

## Supplementing settlement functions with a decision-support system in TARGET2

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*The TARGET2 system went live on 19 November 2007. The following article, which can be read in conjunction with «TARGET2 and European Financial Integration», gives an overview of the decision-support system built into TARGET2. The system provides participating central banks with state-of-the-art shared services and tools that will make them more effective in their dual role as system overseer and operational point of contact for «their» TARGET2 participants. This will promote further harmonisation in the practices of ESCB central banks and so help to foster European financial integration. The Banque de France was entrusted with the design, development and operational management of the system.*

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JEL codes: G14, G15

**T**ARGET2 is based on a Single Shared Platform (SSP) built and operated by a group of three central banks (the «3CB») –the Banque de France, the Deutsche Bundesbank and the Banca d'Italia– on behalf of all the central banks (CBs) in the European System of Central Banks (ESCB). The technical architecture of the SSP is based on three «regions».

The first two regions, which are managed by the Banca d'Italia and the Deutsche Bundesbank respectively, are jointly in charge of the Payment and Accounting Processing Services System (PAPSS), which comprises the real-time settlement functions proper.

The third region, which is managed by the Banque de France, is in charge of the Customer-Related Services System (CRSS), an information and decision-support system for participating central banks.

This article recalls the reasons that prompted ESCB central banks to create a shared decision-support system within TARGET2 (section 1). It then describes the system's main services (section 2) and technical specifications (section 3).

## I | TARGET2 decision-support system: a shared service delivered on a separate platform

As well as real-time settlement functions proper, all modern RTGS systems must also have what is usually called a decision-support system, i.e. a set of business intelligence tools to analyse participant activity and flows and to conduct statistical work and research.

When TARGET2 was being designed, the central banks of the ESCB compared their resources and experiences in this area and talked about their expectations and vision for TARGET2. Two issues emerged in these discussions:

- Issue 1: was it better to develop a shared decision-support system, or should each CB develop (or adapt) its own local system?

A consensus gradually formed around the idea of a shared system. Aside from making economic sense, this type of approach would also help to harmonise the decision-support tools used by ESCB central banks, since the new shared system would replace functionalities that were often developed over time or on an ad hoc basis by most CBs.

- Issue 2: should the shared system be run on the same platform as the PAPSS or on its own platform?

It was decided to create a separate platform with its own functional and technical architecture. A decision-support service typically has to process huge amounts of data according to a virtually limitless range of criteria – needs that are not necessarily compatible with the performance levels required of the PAPSS. And indeed, the new system was expected to address a wide and ambitious range of requirements under TARGET2, including the following:

- CBs need historical baseline data if they are to monitor participant behaviour. For example, by comparing a participant's activities on a given day against its baseline profile, the CB can more effectively detect unusual events that require further analysis and monitoring;
- it is important to keep historical data for banking as well as legal reasons. Being able to access data for previous days, weeks and months is often vital if a CB wants to analyse a participant's transactions or answer questions. In this respect, the CRSS acts as TARGET2's memory;
- statistics and reports must be compiled to establish an aggregate view of system activity and conduct research over short- and long-run periods. For example, the Eurosystem wants more precise information about intraday credit used by TARGET2 participants;
- CB payment systems oversight departments also wanted access to production data to provide them with detailed information about system activity and performance and risk indicators (liquidity and operational risk).

## 2| Services provided by the decision-support system, or Customer-Related Services System (CRSS)

### 2|1 Services that provide CBs with a long-run vision of system activity, helping them to play their dual role as system overseer and operational point of contact for «their» participants

With data fed into it daily at the end of the day by the PAPSS, the CRSS provides CBs with online access to all payments made over the last three years and to aggregate data going back five years. In addition, CBs can use query tools to access preformatted, automatically-refreshed reports as well as customised reports based on on-screen parameters set by users. They can also submit ad hoc queries.

For obvious reasons of confidentiality, a CB can only access detailed data on «its» participants. However, all CBs can access certain more general reports that can

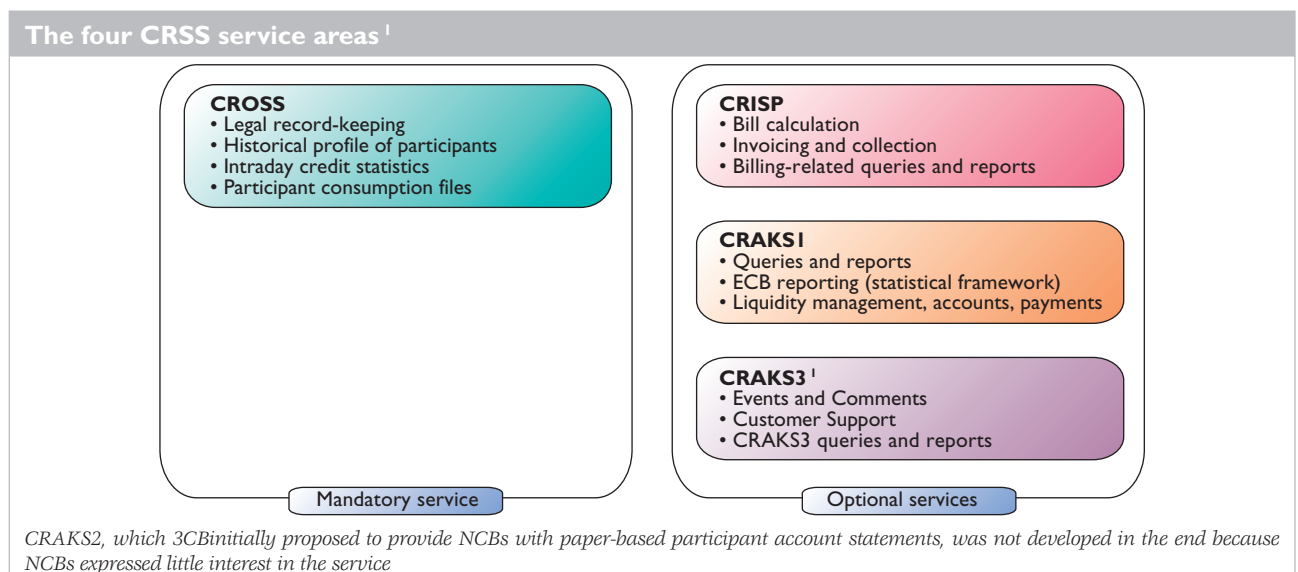
be used to compare the activity of different national banking communities.

In response to the Eurosystem's wish for more extensive analyses of intraday liquidity, the CRSS compiles a number of aggregates every day that offer a detailed vision of intraday credit use in TARGET2.

There are about 70 different CRAKS1 reports covering a wide range of areas, including

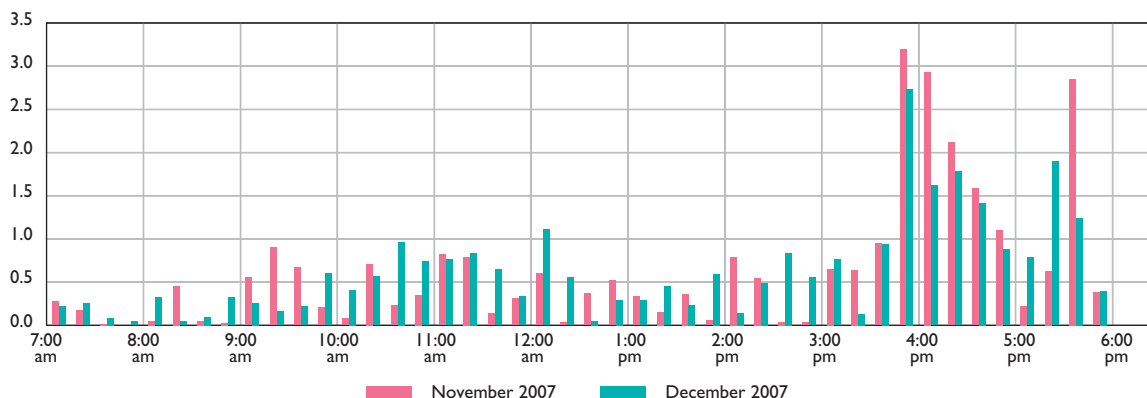
- ongoing activity across the whole TARGET2 platform,
- ongoing activity by a participant or group of participants over a given period,
- ongoing activity by participants in different countries,
- detailed information on the activity of a particular account,
- analysis of ancillary-system settlements.

For example, the following chart shows the historical profile (in value terms) of a participant's activity. The CB that holds this participant's account can use the information to compare the participant's activity that day and the liquidity available under the baseline profile.



### Overview of the activity of a participant over 2 months

(EUR billions average value of payments)



The CRAKS3 Events and Comments function allows CBs to record technical, operational and banking events relating to the activity of an account. This function can be used, for example, to closely monitor developments relating to an event that impacted a participant's liquidity.

More generally, these services and tools enable CBs to be effective in their dual role as operational point of contact for «their» participants and system overseer, by allowing them to:

- access all the information concerning a participant and related events within a single system. Centralised information aids decision-making, especially when unforeseen events arise;
- gain a better understanding of how banks are managing liquidity and using intraday credit and collateral. This enables CBs to assess problems affecting one or more participants more accurately and also enhances CB/participant information exchanges;
- analyse more accurately the liquidity requirements of banks arising from settlement obligations in respect of ancillary systems. CBs can use historical data to measure the liquidity requirements arising from settlement of a given ancillary system CLS, say – and compare these against the liquidity available to the banks in question (balance and intraday liquidity);

- monitor the current activities of a participant by comparing them against its baseline profile, i.e. its past behaviour. They can use this information to swiftly detect any significant deviations and so spot liquidity shortages or technical problems affecting an individual participant, one of the banking communities, or the whole system.

## 2 | 2 Other CRSS services

The CRSS also offers the following additional services:

- legal record-keeping: all transaction-related data and PAPSS reference data are stored on a non-rewritable recording medium. These data are kept for ten years for legal reasons.
- billing: each month, CBs are sent files that detail the previous month's consumption, covering statistics like the number of payments per participant and the number of accounts. These files are used as the basis for billing credit institutions and ancillary systems.
- customer support: the customer support function is used to monitor a participant's file from an administrative and legal standpoint. In particular, this service can be used to monitor banking group links and contractual relations.

### 3| Architecture set up by the Banque de France to manage the decision-support system

In an operational management system, transactions are pre-formatted and processing requirements are largely known and planned in advance. By contrast, a decision-support system needs to be more open so that users can construct and launch their own queries, which may cover very large data sets and be executed in bursts by many users.

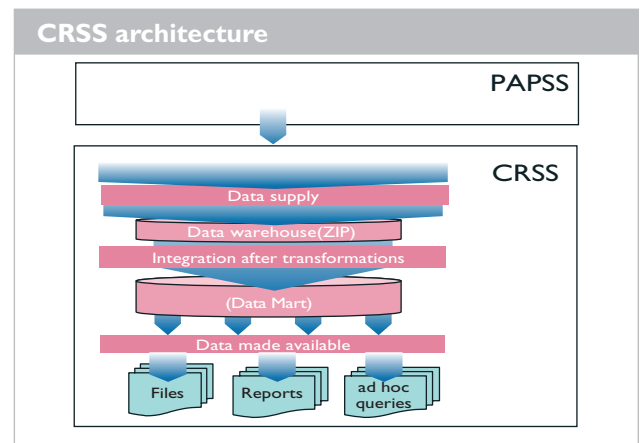
To meet the needs of its different areas of activity (payment systems, cash cycle, research, HR, etc), in the early 2000s the Banque de France established a special methodology and a separate architecture for its decision-support systems. This knowledge was put to use in the design of the CRSS for TARGET2.

The project team was set up in early 2004. It began by determining the user requirements, working closely with the CBs, which were naturally involved in all the later stages of the project, including design, technical specifications, development, testing and acceptance.

As the following diagram shows, the CRSS receives data every day from the PAPSS. More specifically, the

PAPSS supplies data to a data warehouse (also known as a shared information zone, or ZIP), where the data are checked for consistency and integrity, and the first data transformations are performed. The data are then transferred to a data mart so that they can be provided to users in the most appropriate format. The final stage is to create «universes» designed to provide users with a functional view of their data.

Six functional universes – Participants, Accounts, Payments, Payment Statistics, Reserve Management / Standing Facilities Modules and CRAKS3 Service have been created to organise the data as effectively as possible in order to process ad hoc user queries. Over 100 pre-formatted reports are available to CBs.



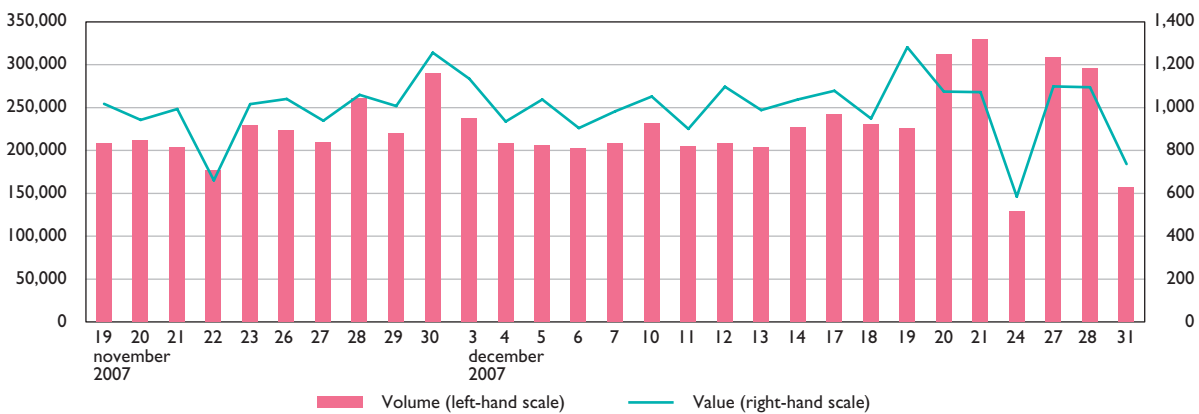
*The decision-support system built into TARGET2 provides ESCB central banks with a set of value-added services that meet their needs, both in terms of managing operational relations with «their» TARGET2 participants and in terms of their research work. As such, it makes a significant contribution to the harmonisation of tools and practices within the ESCB.*

### TARGET2 activity since the system went live on 19 November 2007

The following two reports were obtained from the CRSS and describe, respectively, daily volumes and value of payments, and average volumes per time band for November and December 2007 in the banking communities that took part in the first migration wave. In the first six weeks of operation, an average of 227,541 payments –worth EUR 999 billion– was settled daily in the SSP.

#### SSP daily figures, volume and value of payments

(volume in number of operations, value: EUR billions)



#### SPP daily figures, volume of payments

(volume of payments)

