possible to use, for settlement purposes, the additional liquidity resulting from payments submitted to the participants. With regard to the exchange and settlement of payment orders and the interaction with the system for management and monitoring purposes, SWIFT services were selected, being the international standard for payment systems when TARGET2 was launched.

Finally, in part following the tragic events of 9/11, a business continuity solution was adopted to address a new 'regional disaster' emergency scenario. [21]

The implementation of TARGET2 was entrusted by the Eurosystem to three central banks: Banca d'Italia, Banque de France and Deutsche Bundesbank, collectively the 3CB.[22] They completed the SSP by adapting and integrating the most advanced components of their domestic settlement systems, in accordance with the 'building blocks approach', and turning them into 'modules' for the provision of specific services. On the one hand, this strategy made it possible to draw on past expertise in the development and maintenance of national RTGS systems; on the other, to optimize the time frame and costs of implementation, while preserving and building on previous technical investments, which would have gone to waste if an entirely new platform had been set up.

As mentioned above, the SSP envisages the adoption of SWIFT for the transmission of payment messages and for interaction with end users. SWIFTNet's FIN service is used for the payments,[23] relying on a security network with large interactive potential; in particular, the SWIFTNet services (InterAct, Browse and FileAct) allow the SSP users to interact either by accessing web pages (outside the public network) or by exchanging messages.

As a direct result of the adoption of the building blocks approach, the services provided by the SSP were split into two families with two different technological infrastructures, according to the different risk profiles; the first family is the Payment and Accounting Processing Services System (PAPSS) based on a

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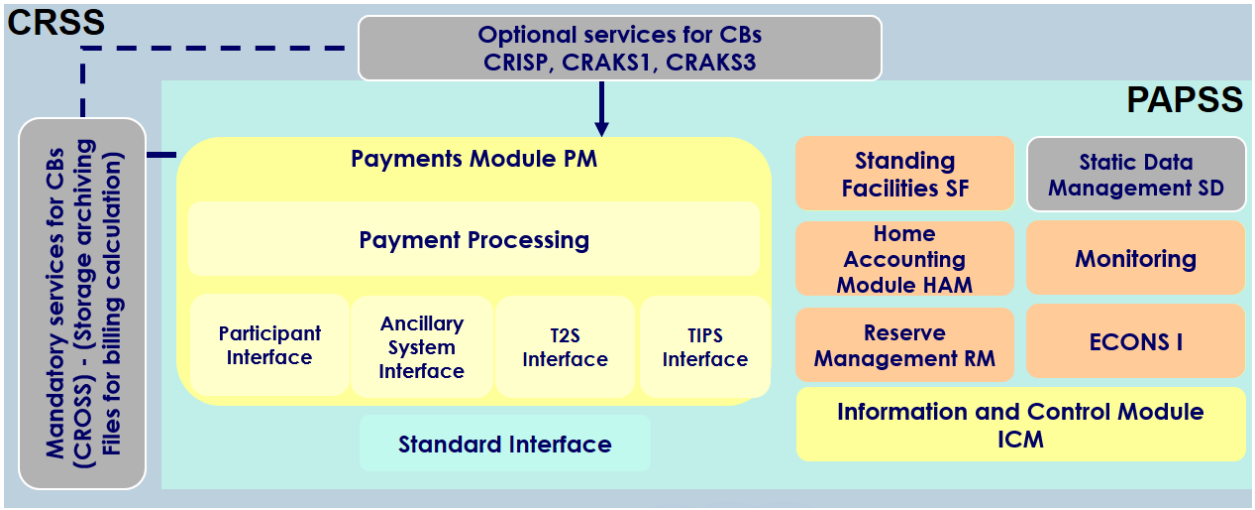
21 For a detailed description of the business continuity solutions adopted, see Appendix A.1.

22 In addition to acting as the service providers, like all other central banks of the Eurosystem the Italian, French and German central banks are also users of the platform.

23 Small participants with low payment volumes are offered a less costly solution than SWIFT's access via an internet-based connection secured through appropriate technological solutions.

mainframe platform,[24] while the Customer Related Services System (CRSS) is based on industry-standard solutions[25] (see Figure 2).

Figure 2 - SSP modules



Source: European Central Bank (2020a). Note: In the context of the agreement between the three providing central banks, the yellow modules were developed by Deutsche Bundesbank, the grey ones by Banque de France and the orange ones by Banca d'Italia.

A further distinction of services provided by the SSP, again based on the building blocks approach, is that between mandatory services, more directly linked to participation in the gross settlement system, and ancillary services, which individual central banks wishing to make full use of the shared resources of the SSP can access by adopting the relevant optional module.

There are four mandatory modules in PAPSS. The gross settlement service is provided by the Payment Module (PM), which was created by Deutsche Bundesbank from the German domestic RTGS+ system. The application interface is provided by the Information and Control Module (ICM), again by Deutsche Bundesbank. Centralized management of the system register and configuration data for TARGET2-related entities takes place through the Static Data Management (SD) developed by Banque de France. The contingency settlement service is provided by the Enhanced Contingency Solution set up by Banca d'Italia (see Appendix A.2), which also provided the infrastructure solution within which the individual components of PAPSS services operate.

Banca d'Italia also contributed to the three optional modules. The Home Accounting Module (HAM), which is an evolution of the domestic RTGS system BI-REL, offers services for the integrated management of non-RTGS accounts (accounts held with the central bank for counterpart transactions with the central bank, such as cash withdrawal operations); the Reserve Management Module (RM), which provides services relating to the management of minimum

[24] IT architecture, typically based on proprietary technologies, which provides for a centralized computer with high processing capacity for running critical applications.

[25] IT system designed for interoperability based on public application standards and distributed processing platforms.

reserves; the Standing Facilities Module (SF), which is dedicated to the conduct of monetary policy standing facilities (marginal refinancing and overnight deposits). Upon joining TARGET2, each central bank may choose either to participate in the optional modules or to guarantee the related services to its banking community through domestic proprietary procedures.

2.2 A MODULAR APPROACH: BUILDING BLOCKS

Payment Module

Participation

Participants connected to TARGET2 may access RTGS functions by way of direct participation, i.e. by holding an account in the Payment Module, or indirectly, via another direct participant settling in their stead on its own account. Direct participants also have the right to authorize their branches and banks (based in the European Economic Area) belonging to their banking group to settle on their PM account by means of payment instructions sent and received autonomously using the multi-addressee access formula.

Liquidity management support

The PM module provides a number of functions that facilitate liquidity management during the business day. In addition to real-time gross settlement in central bank money, access to the PM allows market participants to use additional features to support liquidity management, such as the distinction between urgent and highly urgent payments (where the former are defined by market participants at the time of entry, while the latter can only be submitted[26] by central banks and ancillary systems[27]) and the resulting possibility of setting up liquidity buffers for the settlement of urgent or highly urgent payments.

In addition, for non-urgent payments, limits on exposure vis-à-vis specific counterparties or the system as a whole are defined and the time at which a payment is initiated or removed from the system's queues can be configured in real time. The features described are easily and securely available via the TARGET2 graphic user interface provided by the ICM module.

Consolidation of banking groups' liquidity

In addition, TARGET2 offers additional dedicated liquidity pooling features to institutions belonging to banking groups in order to facilitate the efficient centralization of their liquidity. By pooling the liquidity of the banking group

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26 With the exception of payments related to the ancillary system (see next footnote) CLS (Continuous Linked Settlement), whose debit balances are not sent for settlement by CLS but submitted by the participating banks. Given its multi-currency nature, CLS simultaneously accesses the different RTGS systems for the different currencies. For the sake of consistency, CLS has also adopted a settlement model in TARGET2 whereby the settlement bank submits its debit entries. Therefore, CLS does not use the ancillary system interface. However, the nature of payments related to an ancillary system, although technically not submitted by the ancillary system, has motivated the classification of these payments as highly urgent, even if they are submitted by banks.

27 Systems settling monetary obligations arising from exchange and clearing of payments and financial instruments in TARGET2.

into a single virtual pool, the participating banks can use the liquidity available to the group as a whole for the settlement of their operations.

Optimization and queue dissolving algorithms

The PM provision of liquidity optimization mechanisms mitigates the above-mentioned typical rigidities of a gross settlement system in terms of the liquidity available for settlement at a given time (in order to meet obligations independently of future revenues), thereby undermining the nature of TARGET2 from pure RTGS to 'hybrid' settlement system.

Payments for which settlement cannot take place immediately owing to a lack of liquidity are stored in a queue and an increasingly complex algorithm system examines possible settlement combinations in order to select the one that guarantees the most effective resolution of the queue, i.e. the solution that maximizes the simultaneous settlement of individual payments in queues on the basis of the criteria defined for each algorithm. The optimization mechanism consists of five alternative algorithms arranged according to an intervention priority order that is a function of their complexity: the most sophisticated algorithm comes into play if, and only if, the former failed in his attempt. For a detailed description of the optimization algorithms, see Appendix A.3.

Settlement solutions for ancillary systems

Ancillary systems operating in TARGET2 shall have the following types:

- Retail payment systems;
- Large value payment systems;
- Foreign exchange systems;
- Money market systems;
- Central counterparties;
- Securities settlement systems (SSSs).

As an alternative to payment functionalities resulting from direct participation in TARGET2, ancillary systems can access settlement via a dedicated application interface (ASI), which allows the centralization of liquidity flows for the monetary obligations of their 'settlement banks'[28] as well as the execution of transactions with the highest priority (highly urgent) settlement envisaged by the system. For an overview of the functionalities provided by the ancillary system application interface, see Appendix A.4.

Functionalities related to connection to TARGET2-Securities and TIPS

With the TARGET2 value-added services, a PM account holder who also holds Dedicated Cash Accounts (DCA) in TARGET2-Securities[29] (T2S) may have both the view of the balance of the connected T2S DCA and the possibility to initiate liquidity transfers between them and the PM account. In addition, the

28 Financial institutions participating in an ancillary system in TARGET2 shall be referred to as settlement banks.

29 For a detailed description of the TARGET2-Securities securities settlement platform, see Mastropasqua et al. (2021).

liquidity present at the end of the day in T2S is automatically transferred from the T2S DCA to the related PM account (so-called cash sweep).

Similarly, by means of liquidity transfers from PM accounts in TARGET2, DCAs can be funded on the TIPS platform[30] dedicated to settling instant credit transfers. PM account holders may initiate liquidity transfers to any TIPS DCA and conversely receive liquidity from any TIPS account on their PM account. Unlike T2S, TIPS operates 24 hours per day on all days of the year; therefore, no automatic return of liquidity to TARGET2 is expected at the end of each business day. In order to allow liquidity on the DCAs in TIPS to be taken into account for the purposes of calculating the fulfilment of reserve requirements, a snapshot of the situation on such accounts is taken at the end of each TARGET2 business day.

Information and Control Module

The Information and Control Module provides real-time information and interactive services to operators connected to the SSP, both via a dedicated graphical interface (U2A - user to application) and via XML messages addressed to the domestic applications of the counterparty (A2A - application to application). Market participants can query the system and receive information, among other things, on the status of individual payments and the system as a whole, on account balances, on the use of bilateral and multilateral limits, and on the fulfilment of reserve requirements. Likewise, instructions may be sent to the system for changing the priority of a payment, initiating liquidity transfers and updating static data information.

Static Data Module

The Static Data Module is dedicated to the management of the participants' configuration data, as well as other data referred to as 'static', as they cannot be modified during the day by their nature. Changes made to static data are therefore made effective as from the start of the next business day. This means that, at the beginning of each business day, the information stored in the SD module is propagated to the other modules of the platform in order to allow a synchronized update.

Enhanced Contingency Solution – ECONS I

The third mandatory module is the Enhanced Contingency Solution, used by direct participants and ancillary systems in the event of malfunctions or incidents that make the SSP unavailable for the settlement of critical payments. For a comprehensive discussion of the functioning of this module, see Appendix A.2.

Home Accounting Module

The Home Accounting Module is the optional module dedicated to the management within the SSP of accounts other than RTGS accounts. Access to HAM is a suitable solution for banks not having an interest in holding an RTGS account and yet either subject to reserve requirements and/or willing to manage their accounts directly with their central bank. The HAM module is also used by correspondents (the so-called Central Bank (CB) Customers) which are not authorized, as stated in the TARGET2 Guideline, to open an RTGS account. In addition to the basic features

30 For a detailed description of the instant credit transfer settlement platform, see Renzetti et al. (2021).

related to the execution of payments, the Home Accounting Module offers some value-added services, such as co-management of accounts (i.e. an entity with an HAM account extends the right to move funds held on its account to another entity, the co-manager, which needs to have a PM account) and reservation for cash withdrawals (specific liquidity reserve for cash withdrawals).

Reserve Management Module

TARGET2 offers participants subject to minimum reserves the possibility to use a single account both to hold the funds necessary for its fulfilment and to settle transactions in central bank money with other counterparties participating in the system. Furthermore, via the Reserve Management module, opting central banks can manage their participants' reserve requirements' fulfilment automatically during each maintenance period as well as the charge of penalties and the settlement of interest on excess funds. The Reserve Management Module makes it possible to manage the functions associated with the fulfilment of reserve requirements by interacting with accounts held in PM, HAM or locally[31] with individual central banks. Banks that indirectly fulfil their reserve requirements can rely on a direct participant to delegate the related tasks. In addition, multi-account credit institutions can manage the maintenance of obligations on all accounts held.

Standing Facilities Module

Through the TARGET2 Standing Facilities module, central banks may name eligible and authorized counterparties upon request for specific accounts dedicated to the establishment of overnight deposits and the settlement of the marginal lending facility, facilitating the monitoring, handling of repayments and debiting of interest due. In relation to overnight deposits, banks shall have the possibility to execute liquidity transfers from the PM or the HAM to the SF module via the ICM. For the marginal lending facility, the interaction with the collateral management system takes place outside the SSP; after receiving eligible collateral from credit institutions through delivery of securities, the collateral manager enters the overnight credit operation by debiting the counterparty's account on the SF module against the PM or HAM account of the same counterparty.

2.3 The business day

TARGET2 is open on all days, except Saturdays, Sundays, New Year 's Day, Good Friday and Easter Monday (according to the calendar applicable at the seat of the ECB), International Workers' Day, Christmas and December 26. The reference time for the system is CET.

The current business day (see Table 1) is opened in the evening of the previous business day, at 18:45. From 19:30 to 22:00, and from 1:00 to 6:45, the night-time settlement phase takes place, involving the settlement of liquidity transfers between accounts of the same entity, both in TARGET2 and to T2S, and ancillary system transactions using Model 6 (see Appendix A.4), in which the individual payments

[31] Banks that choose to fulfil their obligation can use both the RTGS account and the 'domestic' account, regardless of whether the RTGS account is held in the Home Accounting Module or in the domestic infrastructure. It should be noted that from November 2023 the interface between the RTGS system and local accounts will be dismissed, see the European Central Bank (2020b).

previously submitted are submitted to the settlement engine in 'packages';[32] daytime settlement takes place from 07:00 to 18:00. Each transaction is settled in real time on an individual basis.

The TARGET2 platform shall be available in U2A and A2A mode throughout the settlement day, except during the technical maintenance period from 22:00 to 1:00. During the technical maintenance period, messages sent in A2A mode shall be queued; during this time, it is not possible to interact with the platform in U2A mode.

Table 1 - TARGET2 business day

Time	Description
18:45	Start-of-day processing. Business Date change. Sending of accounting data for the previous business day to central banks (general ledger files).
19:00-19:30	Capital transfer and interest settlement for standing facilities. Optional updating of intraday credit lines. Earmarking of liquidity on the basis of standing orders from HAM accounts to RTGS accounts.
19:30-22:00	Liquidity provisioning on the basis of standing orders submitted for night-time processing (ancillary system model 6 settlement procedure[1], T2S and TIPS). Night-time settlement.
22:00-01:00	Technical maintenance.
01:00-06:45	Night-time settlement (ancillary system Model 6).
06:45-07:00	Business window prior to daytime operations.
07:00-18:00	Daytime settlement.
17:00	Cut-off for customer payments.
17:45	Cut-off for liquidity transfers from/to T2S DCAs.
18:00	Cut-off for interbank payments.
18:05	Sending of TIPS accounting data to central banks (TIPS general ledger files).
18:15	Cut-off for the use of standing facilities.
18:40	Cut-off for the use of the marginal lending facility (for the central banks).
18:45	End-of-day processing.

[1] For a description of the settlement procedures of the ancillary system application interface, see Appendix A.4.

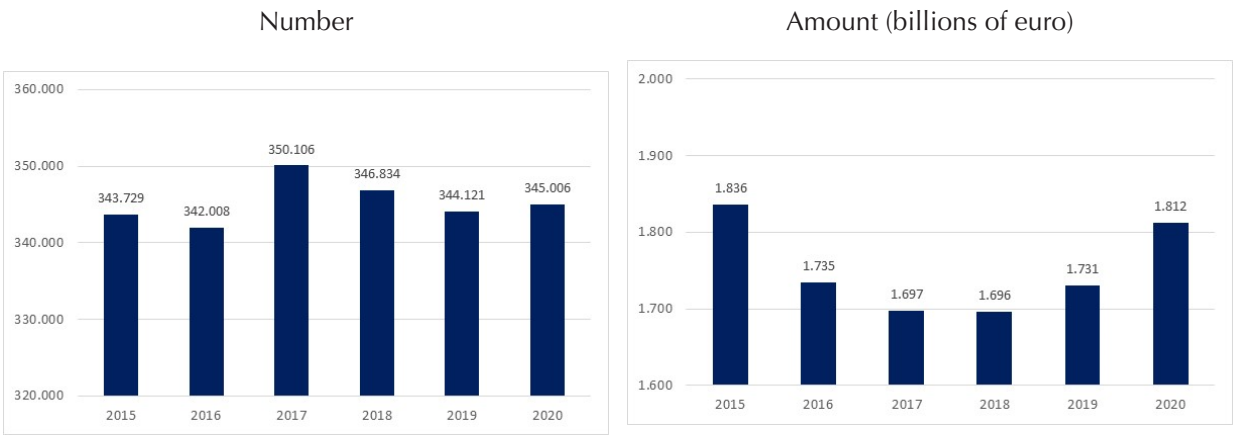
2.4 TARGET2 IN FIGURES

In 2020, around 345,000 transactions per day were settled on average in TARGET2, for an average value of EUR 1,812 billion. These amounts, which are rather constant over time (see Figure 3), explain the importance of TARGET2 for the European economy. Seven business days are sufficient to settle an amount exceeding the annual gross domestic product of the euro area.[33]

[32] Transactions are not sent to settlement individually and immediately, but are organized in groups and subsequently processed through a sequential cycle mechanism with the aim of ensuring the capacity of all dedicated liquidity positions involved.

[33] Euro-area GDP in 2020 stood at EUR 11,329 billion (source: Eurostat, *GDP and main components*, *online data code*: NAMA_10_GDP, updated to 1 July 2021).

Figure 3 - Transactions settled in TARGET2 (2015-20)



Source: European Central Bank.

These figures make TARGET2 one of the most important large-value payment systems in the world. As shown in Figure 4, in addition to CLS (Continuous Linked Settlement), which as a multi-currency system[34] is not strictly comparable with systems operating in a single currency, TARGET2 is somewhere between Fedwire Funds, the US RTGS system operated by the Federal Reserve and operating in US dollars, and BOJ-NET (Bank of Japan Financial Network System), which enables the settlement of transactions in yen.[35]

TARGET2 IN FIGURES

TARGET2 is one of the most important payment systems in the world. In 2020, an average of 345,000 transactions per day were settled in TARGET2, worth a total of EUR 1,812 billion, or 90 per cent of all large-value payments denominated in euros. The amounts settled daily on TARGET2 are equivalent to around 16 per cent of annual euro-area GDP.

At the European level, TARGET2 can be compared with the other large-value payment system in Europe, EURO1.[36] While significant, the number of transactions and their value are lower than the TARGET2 traffic. Figure 5 illustrates the share of TARGET2 in the total transactions settled in the two systems since 2008.

TARGET2 traffic accounts for more than 60 per cent of the total (TARGET2 + EURO1) in terms of the number of transactions and 90 per cent in value terms, indicating a preference on the part of

34 CLS currently operates in 18 different currencies. In 2002, when the system was launched, it was operating in seven currencies; the growth in the value settled is linked to the increase in the currencies settled in the system.

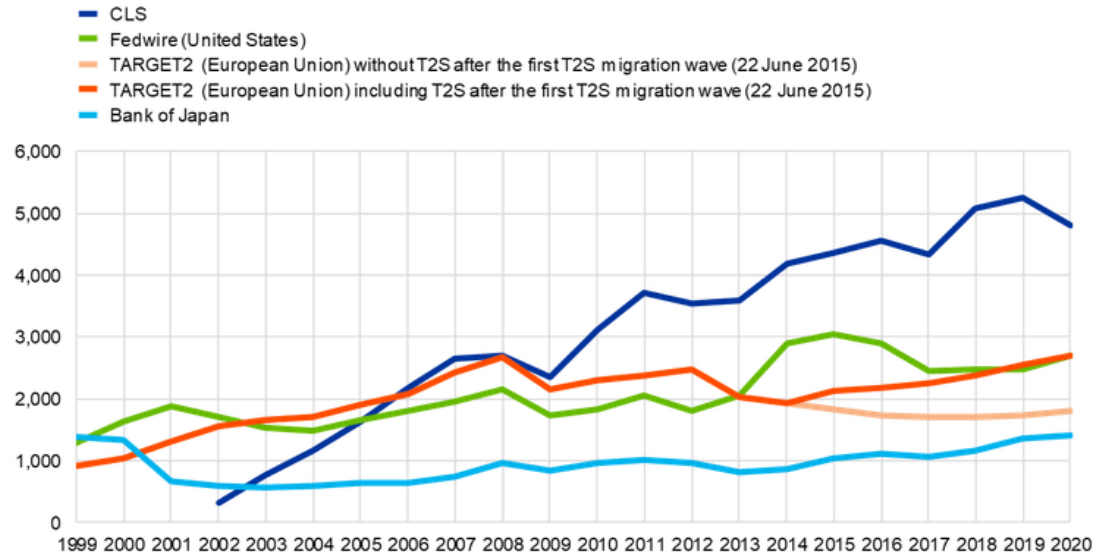
35 For an overview of the major RTGS systems in the world, see Appendix A.5.

36 For details on the functioning of EURO1 and the differences with TARGET2, see Appendix A.6.

financial institutions for the Eurosystem's RTGS system, in particular for larger (and therefore likely more critical) transactions.

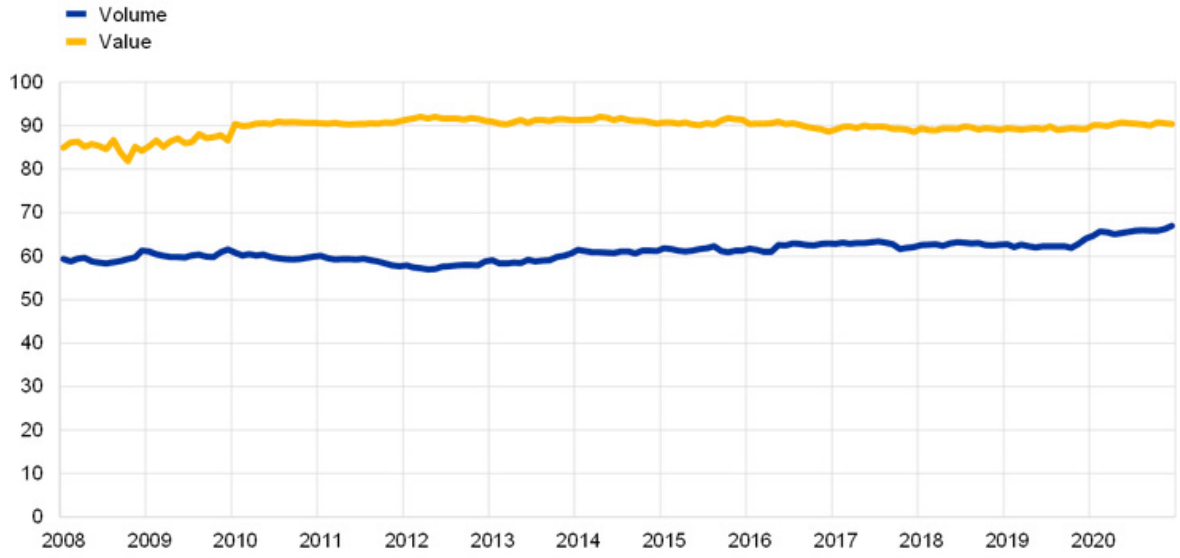
Figure 4 - Main payment systems in the world

(daily average values of transactions settled; billions of euro)



Source: European Central Bank (2021). Notes: the values reported are influenced by developments in the euro/US dollar and euro/yen exchange rates. The decline in the value settled in TARGET2 in 2013 stemmed from a change in the statistical framework. The split of the TARGET2 line in 2015 is linked to the launch of TARGET2-Securities (T2S).

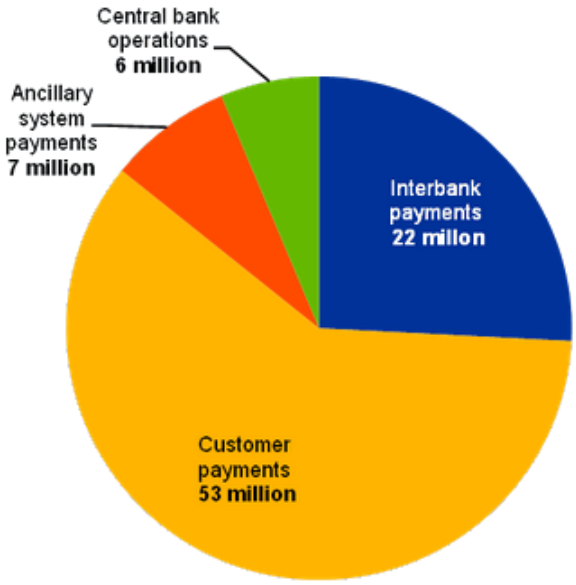
Figura 5 - Transactions settled in TARGET2 as a percentage of the total (TARGET2 + EURO1)



Source: European Central Bank (2021). Notes: volume indicates the number of transactions settled, value the corresponding value. Percentages on a monthly basis.

Customer payments accounted for 60 per cent of the transactions settled in TARGET2 in 2020. The remainder was interbank payments (26 per cent), ancillary system transactions (8 per cent) and transactions with the central bank (6 per cent) (see Figure 6).

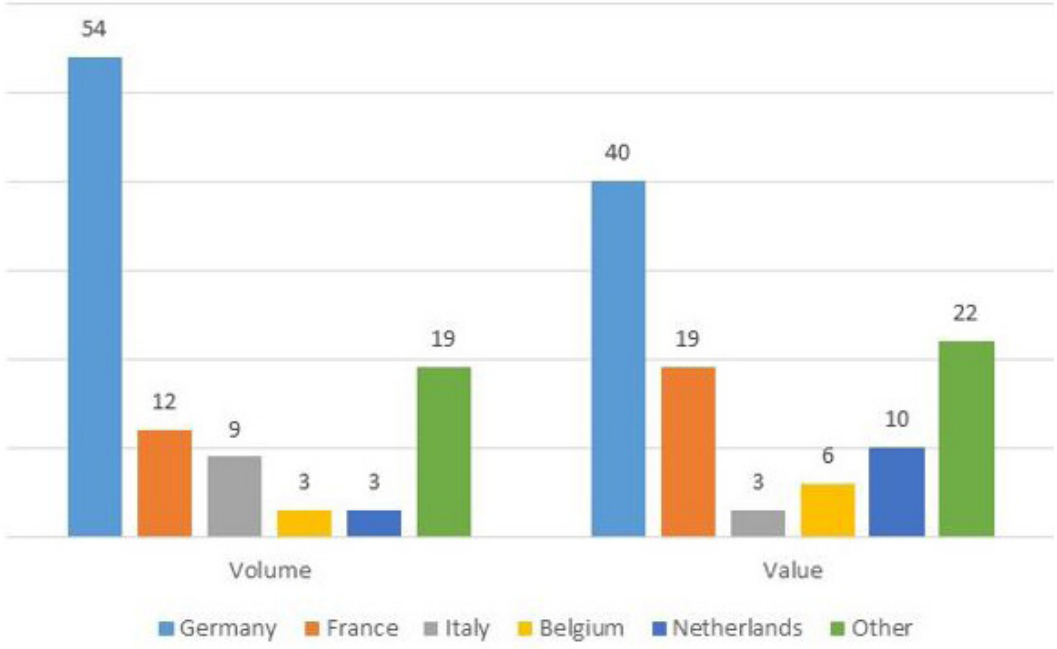
Figura 6 - Types of transactions settled in TARGET2 (2020)



Source: European Central Bank (2021). Notes: in 2020 around 88.6 million transactions were settled in TARGET2 in 257 business days (with a daily average of around 345,000 transactions).

In terms of weights of the different national TARGET2 components,[37] Germany plays a predominant role, accounting for more than half of the transactions settled (in terms of number) and more than 40 per cent of the value. Figure 7 shows the breakdown of transactions settled in the system in 2020 by national component.

Figura 7 - Share of TARGET2 traffic of the main national components (2020)

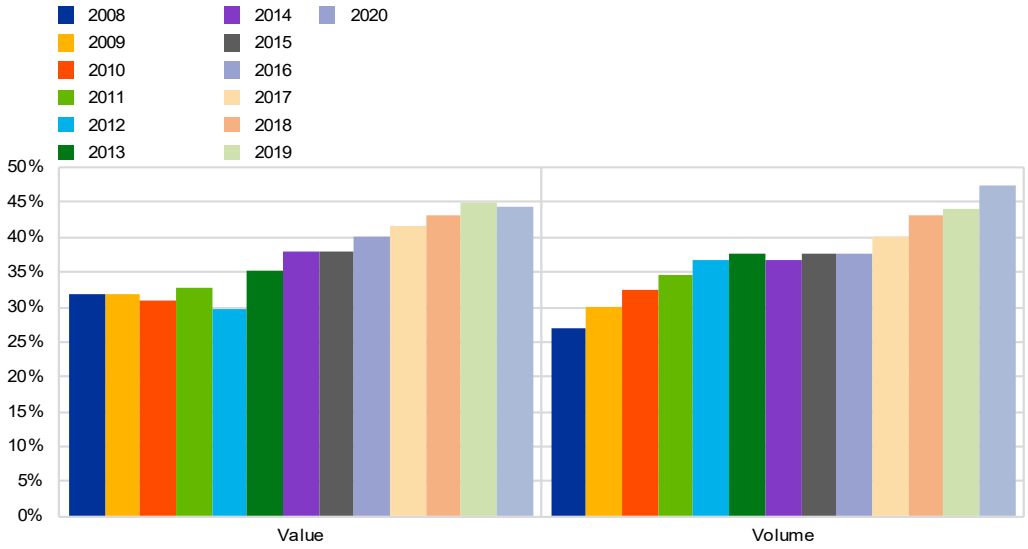


Source: European Central Bank (2021), redrafting by the authors. Notes: as a percentage of the total.

[37] The weights of the different national components are calculated taking into account the nationality of the bank from which the transaction is debited.

Finally, as regards the share of cross-border transactions (between intermediaries in different countries), this has been increasing over time, from the outset and up until 2020, from levels close to 30 per cent to around[38] 45 per cent, both in terms of the number of transactions and in value terms (see Figure 8). This development is in line with TARGET2's objective of facilitating European financial integration.

Figure 8 - Share of cross-border traffic



Source: European Central Bank (2021). Notes: volume indicates the number of transactions settled, value the corresponding value. Percentage of total settled transactions.

TARGET2 BALANCES

In a monetary union, financial intermediaries are free to exchange money;[39] as is well known, the funds that they exchange (reserves) represent an asset for the intermediaries themselves and a liability for central banks.

From the perspective of national central banks, there is a difference between 'domestic' transactions (between two domestic intermediaries) and cross-border transactions. In the case of the former, the transfer of reserves between the two entities only has an impact on the balance sheet of the intermediaries: the debtor bank sees a reduction in its assets (reserves), with a corresponding increase in the assets of the creditor bank.[40] The central bank balance sheet is not affected, since bank reserves remain in the same country and therefore the respective liability remains with the central bank.

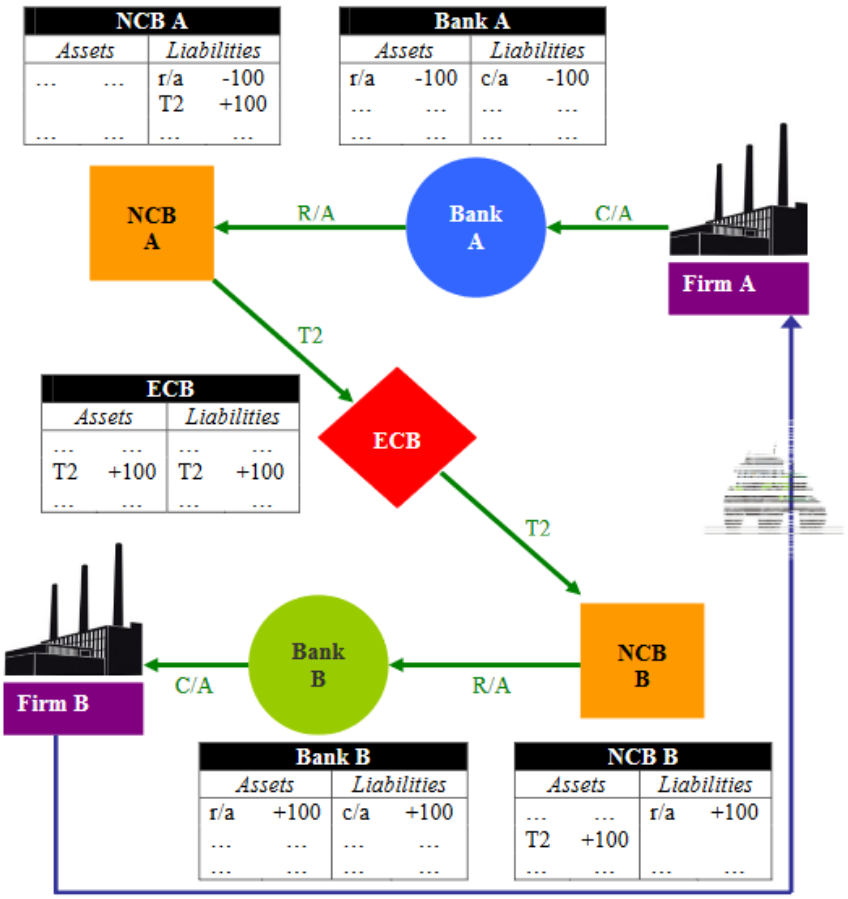
38 In 2020, the share of cross-border payments amounted to 47 per cent in terms of the number of transactions, and 44 per cent in terms of value.

39 Transfers of reserves between commercial banks can arise from interbank trading (e.g. money market) or transactions between their customers (e.g. purchases of goods and services).

40 For the purpose of this discussion, the effects on the liabilities of the intermediaries involved are not mentioned. It should be noted that the transfer of an asset is always accompanied by: (i) the recording of an asset (e.g. a loan, in the case of a money market transaction) or (ii) the cancellation of a liability (e.g. current accounts, which represent a liability to customers in the case of a commercial transaction).

In the case of a cross-border payment, however, the transaction involves two national central banks. The debtor bank's NCB will see a decrease in its liabilities, with a corresponding increase in the liabilities of the creditor central bank. In addition, the corresponding balance sheet change is the change in the TARGET2 balance, a position that each Eurosystem central bank has vis-à-vis the ECB (see Figure 9).[41]

Figura 9 - Cross-border transactions and TARGET2 balance



Source: Cecioni and Ferrero (2012). Notes: the figure shows the balance sheet changes of those involved in a cross-border transaction, in which Firm A buys goods or services from Firm B. Bank A will see a reduction in the current account (c/a) of company A, which corresponds to a liability, while the reserves it holds with its central bank (NCB A) will also decrease at the same time. Bank B will experience an increase in its liabilities (company B's current account), which will go hand in hand with an increase in reserves at its central bank (NCB B). The debtor central bank (NCB A), in return for a reduction in Bank A's reserves (which represent a liability for it), will see a liability of equal amount, i.e. a negative TARGET2 balance (T2). For the creditor central bank (NCB B), by contrast, the increase in liabilities (reserves of bank B) will be accompanied by an increase in assets of equal amounts, i.e. a positive TARGET2 balance.

Technically, on a TARGET2 business day the bilateral balances of each central bank vis-à-vis all other NCBs are calculated. These bilateral balances are then netted, so that each NCB has a single multilateral position at the end of the day, vis-à-vis the ECB.[42] *The TARGET balance of a national central bank is the sum of its daily multilateral positions since the start of TARGET.*[43] *In the case of a*

41 This stems from the fact that in the euro area there is only one currency but there are several central banks.

42 For details of the accounting and legal aspects related to the formation of TARGET balances, see Article 6 of the TARGET2 Guideline (Intra-Eurosystem settlement).

43 1 January 1999, when the European Monetary Union was established.

credit position, the TARGET balance shall be recorded on the assets side of the central bank balance sheet; otherwise (debit position), a liability should be recorded (see Figure 10).

Figura 10 - TARGET balances on central banks' balance sheets

Assets	Liabilities
Autonomous factors	Autonomous factors
- Gold *- Net foreign assets* *- Domestic assets*	*- Banknotes in circulation* *- Government Deposits* *- Other (net) autonomous factors*
- Other claims with the Eurosystem **Claims on TARGET2**	***- Other liabilities with the Eurosystem*** **Liabilities on TARGET2**
Monetary policy instruments	Monetary policy instruments
- Main Refinancing Operations *- Longer Term Refinancing Operations* *- Marginal Lending* *- Covered Bonds Purchase Program (CBPP)* *- Securities Market Program (SMP)*	*- Reserve account* *- Deposit facility* *- Fixed-term deposits*
	Foreign-currency liquidity absorbing operations
Foreign-currency liquidity providing operations	Capital and reserves

Source: Cecioni and Ferrero (2012).

In other words, a central bank will have a positive TARGET balance if financial intermediaries in its country have, since the start of TARGET, received more reserves than they have sent to financial intermediaries in other countries; otherwise, the NCB will have a negative balance.[44]

3 TARGET2: GOVERNANCE, REGULATORY FRAMEWORK AND SUPERVISION

3.1 GOVERNANCE AND ROLE OF THE 3CB

Pursuant to Article 7 of the TARGET2 Guideline (see below), the governance structure of TARGET2 has three levels: at the peak, Level 1 - L1 comprises the Governing Council of the ECB, Level 2 - L2 comprises the Eurosystem NCBs, and Level 3 - L3 comprises the NCBs responsible for offering the SSP to the Eurosystem (3CB).

The Governing Council is responsible for the direction, management and control of TARGET2. The tasks assigned to it include the clarification of the policy guidelines relating to decision-making processes, funding choices, and the establishment of an appropriate legal framework.

The Market Infrastructure Board (MIB), the decision-making body of the NCBs making up L2, assists the Governing Council, to which it reports directly as

[44] For an analysis of the determinants of the formation of the TARGET balances of Eurosystem central banks, see the box: *The ECB's asset purchase programme and TARGET balances: monetary policy implementation and beyond*, in European Central Bank (2017).

an advisory body in all matters related to TARGET2. The MIB[45] is responsible for the operational management of the Eurosystem's settlement infrastructures. In performing this function, the MIB interacts with the Market Infrastructure and Payments Committee (MIPC), which is responsible for the oversight of these infrastructures. In addition to its advisory role, the MIB also executes the tasks assigned to L2 and is the ultimate decision-making body for many aspects of TARGET2. These tasks consist in the concrete application of the guidelines adopted by the Governing Council in its role as L1: with regard to the decision-making processes, the MIB acts as the collector of questions to be raised to the attention of the Governing Council. With regard to financial matters, the guidelines received from L1 are translated into the budget and fee structure; with regard to the legal framework, it transposes the principles set out in the TARGET2 Guideline, which apply to participants in the Eurosystem's settlement infrastructures. Several sub-committees assist and contribute to the work of the MIB. With regard to TARGET2 only, the Working Group on TARGET2 (WGT2) is especially important. It is composed of representatives of the NCBs that participate in TARGET2, involved in the operation of the system. The connected NCBs, i.e. those of non-euro area EU Member States, participate in the discussion of L2 issues but do not have the right to vote. NCBs of Member States that are not connected to TARGET2 act exclusively as observers.

THE 3CB

Banca d'Italia, Deutsche Bundesbank and Banque de France are the NCBs responsible for providing the Single Shared Platform (SSP) on behalf of the Eurosystem and, in their role as Providing CBs, are collectively referred to as the 3CB. They are responsible for the development, maintenance and daily operational management of the SSP, ensuring service levels that have been contractually defined with the Eurosystem, to which they are directly accountable. The Steering Board, composed of representatives of the Providing CBs and chaired in turn by each of them, is the internal decision-making body for all relevant issues.

L3, composed of the 3CB, takes decisions regarding the day-to-day management of the SSP on the basis of the service levels defined in a service level agreement (SLA) with L2 to govern the relationship between the parties for the provision of TARGET2 services. Therefore, L3 is contractually responsible for fulfilling service levels to the Eurosystem, while the Eurosystem is responsible for fulfilling the Eurosystem's service levels vis-à-vis TARGET2 participants. The Steering Board, composed of representatives of the Providing CBs and chaired by each of them, is the decision-making body within L3 for all relevant issues and is also in charge of the representation functions vis-à-vis the Eurosystem.

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45 The MIB is chaired by an ECB senior manager (chairperson) and consists of: nine NCB representatives, including one member from each of the central banks offering the service (role L3); two representatives from the non-Eurosystem NCBs participating in Eurosystem infrastructure services (by virtue of participation in TARGET2 or the conclusion of a Currency Participation Agreement); finally, two members who do not represent an NCB and do not have voting rights, one with experience in the field of payments and the other with experience in the securities sector.

The TARGET2 Guideline details the tasks to be performed by each level in the various operational areas of TARGET2, as summarized in the table below.

Table 2 - Governance of TARGET2

Scope of activity	Level 1	Level 2	Level 3
Governance and financing	Defines rules for ownership, decision-making and financing of the SSP; implements and ensures adequate implementation of the legal framework of the European System of Central Banks for TARGET2	Details the rules on governance and financing laid down by L1; prepares the budget, approves and implements it; assumes ownership and/or control of the application; collects payments and charges for services	Provides L2 with cost data for the provision of services
Cost and pricing	Decides on a common cost methodology and a single price structure	Decides on the pricing of additional services and/or modules	
Service levels	Decides on core services	Decides on additional modules and/or services	Provides input in relation to the needs of L1 or L2
Development of the platform	Consults with L2 on the localization of the SSP; approves the overall project plan	Decides on the initial design and development of the SSP; decides on the choice of SSP operator; establishes, in agreement with L3, the service levels of the SSP; decides on the location of the SSP after consulting with L1; approves the methodology for the process of specification of the product and the progress of the project by L3; establishes the project progress plan, assesses and records the progress made; establishes test scenarios and coordinates their execution in close cooperation with L3	Proposes the initial design of the SSP and its location; drafts the general and detailed functional specifications (internal detailed functional specifications and user detailed functional specifications); provides its initial and ongoing input into basic project planning and control; provides technical and operational support for tests (performing tests on the SSP, input on SSP-related test scenarios, supporting Eurosystem NCBs in their SSP test activities)
Risk management	Decides on the general framework for risk management and acceptance of remaining risks	Is responsible for the management of actual risks; conducts risk analysis and follow-up	Provides the necessary information for risk analysis in accordance with the requests of L1/L2
Migration	Decides on the migration strategy	Prepares and coordinates migration to the SSP, in close cooperation with L3	Provides input on migration issues in accordance with L2 requests; performs SSP-related migration work; provides additional support for joining NCBs
Operations	Manages severe crisis situations; appoints certification authorities for internet-based access;[1] specifies the data protection policy, requirements and controls for the SSP; specifies principles applicable to the security of certificates used for internet-based access	Performs management tasks related to the role of system owner; maintains contacts with users at European level and monitors the day-to-day activities of users; monitors business developments; manages budgeting, financing, invoicing and other administrative activities	Manages the system on the basis of service levels

[1] If a user accesses TARGET2 using the internet network and not the SWIFT network, it is necessary to confirm its identity by verifying suitable digital certificates. By virtue of a specific mandate from the Eurosystem, Banca d'Italia acts as the certification authority. As such, it is responsible for preparing USB tokens with digital certificates for users and processing their requests for internet-based access.

3.2 The regulatory framework

The legal framework for TARGET2 consists of:

- the TARGET2 Guideline;
- the Agreement on the Single Shared Platform for TARGET2;
- the 3CB Agreement.

The TARGET2 Guideline governs the contractual relations between the account holder and the respective responsible central bank. The Agreement on the Single Shared Platform for TARGET2 settles the arrangements between the Eurosystem central banks and the three central banks responsible for managing and developing the SSP. The Agreement between the 3CB defines the rules for cooperation between them.

The TARGET2 Guideline

From a technical point of view, as mentioned above, TARGET2 consists of a single settlement platform.[46] From a legal point of view, however, TARGET2 has a decentralized structure, whereby each participating central bank is a national component of TARGET2 and is responsible for contractual relationships with account holders belonging to its financial community. Indeed, participation in the system is achieved through the signing of certain conditions by an eligible party, which results in a contractual relationship between that entity and the central bank to whom the opening of the account is requested.

Thus, legally, each account registered on the platform is opened within a national TARGET2 component; the responsible central bank is in charge of entering the technical data and provides the necessary operational support to the account holders. All cash accounts opened on the T2S and TIPS platforms also fall within the legal perimeter identified with the all-encompassing term TARGET2.[47]

The legal source for the contractual relationship between account holders and central banks with which such accounts are opened is the TARGET2 Guideline, which comprises both the General Conditions, i.e. the arrangements for central banks participating in TARGET2, and the harmonized conditions for the opening and operation of the different types of accounts.

Each participating central bank must transpose the content of the harmonized terms and conditions into specific contracts to be signed by eligible entities to formalize the request to open their accounts.

In drafting such contracts, central banks may request derogations from the harmonized conditions on account of constraints arising from national legislation. Such derogations need to be approved by the Governing Council of the ECB in order to safeguard the harmonization of conditions applied in the different national components of TARGET2 and the maintenance of a level playing field among participants.

Agreement on the Single Shared Platform for TARGET2

The TARGET2 Guideline (Article 7(6)) imposes an obligation on the 3CB and the Eurosystem NCBs to regulate their relationship by means of a specific agreement. In particular, it is stipulated that 'the SSP-providing NCBs shall

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46 The platform allows all participants admitted to the system to submit and receive payments in the same way irrespective of their location. There is therefore, technically, no difference between sending a payment to a domestic participant and a foreign participant.

47 T2S securities accounts do not fall within the legal scope of TARGET2 Guideline.

conclude an agreement with the Eurosystem central banks governing the services to be provided by the Eurosystem central banks to the latter'. Such agreement shall also include, where appropriate, the 'connected NCBs'. The contract to which reference is made is the Agreement on the Single Shared Platform for TARGET2 (SSP Agreement), entered into force in 2012 and updated in 2018, between the 'Providing CBs' (i.e. the 3CB), on the one hand, 'Participating CBs' (i.e. the Eurosystem NCBs) and 'Connected NCBs' (NCBs of Member States not adopting the euro) on the other.

The main purpose of the contract is to define the rights and obligations of the Providing CBs vis-à-vis the Eurosystem in the management and development of the SSP, which, as stated in one of the articles and in application of the TARGET2 Guideline, shall benefit the Participating CBs.

The Providing CBs have the obligation to comply with the TARGET2 functional specifications described in the General Functional Specifications (GFS) and User Detailed Functional Specifications (UDFS), a set of technical documents annexed to the SSP Agreement that takes the name of 'SSP Documentation'. An additional source of obligations for Providing CBs referred to by the SSP Agreement is the TARGET2 Security and Risk Management Framework, adopted by the Governing Council to provide the Eurosystem with a security and risk management framework.

Since Providing CBs are also Participating CBs, as they offer TARGET2 services to participants, there could be, theoretically, a conflict of interest problem. To avoid such risk, the SSP Agreement stipulates that the Providing CBs, when acting as Participating CB, shall enjoy the same rights and be subject to the same obligations as the other Participating CBs. This aspect is also specifically regulated in the Agreement between the 3CB.

The SSP Agreement also lays down the criteria for reimbursement of expenses and financing of costs, based on the principle of full cost recovery (see Box: *Cost recovery and public good factor*). By this expression, it is understood not only that all costs incurred by Providing CBs in the development and operation of TARGET2 must be reimbursed by the Participating CBs, but also that this should be done at cost. In other words, there is no profit margin in the provision of the service by the 3CB. This ensures maximum containment of the expenditure of public resources for the project and the final cost of the service for the participants.

COST RECOVERY AND PUBLIC GOOD FACTOR

The presence of EURO1 (see Appendix A.6), which is the only competitor of TARGET2 in the field of European large-value payment systems, implies that the Eurosystem has to consider any possible impacts on competition when offering TARGET2 services to the European financial community.

In fact, TARGET2 is provided to the market by the Eurosystem, i.e. the ECB and the national central banks, which do not act for profit but to safeguard public interests (in particular the stability of the general price level). If the Eurosystem were to offer the TARGET2 services to financial institutions at an excessively low price, EURO1 customers would have an incentive to settle their large-value transactions directly in TARGET2.

For this reason, TARGET2 operates on a 'full cost recovery'[48] basis: the Eurosystem needs to adopt a pricing model that, while not aimed at achieving profits, fully recovers the costs of developing and operating the system.[49] This avoids competitive distortions in the large-value payment systems market in the euro area, that would arise if TARGET2 were to operate structurally in loss.

On the other hand, it should be taken into account that a gross settlement system in central bank money, which as such contributes to safeguarding financial stability, is by nature a public good, being built and managed by public entities for the collective good and not for profit.

In view of this, in 2004 the Governing Council decided that in TARGET2 the principle of full cost recovery should be mitigated, accounting for the public good factor.[50] A share of the costs incurred by TARGET2 should not be recovered from the market through fees, as they are imputed to the system's public good function.

Particularly relevant for the development of the SSP are the rules according to which changes to the platform are decided and implemented. These rules are also set out in the SSP Agreement. Each party may propose new features and functionalities of the SSP, as well as modifications to existing features and functionalities. These proposals are submitted and treated in accordance with the procedure set out in the SSP Agreement. The 3CB shall assess the technical feasibility of the proposed addition or amendment; the Parties shall agree on any extra costs, implementation plan and any corrections to the legal framework (in particular to the SSP Documentation). The procedure ends with a testing phase prior to the release of the amendments for production.

Finally, the agreement shall also define the service levels on which the SSP is to operate. These are not regulated in the main body of the agreement, but in a specific annex. They are subject to regular review, to ensure that the needs of the Participating CBs are met, which are prone to a change over time. The service level rules cover the entire daily TARGET2 cycle, indicating for each phase the key performance indicators (KPIs) to be complied with by the platform, both in production and during the testing phase. It also includes rules on the management of any problems or incidents that may arise during the performance of the various operations, the content and frequency of the reports that the L3 is required to produce for the L2.

The Agreement between the 3CB

Within the TARGET2 governance structure, the vertical relationship between the Eurosystem (L2) and the Providing CBs (L3) is governed by the Agreement on the Single Shared Platform. The horizontal relationship between the Providing

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48 The principle *of full cost recovery* derives from Article127 of the *Treaty on the Functioning of the European Union*, which states that: '*...The ESCB shall act in accordance with the principle of an open market economy with free competition...*'.

49 TARGET2 participants may choose between two pricing options. The former, typically used by smaller banks, has a monthly flat fee of EUR 150 and a fixed transaction fee (80 cent). The second group, usually chosen by larger market participants, has a higher monthly flat fee (EUR 1,875), while the cost per transaction decreases with the number of transactions settled (from EUR 60 to EUR 12.5 cent). For more details on the pricing of TARGET2, see European Central Bank (2018).

50 In TARGET2, the share of costs attributable to the public good factor, which is therefore not expected to be recovered, is quantified as EUR 10 cent for each transaction settled.

CBs in the provision of TARGET2 services is governed by an Agreement between the 3CB, formalizing their existence. A first version of the Agreement was signed in 2005, with a scheduled deadline in 2012, to cover the development and launch phase of TARGET2. A second version was signed in 2013 to govern the relations between the 3CB during the TARGET2 operational phase.

The subject of this contract is the definition of the rules for cooperation between the 3CB. Once the implementation has been completed, cooperation between the 3CB in the operational phase takes place in:

- operational management, maintenance and development of all infrastructures, including all technical and functional documentation of the SSP services, i.e. all the elements that are necessary to provide all TARGET2 services on an ongoing basis and in accordance with the service levels set out in the SSP Agreement;
- performance of the administrative and management tasks connected with the activities indicated in the previous point, including, inter alia, coordination of cooperation groups, organization of meetings and the production of reports.

Although contractually established, the cooperation among the 3CB does not involve the recognition of a collective independent legal personality. 3CB are not, and are therefore not recognized as, a syndicate, company or other entity. However, they may have one joint representative (TARGET2 agent) vis-à-vis the Eurosystem, who has the power of representation limited to specific pre-established situations.

If the 3CB are collectively and jointly liable to the Eurosystem for the obligations assumed in the SSP Agreement, it is the Agreement between the 3CB that define the tasks and consequent mutual responsibilities that each central bank assumes for the development and/or operational management of each TARGET2 component. This applies to (i) the Functional and Application Management (the maintenance and development of new functionalities or modifications to the software), (ii) Operational Management (technical and operational management) and (iii) Product Management.

The provisions of the Agreement concerning the internal governance structure of the 3CB are also relevant. In fact, there is a decision-making body within the 3CB, under the name of the Steering Board, in charge of guiding the actions of the 3CB on business policy issues in compliance with all decisions taken at the Eurosystem level. It has general competence for cooperation between the parties, appoints the TARGET2 agent and the TARGET2 Area Managers responsible for the coordination functions of the various business areas, decides on the budget and financial issues relating to the 3CB, on any changes to their respective responsibilities and on any disputes in their respective reports.

Finally, with regard to the conflict of interest provisions mentioned in the previous paragraph, it should be noted that these provisions reflect on the provider side what is stated in the SSP Agreement on the 'customer' side. The parties, who are aware of the potential risks that may arise from the dual role, have been required to have appropriate organizational measures, rules and procedures in place to prevent conflicts of interest. In granting discretion to the 3CB in the way to fulfil such an obligation, the Agreement between the 3CB nevertheless requires the presence of some minimum safeguards. In particular, hierarchical separation

and physical barriers ('Chinese walls') in management and organization of the relevant activities within each institution are required. The latter principle was implemented by Banca d'Italia through the establishment of two separate organizational units (also separated from a logistical point of view), one responsible for the provider functions and the other for the national central bank functions (see Box: *The National Service Desk*).

THE OPERATIONAL TEAM OF THE SSP – TARGET2

The governance model adopted by the 3CB entails the sharing of responsibilities for the management and evolution of the SSP, requiring continuous coordination of central bank resources. This is particularly evident for the day-by-day management of the SSP operations, which Deutsche Bundesbank and Banca d'Italia ensure through a single operational team with resources from both central banks and the other under the ultimate responsibility of Banca d'Italia. The German and Italian components of the Operational Team switch daily in the operational monitoring activities of the SSP production and testing environments and the service desk activities supporting the participating central banks.

Although it is a double-headed structure composed of two mirrored national teams, the Operational Team is indeed the single contact point for central banks, for which this split is fully transparent. This is made possible not only by technical means through dedicated and common communication channels and working tools, but also and above all through the full sharing of working practices, achieved through regular information exchange programmes and working practices that take place both in presence and in virtual environments, as part of the European culture of cooperation.

THE SSP FAM FUNCTIONAL GROUP

The shared responsibilities model adopted by the 3CB is also used for the management of activities related to the planning and implementation of changes to the platform.

The management of the SSP modules in all phases of the application cycle, functional specifications, development, testing and support is entrusted to the Functional and Application Management (FAM), composed of representatives of Banque de France, Banca d'Italia and Deutsche Bundesbank, who are responsible, each within its specific remit, for all aspects of the maintenance (corrections, adaptations or evolutions) of the platform modules.

The group is responsible for assessing all requests for functional changes to the platform, in agreement with the ECB and the central banks, even in common sessions, and subsequently takes care of the estimate of costs impacts, the authorization and the implementation thereof.

THE NATIONAL SERVICE DESK

Each central bank participating in TARGET2 shall operate a National Service Desk (NSD) responsible for maintaining relations with TARGET2 participants (banks and ancillary systems) of its financial community. The NSD performs activities as a help desk and business day monitoring, registers participants within the platform and acts as contingency on behalf of participants in the platform in case of need. Finally, the NSD acts as a user contact point, supporting the work of the Italian AMI-Pay National Stakeholders Group (AMI-Pay NSG), which aims to share the evolution of market infrastructures with representatives of national financial communities and contribute to the better functioning of financial markets.

In addition to their activity under normal conditions, the National Service Desks are required to manage emergency situations in accordance with the operating procedures agreed between the ECB, the 3CB and the central banks.

In particular, incident management is normally under the responsibility of the NSDs; in some scenarios (e.g. the delayed closure of TARGET2 due to system problems or of particularly relevant ancillary systems, malfunctionings with a potential significant impact during the day) involvement of the Crisis Managers in the decision-making process is envisaged. The role of Crisis Managers is generally held by staff with a higher level of seniority.

3.3 Oversight of TARGET2 and SIPS regulation

The role of the ECB and the NCBs as overseers of payment systems

Payment systems, such as clearing and settlement systems, are essential not only for the proper functioning of the financial sector and the economy in the euro area, but also for the implementation of the single monetary policy. Through their oversight function, the ECB and the NCBs of the Eurosystem aim to ensure the stability and efficiency of payment systems and other market infrastructures (FMIs) operating in euro.[51]

IMF oversight function of the Eurosystem

Oversight aims to ensure the safety and efficiency of existing or planned systems and links between them. This objective is pursued by: (i) constant monitoring of these systems; (ii) assessing compliance with the principles and good practices applicable to them; (iii) promoting the necessary amendments for this purpose. In the European System of Central Banks (ESCB), the oversight function encompasses a number of activities aimed at promoting the safety and efficiency of the FMIs and protecting financial systems from possible chain reactions that may occur when credit and/or liquidity problems occur for one or more market infrastructure participants.[52] In the Eurosystem's practice, the oversight function is complemented by the direct operation of market infrastructures (e.g. TARGET2 and T2S), whereby the ESCB itself acts as owner and operator, as well as catalyst, i.e. to promote initiatives to increase the stability and efficiency of euro-area infrastructures.

Legal basis for the Eurosystem's competence for the oversight of payment systems

The competence of the Eurosystem in the field of payment system oversight is based on Article 127.2, fourth indent, of the TFEU and Articles 3.1 and 22 of the Statute of the ESCB. The set of rules and principles for the performance of the oversight function is differentiated according to the relevance of the systems: an ECB Regulation (SIPS regulation) applies to those that are of systemic importance. For others,[53] a soft law approach based on the Principles

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51 See Kokkola (2010).

52 For a broader definition of oversight of payments systems, see CPSS (2003).

53 Regulation of the European Central Bank (EU) 795/2014 of 3 July 2014 on oversight requirements for systemically important payment systems (ECB/2014/28).

for Financial Market Infrastructures (PFMIs), which takes the form of non-legally binding opinions and recommendations under Article 34.1 of the Statute of the ESCB, continues to apply.

The SIPS regulation and the TARGET2 oversight

The SIPS regulation lays down oversight requirements for systemically important payment systems (SIPS). SIPSs can be either large-value payment systems or retail payment systems, provided that they meet the statutory requirements for payment systems (operated by both central banks and private operators). The Regulation aims to enhance the safety and efficiency of SIPSs, to limit systemic risk and to safeguard the stability of the financial system as a whole. The Regulation covers all aspects of the organizational structure and functioning of an SIPS, including its legal basis, governance, liquidity and credit risk, operational risk, access and participation criteria, market disclosure.

The SIPS regulation implements the requirements of the PFMIs in a legally binding manner, detailing and strengthening some aspects thereof, and gives competent authorities a number of powers (information, inspections and sanctions) to ensure compliance.[54]

Following the adoption of the SIPS Regulation by the ECB, five systems were identified by the Governing Council as SIPS: TARGET2, which is operated by the Eurosystem; EURO1[55] (EU) and STEP2-T (EU), managed by EBA Clearing; MasterCard Clearing Management System (MCMS), managed by Mastercard Europe; Core (FR), managed by STET. Banque de France is the overseer for the latter, while the ECB oversees the other four, together with the national central bank of Belgium in the case of MCMS. The Governing Council of the ECB is the ultimate overseer of TARGET2 and is assisted by the Market Infrastructure and Payments Committee (see Section 3.1), in turn technically assisted by the Payment Systems Oversight Working Group. All TARGET2 oversight functions are led by the ECB, with the assistance of the Eurosystem NCBs on a voluntary basis in a joint oversight team.

4. The near future: the T2/T2S Consolidation

4.1 Technological drivers of developments and Vision 2020

With the aim of providing new services to support financial markets, citizens and businesses in Europe, the Eurosystem has developed an evolving strategy, called Vision 2020,[56] to contribute to market infrastructure innovation and the harmonization of securities and cash-related financial services. The Vision

54 The CPSS-IOSCO Principles for Financial Market Infrastructures (PFMIs) were published in 2012 by the Committee on Payment and Settlement Systems (CPSS) of the Bank of International Settlements and the Technical Committee of the International Organization of Securities Commissions.

55 See Appendix A.6.

56 For details on Vision 2020, see Mersch (2015).

2020 strategy is part of the European Commission's Capital Markets Union project aimed at achieving full integration of the European financial market.

The three initiatives developed in the context of Vision 2020 are:

- the provision of a new pan-European instant payments settlement service (TARGET Instant Payment Settlement - TIPS), which the Eurosystem launched on 30 November 2018;
- the consolidation of technology and connectivity for TARGET2 and T2S in order to integrate and modernise the settlement of large-value and securities payments and the services currently offered in a new platform; the related project is currently being tested and will be launched in November 2022;
- the establishment of a single collateral management system for Eurosystem credit operations (Eurosystem Collateral Management System – ECMS), which will start in Production in November 2023.

These initiatives pursue three objectives: (i) achieve improvements in the services offered, also in relation to market needs, and the reduction of current costs, both operational and of platforms management; (ii) promote the development and integration of the European payments market; and (iii) obtain an increase in cyber security against the rising threats due to cyber-attacks (cyber resilience). Technological modernization is a means to address the challenges that market infrastructures face in terms of service efficiency, usability, adaptability, sustainability and costs.

Specifically, centralized and common components will be created for the management of calendars and business days (BDM – Business Day Management), invoicing (BILL – Billing common component), long-term archiving of legal data (LeA – Legal Archiving common component) and aggregated data storage (DWH – Data Warehouse common component). In addition, a unique messaging standard (ISO 20022) will be adopted for all services offered; the Common Reference Data Management (CRDM), the module for the management of the Static Data, which will distribute them to all services of the platform, will be reused and updated; a single access portal to TARGET services, the Eurosystem Single Market Infrastructure Gateway (ESMIG), will be developed to allow market participants to access services via a single interface.

In contrast to TARGET2, where in order to access to it a connection tothe SWIFT network is necessary,[57] the new platform provides, in principle, access using any (network agnostic) network service provider (Network Service Provider – NSP) that is able to provide an efficient, reliable and secure service. Banca d'Italia, under a mandate from the Eurosystem, conducted a public competition for the selection of a maximum of three[58] NSPs, following which it concluded a contract with the selected NSPs granting for ten years the exclusive right to offer connectivity services to and from ESMIG.[59] The aim of this is to ensure that

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57 With the exception of the internet-based participants, which use the internet but have a more limited set of functionalities.

58 The selected NSPs are SWIFT and SIA-Colt.

59 As the ESMIG connectivity licence model follows and develops a similar model, based on licences, previously adopted for T2S, see also Mastropasqua et al. (2021), box: *Connectivity in T2S*.

ESMIG users (Directly Connected Actors – Di.Co.A.) have specific minimum service and security levels and, at the same time, low costs. The prices charged by the NSPs may not exceed the values indicated in the offer during the selection phase of the tender, or the concession would be withdrawn.

VISION 2020

With the so-called Vision 2020, which was developed in 2015, the Eurosystem pursued the objective of further integrating and harmonizing securities and cash-related financial services. To this end, it strengthened the provision of these services and introduced new ones to support financial markets in Europe, and developed technology to integrate and streamline the services offered into a new single market infrastructure, further increasing the resilience of the system.

4.2 The new platform structure. Interaction with T2S and TIPS

In November 2022, once the new consolidated platform becomes available, the current TARGET2 system will cease to exist and banks will be able to access the new large-value, instant and securities settlement services via the aforementioned Single Network Interface (ESMIG), using harmonized messaging and a fully renewed account structure (see Figure 11).

In the new platform, TARGET2-Securities and TIPS will be complemented by the two new Central Liquidity Management (CLM) and Real Time Gross Settlement (RTGS) services, which together form the new settlement system called T2, where settlement in currencies other than the euro will be possible, as strongly requested by users. The first (CLM) will host Main Cash Accounts (MCAs) accounts dedicated to the settlement of central bank operations (e.g. open market operations, overnight deposits and marginal lending, management of minimum reserves) and will enable the centralized management of liquidity, to be distributed to the accounts held in T2S participants, TIPS and RTGS.

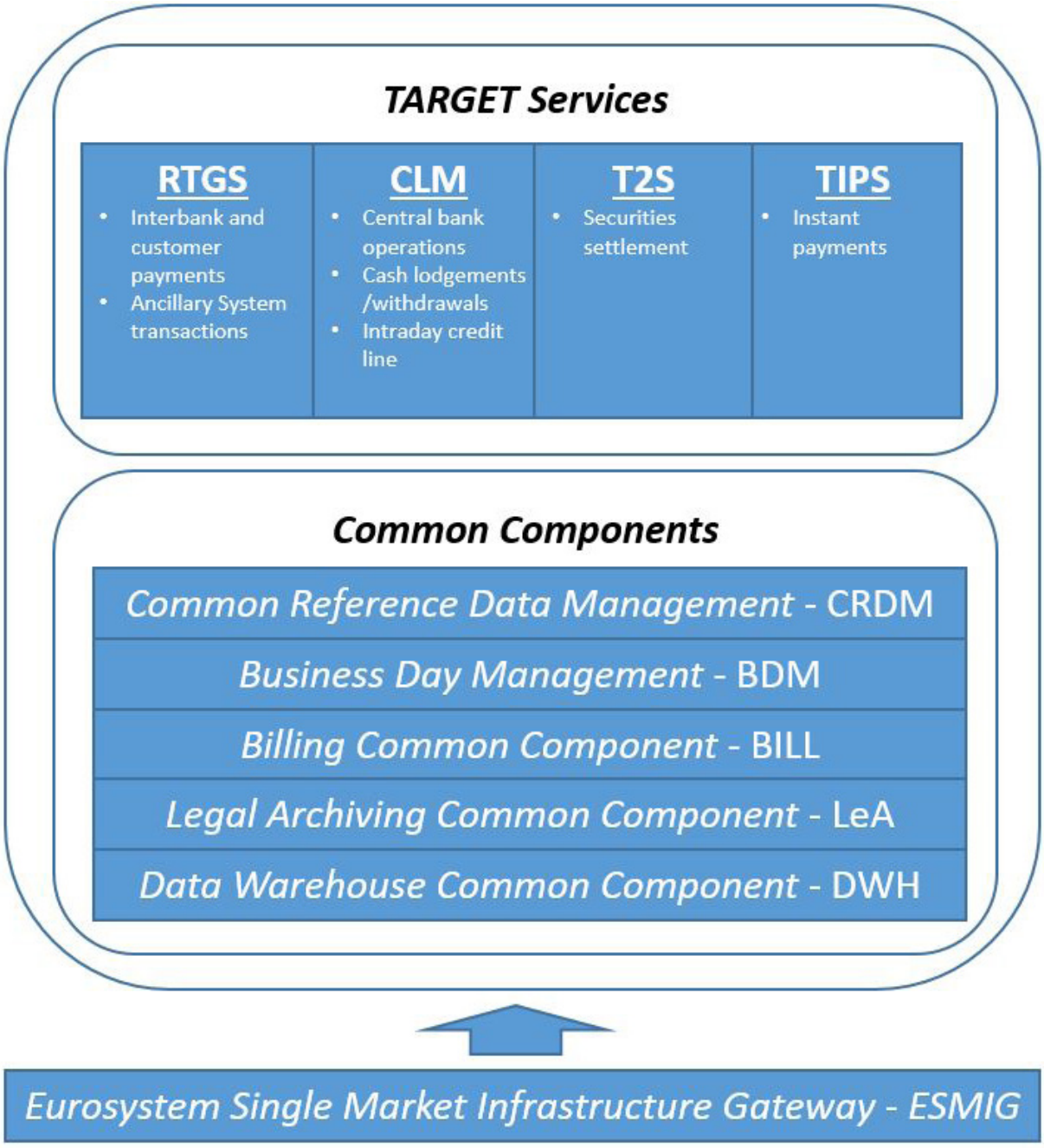
The second (RTGS) will host RTGS Dedicated Cash Accounts (RTGS DCAs), i.e. accounts dedicated to the settlement of interbank transactions, customer payments and ancillary system transactions, such as margin settlement with central counterparties, certain types of transactions with central securities depositories or multilateral balances arising from retail payment systems.

By accessing a single portal, participants will have a variety of services available to efficiently manage liquidity in their accounts for the different types of transactions. To this end, appropriate functions for monitoring and automatically redistributing funds between the different accounts will also be made available if certain thresholds set by the participants are exceeded.

In addition, as is currently the case in TARGET2, participants will be granted access to intraday credit provided by central banks against a corresponding amount of collateral. Intraday credit will only be granted within the CLM service to an MCA account, but the liquidity may be distributed to any other account in the RTGS, T2S or TIPS.

Finally, with regard to the management of minimum reserves, for each participant subject to reserve requirements, the future platform will automatically verify its fulfilment by taking into account the sum of the end-of-day balances on all accounts of a participant on T2, T2S and TIPS and, on the basis of this calculation, will pay interest on any excess funds on the MCA account. In this way, participants will not need to centralize the liquidity needed to fulfil their reserve requirements in a single account.[60]

Figure 11 - The structure of the consolidated platform



[60] For more details on the structure and functionality of the future platform, see the European Central Bank (2020b).

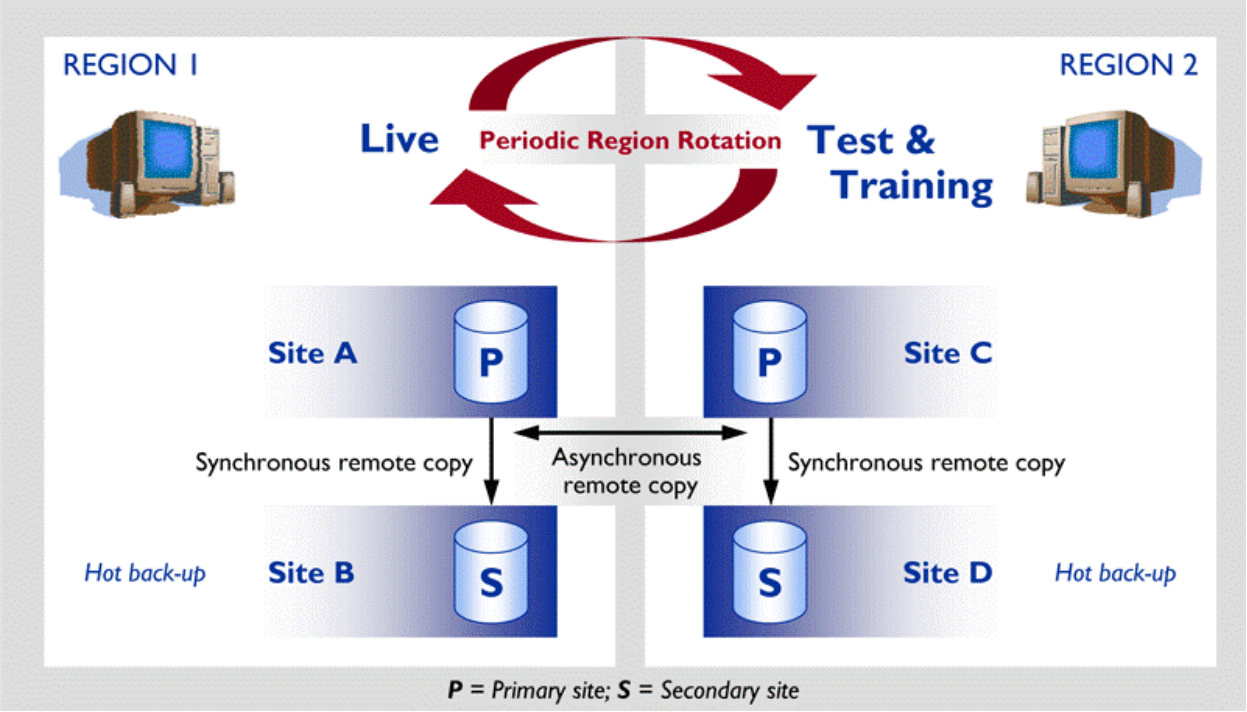
APPENDICES

A.1: BUSINESS CONTINUITY

In view of the systemic importance of TARGET2 and its central role in the Eurosystem's statutory tasks to promote the smooth operation of payment systems, to implement monetary policy and to maintain financial stability, the design of the TARGET2 Single Shared Platform provided for a centralized, highly-redundant technical architecture ensuring high levels of system availability.

The central processing system (mainframe) of the PAPSS components operates alternatively in two distinct regions (Italy and Germany); in each region, a primary and a secondary (or recovery) site is in operation according to the '2 regions for 4 sites' architectural model (see Figure A.1.1).[61]

Figure A.1.1 - Architectural model '2 regions for four sites'



Source: ECB website

The SSP offers a single interface to its users: a change of the region where the system is in operation does not affect in any way the services provided to participants; the system is transferred from one region to another (rotation) without the need for any intervention in the configurations of related parties. The standard rotation process shall take place on an annual basis.

Regions are connected by a high capacity network that ensures that data are transferred and copied from one region to another. The system software,

[61] The secondary region hosts the testing and contingency environments.

the specific application software and the data are aligned with the hardware mechanism of the 'asynchronous copy', so that at the end of the rotation procedure the system can become operational in the target region while keeping its configuration unchanged.

Within the same region, the alignment of software and data between primary and secondary sites is ensured by the 'synchronous copy' mechanism, which ensures continuous consistency and consistency of the data.

The design of the SSP's technical architecture on four sites (two for each region) aims to ensure that TARGET2 may keep operating in all circumstances, minimizing the impact of a regional disaster scenario on the availability of the system. Specifically, the TARGET2 business continuity model implements different technical assumptions depending on the severity of the scenario.

Business continuity

The duplication of critical components distributed between the two sites within the same region and the synchronized data copy mechanism make it possible to guarantee service continuity even in the event of the default of a single component (hardware and software).

Intra-regional failover

Significant disruptions to business continuity caused by exceptional circumstances or localized disasters may require the secondary site to be activated *(*failover*)* within the same region where the system is operating. The 'synchronized copy' mechanism ensures the full consistency of the primary and secondary site databases, without the need for additional reconciliation procedures. The return of full operation on the secondary site is ensured within one hour of the decision to resort to the failover.

Inter-regional failover

A large-scale disaster affecting critical infrastructure in the area that hosts both sites triggers the launch of the secondary region. As a rule, the inter-regional failover allows for an orderly closure of the site of the primary region on which the system is in operation and, as a result, the return of full operation in the secondary region with no loss of data and within two hours of the decision to resort to the failover. If both sites in the primary region become unavailable, operations will be relocated to the secondary region. The latter, because of the asynchronous copy mechanism, may not be fully aligned with the primary region. It will therefore require a reconciliation procedure for the interchange of SWIFT messages between TARGET2 and the connected actors, as well as a process of rebuilding the database, which requires active participation of users. Even in the case of an inter-regional failover with loss of data, the business continuity requirement requires the full operation on the secondary site to be restored within two hours of the decision to resort to the failover.

Contingency Network

In the event of a regional or global failure of the SWIFT network, central banks may access TARGET2 via an alternative contingency network, based on the Eurosystem infrastructure CoreNet, featuring high availability, security and confidentiality.

Access via the Contingency Network enables central banks to ensure, on behalf of participants and ancillary systems, the settlement of critical payments by monitoring payment processing and file loading for ancillary systems via the ICM interface.

The Contingency Network is activated by the Operational Team and may be restricted to the individual banking communities affected by the failure of the SWIFT network.

Organizational provisions

Business continuity is also ensured by organizational policies, such as redundancy of 3CB teams responsible for the operational and technical management of the SSP in the two regions.

The team responsible for the operational management of the platform (Operational Team) alternates with its inter-regional counterparty on an intraday basis; the technology infrastructure management (technical team) alternates following the rotation of systems. In both cases, the objective of rotation of responsibilities is to ensure that responsibilities are allocated in such a way that they can immediately become operational in the event of disaster events.

The complexity and criticality of contingency procedures, also in view of the emergency conditions under which they are activated, call for periodic meetings with the involvement of L3, L2 and system participants. In addition to the standard regional rotation, site recovery and regional recovery tests are regularly performed to verify that the business continuity requirements have been met.

The settlement of critical payments during the incident is secured by activating the contingency module called ECONS I (see Appendix A.2).

A.2: Contingency procedures and forms

Basic principles

The contingency module is one of the mandatory modules for central banks participating in TARGET2 and is available for direct participants and ancillary systems.

The contingency module is located in the region which is not active in relation to the production module, increasing the overall resilience of the system in the event of a regional disaster. Experience has shown that the module can be activated and used even when the platform is unavailable for different reasons.

The use of the contingency module is limited to the processing of critical and very critical payments.

Developments from CM to ECONS I

Since the start of production of the SSP in November 2007, the contingency module (CM) has undergone an important evolution, coinciding with the launch of release 13 of the SSP (November 2019), resulting from the work of the Task Forces called 'Cyber Resilience Framework' and 'Managing Long Lasting TARGET2 Incidents'. Both identified critical points of the module in the

light of the new oversight requirements[62] and required the changes to meet the T2/T2S Consolidation user requirements.

The CM originally had basic but still sufficient characteristics for the purpose for which it was developed. It was able to process payments only on the same accounting date (business date) on which it was activated. This feature would not have allowed the management of a long-lasting incident. Access was restricted to central banks acting on behalf of their direct participants, it was not possible to process any type of ancillary system-related transaction and had a very limited capacity to process transactions.[63]

As a result of the investigation of the two task forces and discussions between the three SSP-providing central banks and the ECB's managers, it was decided to develop features and functionalities of the module more in line with the new technologies in order to enable its better and safer use.

The CM was re-named ECONS I. To address the issues related to the accounting date, ECONS I can operate on several days (up to five consecutive days) with the possibility of changing dates within the same session.

In addition, access to direct participants was extended and business-related files for ancillary systems were allowed to be processed and settled, in both cases under the control of the respective central banks. Finally, the technical[64] and processing capabilities of the system were enhanced.[65]

Main features

At the start of a contingency session, the static data of the participants are immediately available and active, as each day the module, although not active, receives the data from the Static Data module.

At the start of each contingency session the balances of all participants shall be zero; therefore, central banks provide the liquidity to be used for the settlement of transactions in ECONS I on the basis of collateral under the Eurosystem's common legal framework.

Participants and accounts

Central banks shall have access to the system in both U2A and A2A mode, while direct participants and ancillary systems shall only have access to the system in U2A mode.

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62 See CPMI-IOSCO (2018).

63 The Service Level Agreement (SLA) limited the CM's processing capacity to 1,000 payments per hour, with a maximum of 1,500 payments.

64 In order to increase the resilience of the system as a whole, it has also been decided to diversify the technologies used; therefore, in order for the application to be installed and made operative on servers different from those used by the RTGS in Production, the use of Linux systems was envisaged for some components. The full diversification of the technologies used in the contingency module will be achieved with the launch of ECONS II (see below).

65 ECONS I is able to process an average of 40,000 transactions per day for at least five days, supporting a peak of 55,000 transactions.

Liquidity management and settlement

In order to allow central banks to maintain control over the type of payments to be settled in the contingency module, any payment entered by a participant other than the central bank shall be subject to verification and validation by the responsible central bank.

Files related to the settlement of ancillary system transactions are sent to the contingency module by the central banks, after checking their authenticity and regularity. Once formally authorized and verified, transactions are sent directly to the settlement engine as no queuing mechanism is envisaged in contingency.

The settlement of ancillary system files takes place via the so-called 'debit first' process, which follows the settlement model 4 set out in the SSP (see Appendix A.4). The system first checks that all debit transactions[66] can be settled, then starting settlement and then turning to credit transactions. If only one transaction can not be settled, the file would be rejected in full as no partial settlement is foreseen in contingency.

Date change

Within the module, there is no real management of the calendar and business day, but, as mentioned, it is possible to change business dates within the same contingency session, following an extended failure of the main system.

During any given date change, the General Ledger and the Raw Data are sent to the central banks to enable them to reconcile their activities on that day.

Closure of the contingency session

When TARGET2 is again up-and-running, the contingency session may be closed, not before the days of the contingency session have been set up as closing days in the main system and the business dates of the two modules have been aligned. Only after that the contingency session can be closed and only the final balances of the participants in ECONS I will be transferred to the RTGS settlement module.

The future – ECONS II

At the same time as the T2/T2S Consolidation project starts, the process of technological innovation initiated by ECONS I will be completed. The contingency module will be further developed and will start operating under ECONS II name.

The main changes will concern access modalities, as users can access the single ESMIG portal, which will also provide access to all other services (T2, T2S, TIPS) offered by the Eurosystem.

Continuing the work of technological diversification in order to increase the resilience, access to ECONS II will be technically provided through a different

66 Debit transactions are those with a participant as debtor and a technical account as creditor, while credit transactions are those where the debtor is a technical account and the creditor is a participant.

channel,[67] separated and segregated from the rest of the system. This will ensure, as requested by users, the separation of the contingency environment from the normal settlement environment, the compliance with the established security criteria and the minimization of the risks associated with a disruption of the hardware and software functions of the production system and/or a cyber-attack.

Of course, the interfaces with the new settlement system, which will no longer be the discontinued TARGET2 but the CLM service of the consolidated platform, will be updated.

The Graphical User Interface (GUI) will be adapted and updated to those already in place in T2S and TIPS allow a greater and easier usability of the functions.

Among the most important innovations, the following ones can be highlighted: (i) a new functionality will be made available to central banks for the consolidated monitoring of the liquidity of their participants; (ii) it will be possible to stop the operations, not allowing users to access the system and, if necessary, install or modify existing software for maintenance; (iii) the static data will be adapted to those already used in other services and additional new features will be introduced, such as the possibility for central banks to block/unblock a participant while being still allowed to authorize the settlement of transactions on its account.

Without prejudice to the processing capabilities established for ECONS I, ECONS II will further enhance the handling of payments, settling 95 per cent of transactions within five minutes and being able to process 1,000 transactions per minute, potentially maintaining this peak capacity for at least 20 minutes.

Furthermore, ECONS II will be connected with the future Eurosystem Collateral Management System, the Eurosystem's new single collateral management system, as soon as this will start operating.[68] This will allow ECMS to provide, on behalf of central banks, the initial liquidity needed to settle transactions during a contingency session.

A.3: Optimization algorithms

Five algorithms are used to ensure the settlement of payments in the event of insufficient liquidity on the relevant account. These algorithms can intervene either sequentially or in response to specific conditions. Algorithms in a sequence are executed in increasing order of complexity, looking for sets of payments locked in the queues and verifying that their simultaneous settlement generates a redistribution of liquidity in such a way that all parties involved are able to redistribute their liquidity. Once a suitable solution has been found, the algorithm proceeds to settle the transactions that have been

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67 In particular, a dedicated instance of the ESMIG portal will be used.

68 As mentioned above, the start of production of ECMS is scheduled for November 2023.

queued, also allowing the balance to turn negative for some participants for some infinitesimal time. At the end of the sequence, payment inflows for all the involved parties will be larger than outflows and balances on accounts positive or equal to zero. The algorithm list is as follows:

- 'All or nothing' optimization (Algorithm 1)
- Partial optimization (Algorithm 2)
- Multiple optimization (Algorithm 3)
- Partial optimization with the ancillary system (Algorithm 4)
- Optimization of dedicated liquidity (Algorithm 5)

The Algoritms 1, 2 and 3 are applied sequentially and cyclically to try to resolve the queues unless they are populated with transactions submitted by an ancillary system that settles with model 5 (see Appendix A.4). In the latter case, the system applies Algorithm 4 until the queuing of ancillary system transactions with a simultaneous multilateral settlement model is resolved.

The time span between an algorithm application and the next is parametric and configurable. In any case, the Service Desk may intervene manually to initiate ad hoc boxes outside the default system schedule.

Algorithm 1: 'All or nothing' optimization

The algorithm shall calculate the changes in the balance potentially resulting from the execution of the payments received in accordance with the bilateral and multilateral limits of each participant, for which the overall liquidity position is determined: if all overall liquidity positions are sufficiently funded, the whole queue is resolved and all transactions are settled.

Algorithm 2: Partial optimization

The algorithm shall apply a mechanism for the selection and suspension of individual payments to the overall liquidity positions with insufficient funds with the aim of ensuring that all positions are sufficiently funded: selected and suspended payments remain in the queue and are subject to the subsequent optimization cycle while the others are settled.

Algorithm 3: Multiple optimization

The algorithm proceeds in two steps, examining first queued payments subject to bilateral limits and then those subject to multilateral limits.

In the first step, it assesses the most effective sequencing to achieve the settlement of transactions subject to bilateral limits, which are ordered in pairs, favouring the best off-set trades. Once the sequence of pairs to be initiated for settlement has been determined, the algorithm selects and suspends individual payments that could not be settled owing to failure or breach of the limit.

In the second step, the algorithm determines the capacity of multilateral positions and selects and suspends non-settled payments in the same way.

Algorithm 4: Partial optimization with the ancillary system

The algorithm is designed to ensure the speed and efficiency of settlement within model 5 – simultaneous multilateral settlement. Having replicated the Algorithm 1 optimization method, it selects and suspends payments related to insufficient overall liquidity positions, while preserving all debit transactions for the benefit of the ancillary system for each participant. The optimization covers all payments, of any priority, and also includes payments that do not belong to an ancillary system settlement bank model 5 in order to maximize the off-set possibilities provided by the queue.

Algorithm 5: Optimization of dedicated liquidity

The algorithm applies an 'all or nothing' optimization similar to Algorithm 1 to packages of transactions on dedicated liquidity accounts for night-time settlement: at the end of each settlement cycle, all transactions debiting a sub-account whose overall liquidity position is lacking are rejected, even when the failure would be caused by only one transaction in the package.

A.4: Ancillary System Interface – Settlement procedures

Access to settlement by ancillary systems, both in real time and in batch modality, is provided via six dedicated procedures:

'Liquidity transfer' (model 1): on the initiative of the ordering settlement bank, it enables the transfer of liquidity between an RTGS account and the mirror account of an ancillary system. The use of this procedure became residual and eventually phased out following the migration of central securities depositories (CSDs) to TARGET2-Securities (T2S).

'Real-time settlement' (model 2): it executes single bilateral transactions between two RTGS accounts, or between a settlement bank's RTGS account and the technical account of an ancillary system.

'Bilateral settlement' (Model 3): it allows the sending of a pool of bilateral transactions independent from each other in a single batch file.

'Standard multilateral settlement' (Model 4): it allows the settlement of a package of interdependent transactions (typically multilateral balances) in a single batch file. The procedure involves, first, the settlement of all amounts due against a technical account of the ancillary system; credit amounts are initiated for settlement only after all debits have been settled.

'Synchronized multilateral settlement' (Model 5): it allows the settlement of a pool of interdependent transactions in a single batch file. Transactions are settled at the same time, according to the 'all or nothing' principle.

'Dedicated liquidity regulation' (Model 6): it allows the settlement of a pool of interdependent transactions in a single batch file, against the funding of the necessary liquidity on specific sub-accounts of settlement banks (the 'interfaced' model). The procedure may also be used to transfer liquidity between a settlement bank's RTGS account and the ancillary system's real-time settlement technical account (the 'real-time' model, which was introduced in November 2017 to support market solutions dedicated to the settlement of instant payments).

A.5: RTGS systems in the world[69]

The use of RTGS systems for the settlement of interbank transactions in central bank money has become common across the world over the past two decades. In 1990, less than ten central banks had adopted an RTGS system, while currently more than 175 use it.

The volume and value of transactions settled in the different RTGS systems differ significantly. In fact, although the adoption of RTGS systems stems from the need to settle a limited number of large-value transactions in real time, technological developments, combined with the emergence of instant payments over the past ten years, have led to an increase in the volume of transactions settled and a reduction in their value in some systems (see Table A.5.1).

Table A.5.1 - Main central bank-operated RTGS systems

Country	Name of the RTGS system	Annual value of transactions (USD billions)	Number of transactions (millions)
Argentina	MEP	4.190	3
Euro area	TARGET2	509.382	89
Australia	RITS	36.629	13
Brazil	STR	100.041	214
China	HVPS	716.314	1.094
South Korea	BoK-Wire+	78.344	5
Japan	BOJ-NET	366.611	18
India	RTGS	19.718	148
Indonesia	BI RTGS	9.033	11
Mexico	EXPENDITURE	13.586	838
United Kingdom	CHAPS	106.358	49
Russia	Bank of Russia Payment System	24.204	1.709
Singapore	MEPS+	17.558	6
United States	Fedwire Funds Service	695.835	168
South Africa	SAMOS	9.449	9
Sweden	RIX	14.869	6
Turkey	EFT	12.934	3

[69] The data presented in this Appendix are published on the Bank for International Settlements (BIS) website at *https://stats.bis.org/statx/toc/CPMI.html*.

The number and type of participants, which, as in the case of TARGET2, can be divided into direct and indirect, are also not uniform across RTGS systems (see Table A.5.2).[70]

Table A.5.2 - Participation in major RTGS systems operated by central banks (data as at 31 December 2019)

Country	Name of the RTGS system	Total number of participants	Number of direct participants		
				of which: Banks	*of which: Other (central banks, government agencies, ancillary systems)*
Argentina	MEP	94	94	65	29
Euro area	TARGET2	2.136	1.570	1.463	107
Australia	RITS	102	58	50	8
Brazil	STR	233	233	131	102
China	HVPS	148.433	326	286	40
South Korea	BoK-Wire+	125	125	54	71
Japan	BOJ-NET	522	522	441	81
India	RTGS	236	236	220	16
Indonesia	BI RTGS	139	139	130	9
Mexico	EXPENDITURE	90	90	52	38
United Kingdom	CHAPS	34	34	31	3
Russia	Bank of Russia Payment System	1.779	1.779	1.403	376
Singapore	MEPS+	136	61	57	4
United States	Fedwire Funds Service	5.825	N/A	N/A	N/A
South Africa	SAMOS	34	34	31	3
Sweden	RIX	37	37	28	9
Turkey	EFT	52	52	50	2

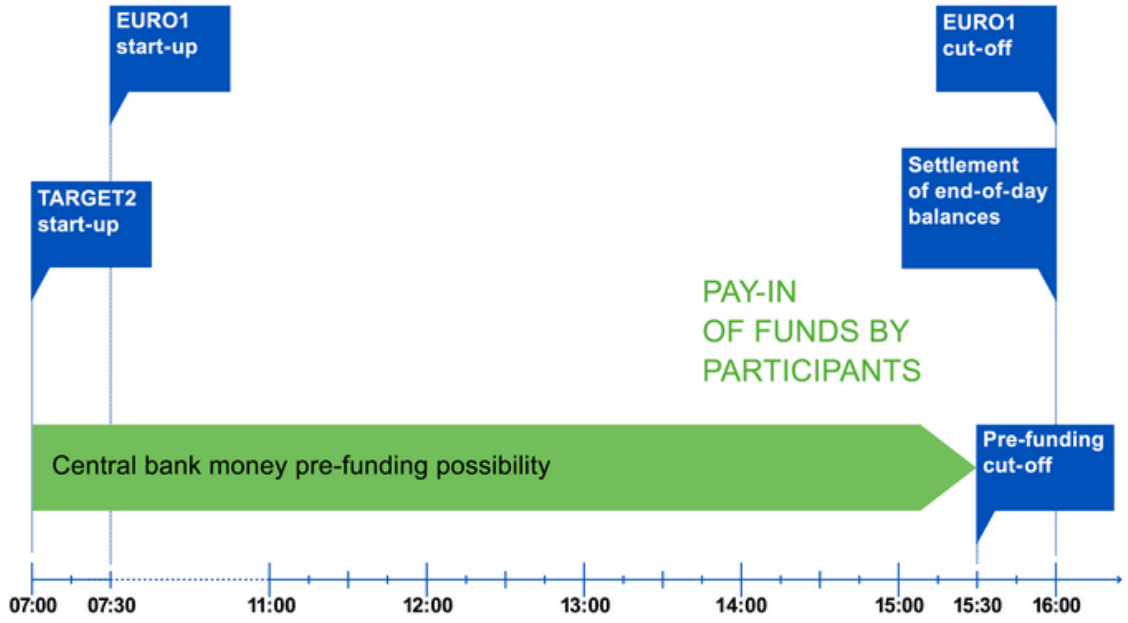
[70] Direct participants shall have an account in the system on which they settle their own payments and those of their customers. Indirect participation takes various forms, but generally implies that an entity does not have its own account in the system and settles transactions through a direct participant.

A.6: EURO1

TARGET2 is not the only large-value payment system in Europe. EURO1, a private system operated by EBA Clearing,[71] in which a small number of large European banks participate, also plays an important role.

In addition to the ownership structure, composed of private entities and not central banks, and the number of participants, the main difference between TARGET2 and EURO1 is in the settlement model used, which in the case of EURO1 involves clearing (or net settlement). This implies that payments submitted and received by participants in the system during the business day[72] are not settled immediately, but are accumulated by contributing to the build-up of multilateral net balances. These are then settled in TARGET2 at the end of the business day[73] (see Chart A.6.1).

Figure A.6.1 - The EURO1 business day



Source: EBA Clearing (only funding side).

To mitigate the risks inherent in a net clearing system (see Chapter 1 – Box: *Gross and net settlement*), in EURO1 only payments up to a predefined amount can be submitted separately for each participant (Debit Cap).[74] However, reaching

[71] EBA Clearing is a private company, founded in 1998, and its share capital is held by a number of large European banks. Among the payment systems operated by EBA Clearing, in addition to EURO1 in the field of large-value payments, it is worth mentioning STEP2, a pan-European retail payment settlement system, and RT1 for the settlement of instant payments. All these systems operate as ancillary systems in TARGET2.

[72] The EURO1 business day ranges from 7:30 a.m. to 4 p.m. CET.

[73] Specifically, banks with a debit balance have to transfer funds to an EBA Clearing technical account at the ECB. When all debit balances have been settled, funds are transferred from the EBA's technical account to participants with a credit balance.

[74] Importantly, bilateral caps do not restrict bilateral flows. Each participant may send payments up to its total debit cap, regardless of the bilateral caps.

the Debit Cap does not imply that the participant must stop its business until the end of the business day. EURO1 offers participants the opportunity to pre-build a reserve of funds in central bank money (on a dedicated account opened by EBA Clearing in TARGET2), which can be fed up to 15.30 p.m. A participant that reaches the debit cap may then continue to send payments automatically using this pre-funding account. A participant's debit cap is the sum of the bilateral caps allocated to that participant by all other participants.

In addition, EURO1 members have signed a loss sharing agreement in the event of a participant defaulting. To this end, they have set up a reserve of liquidity at the ECB,[75] to which all participants are required to contribute in equal shares.

[75] The liquidity reservation is also set up on an account in TARGET2.

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Glossary

A2A (Application-to-Application)	Interaction mode between IT applications (typically between computers that cooperate with each other through a data communications network).
Billing	A common component developed by the Eurosystem in order to maximize synergies between TARGET2 and TARGET2-Securities and to support the consolidation of the technical, application and infrastructure components of TARGET services. The objective of the BILL component is to centralize the invoicing process for all TARGET services.
CET (Central European Time)	Time-zone in central Europe.
CLM (Central Liquidity Management)	Component of the new consolidated platform (T2-T2S Consolidation) responsible for the settlement of central bank operations and the centralized management of liquidity.
CLS (Continuous Linked Settlement)	A settlement system for multi-currency payments, which was established in 2002. The settlement of transactions takes place through the mobilization of CLS accounts with the central banks of issue of the eligible currencies.
CoreNet	Internal Eurosystem network service used by the Eurosystem central banks as a contingency network to access the SSP if SWIFT is not available.
CRDM (Common Reference Data Management)	A common component developed by the Eurosystem in order to maximize synergies between TARGET2 and TARGET2-Securities and to support the consolidation of the technical, application and infrastructure components of TARGET services. The aim of the CRDM component is to centralize the reference data used by all TARGET services.
ECMS (Eurosystem Collateral Management System)	A technical platform shared among national central banks for the harmonized collateral management of Eurosystem credit operations (monetary policy and intraday credit).
ECONS (Enhanced Contingency Solution)	Functionality of the SSP which can be activated in the event of the technical failure of the Payment Module to ensure the settlement of very critical payments (payments stemming from CLS and EURO1 systems and margins of transactions with central counterparties) and critical payments (payments whose settlement delay may entail systemic risk).
ESCB (European System of Central Banks)	A system composed of the European Central Bank and the national central banks of all 27 Member States of the European Union. It was established by the Maastricht Treaty in 1992, which set out its objectives: (i) maintaining price stability as the primary objective and priority (ii) supporting EU economic policies with a view to achieving and maintaining a high level of employment in its member states, without prejudice to the former.
ESMIG (Eurosystem Single Market Infrastructure Gateway)	A common component developed by the Eurosystem in order to maximize synergies between TARGET2 and TARGET2-Securities and to support the consolidation of the technical, application and infrastructure components of TARGET services. The objective of the ESMIG component is to provide European banks with a single point of access to all Eurosystem infrastructure services.

Eurosystem	A central banking system of the euro area responsible for the implementation of the single monetary policy. It comprises the European Central Bank and the national central banks (NCBs) of those EU countries that have adopted the euro.
EMI (European Monetary Institute)	A body set up on 1 January 1994 with the start of the second stage of Economic and Monetary Union (EMU). Its main tasks were (i) to strengthen central bank cooperation and (ii) to make the necessary preparations for the establishment of the ESCB. It was not responsible for the conduct of the European Union's monetary policy.
ISO 20022 (standard)	International standard based on XML messages (eXtensible Markup Language) for the electronic exchange of financial data.
LEA (Legal Archiving)	A common component developed by the Eurosystem in order to maximize synergies between TARGET2 and TARGET2-Securities and to support the consolidation of the technical, application and infrastructure components of TARGET services. The aim of the LEA component is to centralize the storage of information for legal purposes for all TARGET services.
MCA (Main Cash Account)	Account opened in the consolidated platform CLM module (T2-T2S Consolidation), dedicated to central liquidity management and central bank operations.
MIB (Market Infrastructure Board)	The Market Infrastructure Board is the governance body that supports the Governing Council of the European Central Bank by ensuring the establishment, operation and development of the Eurosystem's market infrastructures, in line with the objectives assigned by the Treaty to the European System of Central Banks (ESCB), business requirements, technological advances, the legal framework for Eurosystem services and projects, and legal and oversight requirements, in full respect of the mandates of the ESCB committees. The MIB reports directly to the decision-making bodies of the ECB.
RTGS	Component of the new consolidated platform (T2-T2S Consolidation) for the settlement of interbank transactions, customer payments and ancillary system operations.
RTGS (Real-Time Gross Settlement)	Real-time gross settlement system. Payment orders from banks are settled individually by the system and in real time, provided that there is sufficient funds or credit availability on the payer's account.
T2	In the consolidated platform (T2-T2S Consolidation), T2 is to be intended as the set of CLM and RTGS components, which will replace TARGET2.
TARGET (services)	Payment services for the market, developed and operated by the Eurosystem, which ensure the free exchange of money, securities and collateral across Europe. These include TARGET2 (for the settlement of large-value interbank payments and monetary policy operations), T2S (for securities settlement) and TIPS (for the settlement of instant payments). All services settle in central bank money.

TARGET (Trans-European Automated Real time Gross settlement Express Transfer system)	The real-time gross settlement system set up by the EU central banks for Stage Three of EMU (1999) for the processing of large-value payments in euro. The system, consisting of the national settlement systems and the infrastructures needed to connect them, was discontinued on 19 May 2008, when migration to the new TARGET2 system was completed.
TARGET2 Guideline	ECB Guideline governing the European TARGET2 system.
TARGET2-Securities (T2S)	A common technical platform owned by the Eurosystem for the simultaneous settlement of domestic and cross-border securities transactions, both the securities leg and the value in central bank money. The development was entrusted to the central banks of France, Germany, Italy and Spain (4CB). Banca d'Italia and Deutsche Bundesbank are also responsible for the operational operation of the platform after its launch.
TARGET2-Securities (T2S) DCA	A bank's cash account in T2S, which is used for the settlement of the cash leg of securities transactions. T2S DCAs are governed by the TARGET2 Guideline.
TIPS (TARGET Instant Payment Settlement)	A pan-European platform for the real-time settlement of instant payments (credit transfers settled within a few seconds of the initiation of the transaction).
TIPS DCA (Dedicated Cash Account)	An account held by a bank in its capacity as TIPS Participant, which is open and used for the settlement of instant payments in TIPS. TIPS DCAs are governed by the TARGET2 Guideline.
U2A (User-to-Application)	Interaction mode between a person and an IT application.