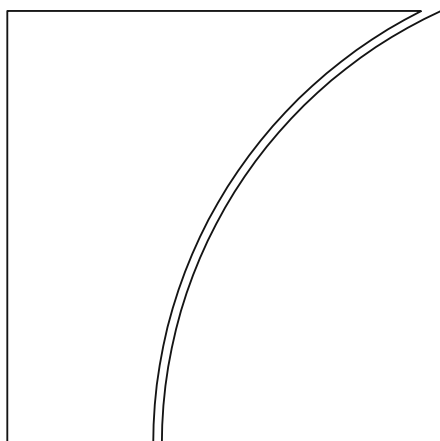


# Committee on Payments and Market Infrastructures



## Developments in retail fast payments and implications for RTGS systems

December 2021



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## Executive summary

The need for fast and safe digital payments in our daily lives is ubiquitous. Retail fast payment systems (FPS) allow processing of small-value (retail) account-based transactions such that funds are immediately available to the payee. Further, these FPS are available on a (near) 24/7 basis. FPS can have a significant impact on domestic payment landscape, but can also be relevant for cross-border payments. In October 2020, the G20 endorsed a roadmap to enhance cross-border payments, developed by the Financial Stability Board (FSB) in coordination with the Committee on Payments and Market Infrastructures (CPMI) and other relevant international organisations and standard-setting bodies. The G20 cross-border payments programme aims to address long-standing challenges in the cross-border payments market, including high costs, low speed, limited access and insufficient transparency (CPMI (2020), FSB (2020)). FPS can be part of broader solutions in that they provide (near) 24/7 funds transfers in the “last mile” (or the “first mile”) of these payments.

More recently, the Covid-19 pandemic has accelerated the digitalisation of payments and reinforced the potential of fast payment services. In some jurisdictions, governments have used FPS to disburse timely Covid-19-related benefit payments to households and businesses in need (Kosse and Szemere (2021)).

This report, produced by the CPMI, takes stock of recent developments in retail FPS, examines central banks' roles in these systems and discusses the implications for real-time gross settlement (RTGS) systems which provide a critical foundation for the wholesale settlement associated with FPS.

Global adoption of retail FPS is rising at a rapid pace with some convergence in features and design. The report finds that a growing number of FPS have adopted – or are moving towards adoption of – the ISO 20022 messaging format. FPS are also increasingly settling obligations among banks and, where relevant, non-bank FPS participants on a payment-by-payment basis in real time, rather than deferring such settlements. In terms of the role of the central bank in an FPS, while differences in approaches remain, central banks tend to play important roles to facilitate the operations of FPS; in a number of cases, they also operate the FPS system.

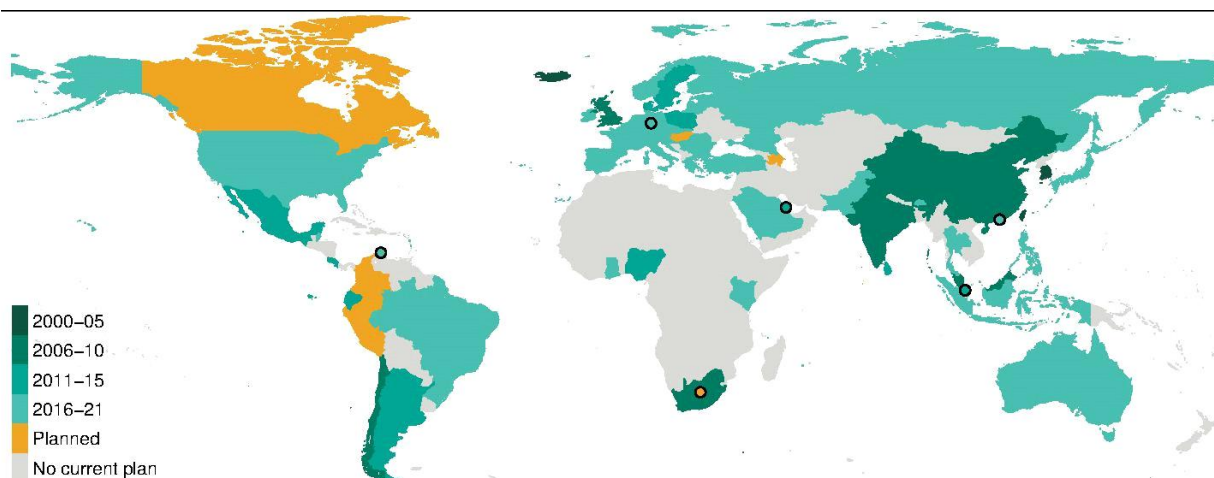
Designing, implementing and operating an FPS is complex. Challenges include ensuring high ((near) 24/7) system availability and reliability requirements. FPS can also have significant implications for the operations and services of RTGS systems in the jurisdiction. This can include potential modifications to access criteria and extension of operating hours at the RTGS system. The insights from this study can be relevant for jurisdictions considering implementing a new FPS, or modifying an existing arrangement.

## 1. Introduction

A payment is “fast (instant)” when the transmission of the message and the availability of funds to the payee occur in real time or near real time on as near to a 24-hour and seven-day (24/7) basis as possible (CPMI (2016)). Since the first fast payment system (FPS) in Korea in 2001, such systems have proliferated around the globe (Graph 1), with currently over 60 jurisdictions that have launched fast payment services. More recently, the Covid-19 pandemic has increased end users’ demands for digital payments and thus further increased the potential of fast payment services as an alternative to cash. A number of countries are planning to implement such systems in coming years.<sup>1</sup>

Fast payment systems around the world

Graph 1



The use of this map does not constitute, and should not be construed as constituting, an expression of a position by the BIS regarding the legal status of, or sovereignty of any territory or its authorities, to the delimitation of international frontiers and boundaries and/or to the name and designation of any territory, city or area.

The circle in Europe represents the FPS in the euro area. The FPS in Aruba, Bahrain, Hong Kong SAR, Singapore and SADC region are also represented by circles.

Sources: CPMI FPS survey; national data.

Against this backdrop, this report examines recent developments in FPS, the role of the central bank in these systems and implications for real-time gross settlement (RTGS) systems.<sup>2</sup> The analysis is based on a survey of CPMI member jurisdictions conducted in 2019–20<sup>3</sup> and covers 31 FPS.<sup>4</sup> The work was conducted by a group of experts from CPMI jurisdictions (Annex 2). Where applicable, previous CPMI work and surveys were leveraged.<sup>5</sup>

The findings from the survey results are as follows: (i) global implementation of fast payments is continuing at a rapid pace; (ii) the use of a given FPS (ie adoption rate) is generally low in the early stages

<sup>1</sup> Four CPMI jurisdictions are planning to implement an FPS in the coming years. See Table 1 and Annex Table A1 for more details.

<sup>2</sup> Typically, RTGS systems process large-value payments, while FPS process low-value payments.

<sup>3</sup> The survey was conducted over H2 2019 and Q1 2020, ie before the outbreak of Covid-19.

<sup>4</sup> The CPMI member jurisdictions are Argentina, Australia, Belgium, Brazil, Canada, China, the euro area, France, Germany, Italy, Hong Kong SAR, India, Indonesia, Japan, Korea, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. More information on the CPMI is available [here](#).

<sup>5</sup> Notably, CPSS (2012) and CPMI (2016).

of its implementation, although some recent FPS have been more rapid; (iii) there is little evidence hitherto that FPS are “cannibalising” RTGS system volumes and values;<sup>6</sup> (iv) FPS are increasingly settling obligations among banks and, where relevant, other FPS participants (eg non-bank payment service providers) on a payment-by-payment basis in real time; (v) most jurisdictions have either adopted or are moving towards ISO 20022 as the messaging format for their FPS; and (vi) while differences in approaches remain, central banks tend to play important roles to facilitate the operations of FPS – in a number of cases, they also operate the FPS.

Based on the survey results, some inferences can be drawn with regard to the impact on central banks and potential lessons for FPS owners/operators. First, FPS can trigger significant changes in RTGS systems. For instance, RTGS systems may need to extend operating hours to help the management of liquidity and settlement risk, and/or to reconsider their participation policies. This is particularly relevant for those cases where interbank settlement occurs in real time (as opposed to deferred settlement). Second, in markets where there is only a single private-sector FPS, regulators and overseers will need to pay close attention to risk, access and competition issues. Concerns of this type have underpinned recent decisions by the central banks in the euro area, Sweden and the United States to have an active role in the operation of their FPS. Third, increased use of ISO 20022 by FPS will provide users with more flexibility in choosing payment channels (for instance, between correspondent banking, RTGS systems and FPS) and greater use of straight through processing for payments. Finally, FPS adoption rates can depend on a range of factors, including cost, types of payments in scope (eg person-to-business, business-to-business or all-to-all), marketing to users (including user interfaces), limits on the value of individual transactions, and inertia due to legacy systems and network externalities.

The remainder of this report is organised as follows. The next two sections outline the main findings from the survey. Section 4 highlights some challenges in setting up and operating FPS. Section 5 discusses the impact of FPS on RTGS systems and other parts of the payments ecosystem. Section 6 highlights some inferences based on the survey results. The last section concludes.

<sup>6</sup> The impact of FPS on other types of retail payments and cash was not covered explicitly in the survey.

## 2. Survey findings

### 2.1 Use of fast payment systems

The survey covers 31 FPS in CPMI jurisdictions. Among these, 27 FPS are operational as of December 2021, with another four planned for launch in the coming years (Table 1).<sup>7</sup> The introduction of these systems was motivated, in part, to respond to customers' desire for speed, convenience and the advancement of technology.<sup>8</sup>

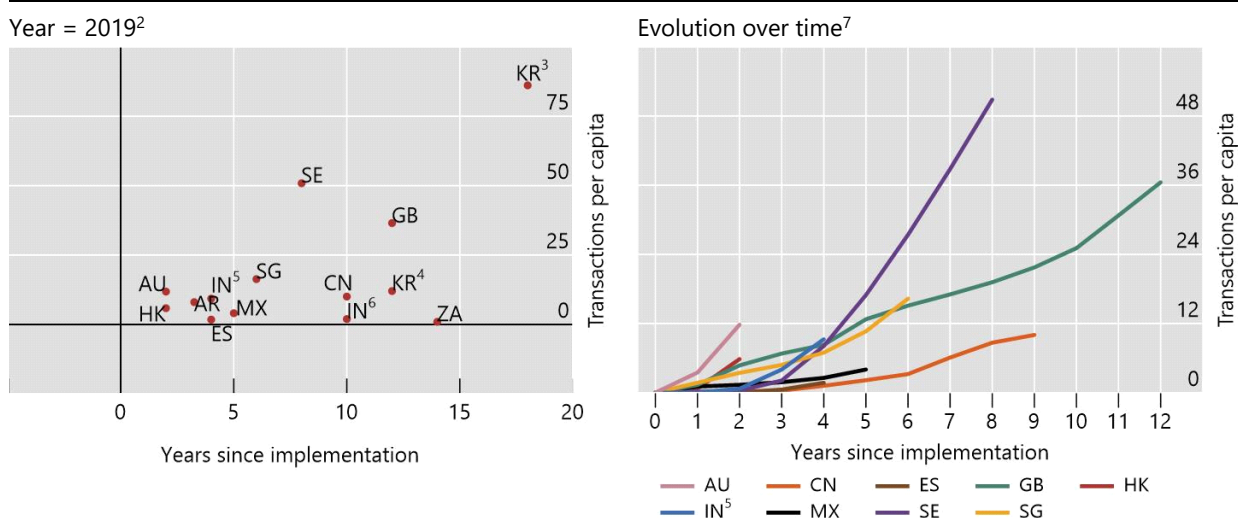
The use of FPS (defined as volume of transactions processed per capita) varies significantly across jurisdictions (Graph 2). While the use of FPS is rising in many countries, it tends to be low in the early period of implementation. Some recent systems, however, have defied this trend. In Sweden, the adoption of Swish (the FPS app) for person-to-person payments has been very strong. In Australia and Hong Kong SAR, growth in transaction volumes has also been very rapid, reaching an annualised rate of around 18 and 21 payments per capita, respectively, at the end of the second year of operation.<sup>9</sup>

In general, total values settled by FPS are still relatively low compared with values going through other retail systems, such as credit and debit card systems. This also implies that, so far, FPS transaction values in most countries are not approaching levels where the FPS would necessarily be considered as systemically important systems.

#### Use of fast payment systems

Volumes, selected CPMI jurisdictions<sup>1</sup>

Graph 2



<sup>1</sup> Jurisdictions were selected based on data availability. <sup>2</sup> Except for AR and KR, where 2018 data are shown. <sup>3</sup> Electronic Banking System (EBS). <sup>4</sup> CD/ATM system. <sup>5</sup> Unified Payments Interface (UPI). <sup>6</sup> Immediate Payment Service (IMPS). <sup>7</sup> Data are until 2019.

Sources: CPMI FPS survey; IMF; national data.

<sup>7</sup> Based on survey responses.

<sup>8</sup> See Bech et al (2017) and CPMI (2016).




























<sup>9</sup> In addition to Australia, Hong Kong SAR and Sweden, early data for the Brazilian FPS (Pix/SPI) (which went live on 3 November 2020) also show signs of rapid adoption. Due to the lack of sufficient data, Pix/SPI (BR) is not included in Graph 2.








## Fast payment systems in CPMI jurisdictions

Selected characteristics

Table 1

| Jurisdiction (abbrv)         | System name          | Operator                     | Year of introduction | Settlement model   | Scope: payment types        | Transaction limit |
|------------------------------|----------------------|------------------------------|----------------------|--|-----------------------------|-------------------|
| <b>Argentina (AR)</b>        | IT                   | RedLink SA & Prisma SA       | 2011                 |   | P2P, P2B, B2B, P2G          | ✓                 |
| <b>Australia (AU)</b>        | NPP                  | NPPA                         | 2018                 |   | P2P, P2B, B2B, P2G, G2P     | X                 |
| <b>Belgium (EA (BE))</b>     | CEC.IP               | CEC <sup>1</sup>             | 2019                 |   | P2P, P2B, B2B, P2G, G2P     | X <sup>2</sup>    |
| <b>Brazil (BR)</b>           | Pix/SPI <sup>3</sup> | BCB                          | 2020                 |   | P2P, P2B, B2B, P2G, G2P     | X                 |
| <b>Canada (CA)</b>           | RTR                  | Payments Canada              | 2022                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>China (CN)</b>            | IBPS                 | China NCC <sup>4</sup>       | 2010                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>Euro Area (EA)</b>        | RT1                  | EBA Clearing                 | 2017                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>EA</b>                    | TIPS                 | Eurosystem                   | 2018                 |   | P2P, P2B, B2B, P2G, G2P     | X                 |
| <b>France (EA (FR))</b>      | SEPA EU              | STET                         | 2018                 |   | P2P, P2B, B2B               | ✓                 |
| <b>HK SAR (HK)</b>           | FPS                  | HKICL                        | 2018                 |   | P2P, P2B, B2B, P2G, G2P     | X                 |
| <b>India (IN)</b>            | IMPS                 | NPCI                         | 2010                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>IN</b>                    | UPI                  | NPCI                         | 2016                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>Indonesia (ID)</b>        | BI-FAST <sup>5</sup> | BI                           | 2021 <sup>6</sup>    |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>Japan (JP)</b>            | Zengin <sup>7</sup>  | Zengin-Net                   | 1973<br>2018         | <br> | P2P, P2B, B2B, G2P          | X <sup>8</sup>    |
| <b>Korea (KR)</b>            | EBS <sup>9</sup>     | KFTC                         | 2001                 |    | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>KR</b>                    | CD/ATM <sup>10</sup> | KFTC                         | 2007                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>Mexico (MX)</b>           | SPEI                 | Banxico                      | 2015                 |   | P2P, P2B, B2B, P2G, G2P     | X                 |
| <b>Netherlands (EA (NL))</b> | eW IP CSM            | eW                           | 2019                 |   | P2P, P2B, B2B, P2G, G2P     | X <sup>11</sup>   |
| <b>Russia (RU)</b>           | FPS <sup>12</sup>    | CBR                          | 2019                 |   | P2P, P2B, B2P <sup>13</sup> | ✓                 |
| <b>Saudi Arabia (SA)</b>     | sarie                | SAMA                         | 2021                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>Singapore (SG)</b>        | FAST                 | BCS                          | 2014                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>South Africa (ZA)</b>     | RTC                  | BankServAfrica <sup>14</sup> | 2006                 |  <sup>15</sup>  | P2P, P2B, B2P, B2B          | ✓                 |
| <b>Spain (EA (ES))</b>       | SNCE                 | Iberpay                      | 2016                 |   | P2P, P2B, B2B, P2G, G2P     | ✓                 |
| <b>Sweden (SE)</b>           | BiR                  | Bankgirot                    | 2012                 |   | P2P, P2B, P2G               | X                 |
| <b>SE</b>                    | RIX-INST             | Riksbank                     | 2022                 |   | P2P, P2B, B2B, P2G, G2P     | X                 |
| <b>Switzerland (CH)</b>      | Twint                | Twint Ltd                    | 2017                 |   | P2P, P2B                    | ✓                 |

(continued)

|                            | System name        | Operator          | Year of introduction | Settlement model  | Scope: payment types     | Transaction limit        |
|----------------------------|--------------------|-------------------|----------------------|---|--------------------------|--------------------------|
| <b>CH<sup>16</sup></b>     | SIC IP             | SIX               | 2023                 |  | P2P, P2B, B2B, P2G, G2P  | <i>tbd</i>               |
| <b>Turkey (TR)</b>         | FAST <sup>17</sup> | CBRT              | 2021 <sup>18</sup>   |  | P2P, P2B <sup>19</sup>   | ✓                        |
| <b>United Kingdom (UK)</b> | FPS                | Pay.UK            | 2008                 |  | P2P, P2B, B2B, P2G, G2P  | ✓                        |
| <b>United States (US)</b>  | RTP                | TCH <sup>20</sup> | 2017                 |  | P2P, P2B, B2B            | ✓                        |
| <b>US</b>                  | FedNow Service     | FRB <sup>21</sup> | 2023                 |  | <i>Tbd</i> <sup>22</sup> | <i>Tbd</i> <sup>23</sup> |

**Key:**  = real-time settlement;  = deferred net settlement.

<sup>1</sup> STET is the technical operator of CEC.IP, whereas the legal operator is the CEC (the Belgian ACH). <sup>2</sup> There is no limit to the amount of payments, but payments can only be executed if the payer's participant has sufficient funds available in the prefunded account, otherwise the payment is refused. Sufficient funding by all participants is paramount for the smooth functioning of CEC.IP. <sup>3</sup> Pix is the brand name for the fast payment scheme managed and operated by the Central Bank of Brazil; SPI is the payment system managed and operated by the Central Bank of Brazil which settles Pix transactions. <sup>4</sup> China National Clearing Center of the People's Bank of China. <sup>5</sup> This new system complements an existing private-sector system (ATM System), which facilitates account-to-account payment transfers on a 24/7 basis. <sup>6</sup> To go live on 21 December 2021. <sup>7</sup> The Zengin Core Time System (CTS), launched in 1973, processes all transactions (large-value transactions (greater than or equal to JPY 100 million) as well as small-value transactions (smaller than JPY 100 million)) and settles in the BOJ-NET during business hours. The More Time System, launched in 2018, operates when CTS does not and processes smaller-value transactions (below JPY 100 million) only on a deferred net basis. <sup>8</sup> There is no transaction limit in principle; however, a transaction of JPY 10 billion or more can only be sent in lots due to system configurations. <sup>9</sup> Since 2016, large-value transactions greater than KRW 1 billion have been settled through BOK-Wire+ accounts in real time. <sup>10</sup> The CD/ATM system has provided near-real-time payments since 1988, with operations on a near to 24/7 basis (00:05~23:55) since 2007. <sup>11</sup> There is no limit to the amount of payments, but payments can only be executed if the payer's participant has sufficient funds available in the prefunded account, otherwise the payment is refused. <sup>12</sup> The Faster Payments System (FPS) at <http://www.cbr.ru/eng/Psystem/sfp/>. <sup>13</sup> Other payment types are in the pipeline. <sup>14</sup> BankServAfrica is a South African and regional clearing house. In 2018, BankservAfrica started work on a new instant payments service for banks in South Africa called Rapid Payments Programme. <sup>15</sup> South Africa uses deferred gross settlement. <sup>16</sup> The Swiss National Bank will launch a fast payment service as part of the RTGS system with real-time settlement in central bank money ("SIC IP" is a provisional name). <sup>17</sup> Instant and Continuous Transfer of Funds (FAST). <sup>18</sup> The pilot was first launched in December 2020 and the system was fully rolled out on January 2021. <sup>19</sup> Other payment types are to be defined. <sup>20</sup> The Clearing House. <sup>21</sup> Federal Reserve Banks. <sup>22</sup> The FedNow Service is planned to be capable of supporting all use cases. <sup>23</sup> The FedNow Service will have a per-transaction value limit.

Source: CPMI FPS survey.

## 2.2 Fast payment types and features

### Payment types processed

All FPS surveyed process person-to-person (P2P) and person-to-business (P2B) payment types. Some systems cover *all* types of retail payments, including those between businesses (B2B), and between persons and governments (P2G/G2P). As FPS build upon bank account-based credit transfers, to the extent that broadly the same message type is used in all FPS payments, these systems can potentially accommodate all payment segments without additional investments. Generally, the technical capability of the FPS is not a constraint in terms of the types of payments that it can process. For instance, where G2P and P2G payments are currently not processed through the FPS covered, this could reflect government readiness to use FPS, and/or the stickiness of their existing payment practices.

### Transaction value limits

As shown in Table 1, the majority of FPS impose a transaction value limit, ie only payments that are of lower value than the limit can be processed. However, there is a wide range for value limits, from (the equivalent of) USD 400 in Mexico to over USD 300,000 per transaction in the United Kingdom (see Annex Table A2 for details). While a few jurisdictions (eg Australia, Brazil, the Netherlands, Hong Kong SAR) do not have a system-wide (uniform) transaction value limit, individual banks in these jurisdictions may well impose limits on their customers (at either the customer account or the transaction level), with banks often citing security as a reason for such restrictions.<sup>10</sup> Banks' liquidity management can also be a consideration. In many jurisdictions, fast payments are still relatively new and low initial transaction limits may help banks' treasury functions better manage the associated liquidity risks. This is especially relevant if (and to the extent) that the settlement occurs outside of business hours.

Transaction value limits could curtail B2B use. For example, one use case of fast payments would be to facilitate non-financial firms' treasury functions. For these firms, immediate settlement of large commercial payments lowers credit risk and may allow them to conduct liquidity management more efficiently. This is particularly attractive for medium-sized and large firms. However, the current limits in several FPS could restrict this use.<sup>11</sup>

### End user interface

Although FPS are often associated with particular end user interfaces or brands (such as Swish for BiR (SE)),<sup>12</sup> this is not common. In fact, the majority of FPS are interface-agnostic. These systems are open to various channels (eg including internet banking as well as mobile payments), with the interfaces typically developed and offered by FPS participants, depending on the particular use cases (eg P2P/P2B/B2B). This approach can have both pros and cons. On the one hand, openness to many types of user interfaces increases the scope for very high use of the FPS in the longer run. On the other hand, focusing on a single channel and brand may be more conducive to strong initial growth in transaction volumes.

<sup>10</sup> Based on anecdotal evidence, banks usually set such limits on the basis of a range of factors, including anti-fraud, anti-money laundering, and prevalent customer needs.

<sup>11</sup> For instance, there is a limit of EUR 100,000 in the payment scheme SCT Inst in TIPS (EA) and USD 25,000 in the RTP (US).

<sup>12</sup> Swish is a mobile payment service that works only through a smartphone application. Although all transactions that settle on BiR are initiated via Swish, BiR is also open to settlement via other channels.

## ISO 20022 format

A majority of surveyed FPS<sup>13</sup> have either adopted or will transition to the ISO 20022 messaging format.<sup>14</sup> This is in line with the trends towards the use of ISO 20022 in other areas of payments (eg in RTGS systems and automated clearing houses (ACHs)) and financial services more generally. These broader trends towards the use of ISO 20022 could be further supported through the ongoing cross-border payments programme.<sup>15</sup>

ISO 20022 enables transmission of richer and more structured data with transactions in a standardised manner, and promises to provide consistency, flexibility, and enhanced resilience and security in transactions (FIS (2019a)). Notably, it can help in complying with checks in relation to anti-money laundering and combating the financing of terrorism (AML/CFT).<sup>16</sup> In addition, SWIFT has announced plans to replace three of its current message categories (MTs 1, 2 and 9) with ISO 20022 messages for cross-border payments starting in November 2022 and ending in 2025 with an interim period in between.<sup>17</sup> This implies that going forward all interbank payments using the SWIFT network would require the use of ISO 20022.

## 2.3 Settlement models

While the user experience of FPS is “instant” (ie with respect to the crediting of payee account and debiting of payer account), the final settlement of obligations between the payment service providers (PSPs) that are direct participants of the FPS can occur either on a real-time or a deferred basis (CPMI (2016), Bech et al (2017)) (Figure 1). FPS in CPMI jurisdictions are split between using real-time and deferred settlement models (Table 1), though in recent years, FPS have increasingly been settling interbank obligations in the real-time model.

In the real-time settlement model, final funds are made available to payees immediately after interbank settlements have occurred on an individual gross basis, and such interbank settlements occur 24/7 and in real time.<sup>18</sup> The real-time settlement model avoids the credit and liquidity risks associated with interbank settlement (eg in the event of a participant’s default). However, gross settlement generally requires more liquidity than net settlement. In addition, this model may require the RTGS system operator to have additional operational arrangements in place:

- In one setup of the real-time model, interbank settlements take place in the same accounts (ie RTGS accounts) that FPS participants use for other types of payments in the RTGS system. In this case the RTGS system operator would need to make RTGS accounts available 24/7 for interbank settlement.
- In another setup, FPS participants may each have a dedicated account for FPS settlement at the central bank (ie distinct from an RTGS account, even in a separate settlement system). In this case the system that manages dedicated FPS accounts would need to be open 24/7 for FPS interbank settlement, while the main RTGS system does not have to be open 24/7. This arrangement requires a mechanism that

<sup>13</sup> Response to this question was provided for 30 systems; out of these, 23 use (or will use) ISO 20022.

<sup>14</sup> ISO 20022 is set to become the common global standard for exchanging payments within and across borders.

<sup>15</sup> See CPMI (2020), in particular building block 14 on adopting a harmonised ISO 20022 version for message formats (including rules for conversion/mapping).

<sup>16</sup> With the usage of a structured field for identifying payer/payee, ISO 20022 supports the full automation of AML/CFT checks.

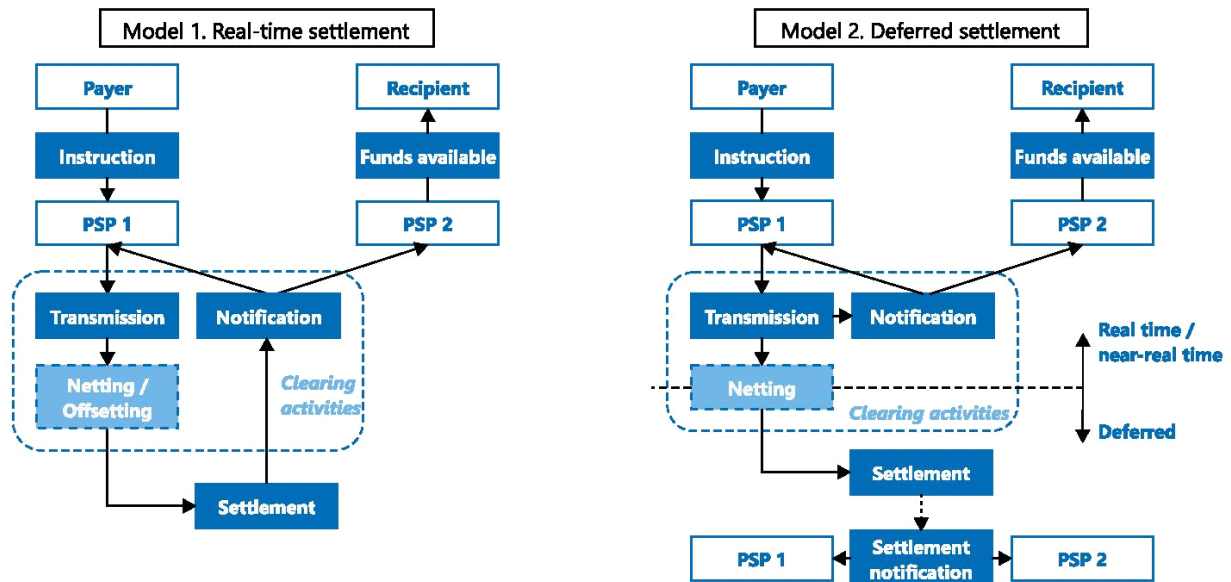
<sup>17</sup> See [www.swift.com/standards/iso-20022-programme/new-approach-iso-20022-adoption](http://www.swift.com/standards/iso-20022-programme/new-approach-iso-20022-adoption).

<sup>18</sup> In some FPS, their direct participants may include non-bank PSPs in addition to banks (See Table 2 below). However, in what follows, the term “interbank settlement”, rather than “inter-PSP settlement”, is used for simplicity when it can also include settlements between banks and non-bank PSPs or those between non-bank PSPs.

allows for (automatic or manual) movement of funds between RTGS accounts and dedicated FPS accounts as will be needed (see Section 2.4 for more information).<sup>19</sup>

Stylised model for interbank settlement in FPS

Figure 1



1 If there is a netting or queuing and offsetting mechanism available in Model 1, it is applied at very short settlement intervals and settlements can take place in close to real time. See CPMI (2016) pp 37–39.

Source: Based on Figure 3 and 4 from CPMI (2016).

While these two examples of the real-time settlement model both require the operation of the RTGS system – in varying degrees – outside standard business hours, another real-time settlement model does not involve an RTGS system operating outside its standard business hours; in particular, a (private-sector) FPS can perform interbank settlements on its private ledger 24/7 in real time. FPS participants in one such variant would each transfer funds via an RTGS system during its operating hours into the single joint or fiduciary account held by the FPS (or its designated settlement account agent) at the RTGS system for the benefit of all FPS participants. The FPS (or the designated agent) would record the corresponding pay-in amount on its own private ledger for each participant and then interbank settlements of FPS transactions would occur in real time on the private ledger.<sup>20</sup>

In contrast, in the deferred settlement model, interbank settlements are delayed and occur (typically with netting) at set intervals during the day. The interbank settlement risk associated with the deferred settlement model may be mitigated with appropriate risk management mechanisms, including limits on net debit obligations, collateralisation and loss allocation arrangements. In one setup, the net

<sup>19</sup> Such movements of funds are possible during the operating hours of the RTGS system.

<sup>20</sup> The sum of all the pay-ins (and that of all the participants' balances at a point in time) recorded on the private ledger is to always equal to the total funds in the joint account at the central bank/RTGS system.

debit obligations of each participant from its FPS transactions are to be fully backed by (and cannot exceed) the balances in each participant's dedicated cash collateral account at the central bank.<sup>21, 22</sup>

## 2.4 Liquidity management

Given that FPS operate on a (near) 24/7 basis, and usually the domestic RTGS systems do not, managing liquidity outside RTGS operating hours can be an issue for participants. As alluded to above, the choice of settlement model for the FPS and the availability of liquidity management tools are closely related. Liquidity management is particularly important for those FPS with real-time settlement. Liquidity management arrangements may rely on existing or augmented facilities of the RTGS system or may be entirely new arrangements put in place to support the FPS, such as a "satellite" settlement system (Box 1). For example, in Australia, FPS transactions are settled through the Fast Settlement Service (FSS), which was developed by the Reserve Bank of Australia (RBA) as a new service of its RITS RTGS system, with PSPs having separate funds allocations between the two systems.

Common liquidity management tools in FPS include: (i) intraday and longer-term liquidity facilities; (ii) monitoring of liquidity levels (eg alerts if they fall below a preset limit); (iii) enabling of consolidated views of a participant's position with the ability to set parameters (min/max balances); and (iv) transfer of liquidity/sweeping of balances between systems when the FPS settlement accounts are separate from those for the RTGS system.<sup>23</sup>

Box 1

### Liquidity management in selected FPS

In practice, FPS can use a combination of liquidity management tools and adjust the design of the tools to fit the local financial landscape. For instance, some of systems that settle (or will settle) in real time use the following approaches:

- In Australia, the Reserve Bank introduced functionality to provide for automated transfers between participants' RITS (RTGS) and FSS (FPS) accounts. In addition, liquidity arrangements such as open-dated repurchase agreements provide cost-neutral liquidity and help to support overnight and weekend New Payments Platform (NPP) activities. When the RTGS is closed, all liquidity held by participants (including from open repos) is made available to fund settlement of fast payments in the FSS. Of course, the availability of significant amounts of liquidity outside normal business hours raises the possibility of significant outflows from banks during these times. The central bank and prudential supervisor therefore have required banks to have strict policies and controls regarding liquidity management. For example, it was suggested that banks should change their customer terms and conditions to acknowledge that NPP payments outside RTGS operating hours were subject to liquidity availability and that failure to settle payments would not trigger an event of default.
- In the case of TARGET Instant Payment Settlement (TIPS) in Europe, a positive TIPS balance may offset an overdraft in the RTGS account of the same participant. The TIPS balance also counts towards the fulfilment

<sup>21</sup> When deferred interbank obligations are settled (at intervals) in the RTGS system and if balances in a participant's settlement account in the system are insufficient to settle its net debit obligation, the shortfall amount will be drawn down from its prefunded cash collateral account at the central bank.

<sup>22</sup> While this arrangement is a deferred settlement model, it is economically (albeit not operationally or legally) close to the real-time settlement model with a single joint or fiduciary account held by the FPS at the RTGS system described above in that they both involve prefunding at the central bank (ie in terms of liquidity usage associated with the interbank settlement).

<sup>23</sup> Almost 90% of FPS that use RTGS have liquidity management tools, compared with one third of FPS that use deferred net settlement (DNS).

of minimum reserves. Hence it does not matter from a liquidity management point of view whether liquidity in central bank money is held on the TIPS or on the RTGS account. In addition, a set of available tools support decision-making and management of liquidity in central bank money. In particular, liquidity may be brought in from or sent back to TARGET2 via a dedicated liquidity bridge whenever TARGET2 is open. When TARGET2 is closed (eg during weekends or bank holidays) no such adjustment is possible.

- In Brazil, participants in SPI have a 30-minute window following the daily closure at 18:30 of STR (an RTGS system operated by the Central Bank of Brazil), during which they can (i) transfer part or all of the reserves from STR to the SPI, which can be done on an automated basis; and (ii) if they are financial institutions, can enter into overnight repo transactions against federal public bonds. During weekends and bank holidays (when STR is closed) and between 19:00 and 6:30 on working days there is no liquidity transfer mechanism currently available.
- Canada is exploring ways to allow participants to transfer settlement balances between the new RTGS (Lynx) and Real-Time Rail (RTR) during Lynx operating hours so that the settlement balances of the two systems would be fully fungible during Lynx operating hours.
- In Japan, participants with high-value transactions, which are settled in real time, can use liquidity management mechanisms provided by the Bank of Japan that include daylight overdrafts and liquidity-saving features when shortfalls in funds for settlement occur. Daylight overdrafts and liquidity-saving features are not available when BOJ-NET (an RTGS system operated by Bank of Japan) is closed (eg weekends and bank holidays).

## 2.5 Participation arrangements

Participation arrangements for FPS are not always the same as arrangements for the domestic RTGS systems. This FPS in the survey can be categorised in three groups (Table 2):

1. *Broadly aligned arrangements ("=")*: For a number of FPS, the participation arrangement is (or will be) the same as for the domestic RTGS systems (eg FPS (UK), TIPS (EA), RIX-INST (SE) and FedNow Service (US)<sup>24</sup>).
2. *FPS is more restrictive ("<")*: In this category, the FPS only allows direct access by banking entities, whereas the domestic RTGS system allows access by more types of participants (eg IT (AR), and Twint (CH)). Technical/operational capabilities and readiness outside the normal business hours can also be part of the eligibility criteria for an FPS, which may limit participation to a subset of banking entities and PSPs. Further, privately operated FPS, especially those that use deferred net settlement (DNS), may restrict direct participation to entities with "acceptable" risk profiles to minimise the credit and operational risks the FPS takes on.
3. *FPS is less restrictive (">")*: There are several instances where the FPS allows (or will allow) more types of participants to directly access the system than the domestic RTGS system (eg NPP (AU), RTR (CA), FPS (HK), UPI (IN) and FAST (SG)). Australia's NPP, for example, was designed to be "open access" to encourage broad participation across the payments ecosystem. While there are

<sup>24</sup> The Federal Reserve will have the authority to provide the FedNow Service to the same institutions that participate in its RTGS system. However, the FedNow Service is still under development, and the Federal Reserve has not determined whether it will restrict access to the service based on policy, risk or other considerations.

several different ways to “access” the NPP,<sup>25</sup> only two require participants to have RTGS system membership; this makes a broader participation in the NPP feasible. In Singapore, RTGS system participants need to be SWIFT members and have the necessary hardware, software, systems and capability to send or receive messages or instructions to or from any other RTGS system participants using SWIFT, while FAST participants are not subject to the same SWIFT connectivity requirements. Wider participation criteria in Australia and Singapore could be a contributing factor (among others) to the faster than average adoption rates for their systems.

## FPS in CPMI jurisdictions

Fast payment vs RTGS participation: criteria and arrangements

Table 2

| Country      | FPS name               | Participation Criteria comparison <sup>1</sup> |                |                | Access arrangements |          |      |                |
|--------------|------------------------|--|----------------|----------------|---------------------|----------|------|----------------|
|              |                        | <  | =              | >              | Direct              | Indirect | Bank | Non-bank       |
| Argentina    | Immediate Transfer     | ✓  |                |                | ✓                   |          | ✓    |                |
| Australia    | NPP                    |  |                | ✓              | ✓                   | ✓        | ✓    | ✓              |
| Belgium      | CEC.IP                 |  | ✓ <sup>2</sup> |                | ✓                   | ✓        | ✓    |                |
| Brazil       | SPI                    |  | ✓              |                | ✓                   | ✓        | ✓    | ✓              |
| Canada       | RTR                    |  |                | ✓              | ✓                   | ✓        | ✓    | ✓ <sup>3</sup> |
| China        | IBPS                   |  | ✓ <sup>4</sup> |                | ✓                   | ✓        | ✓    |                |
| Euro area    | RT1                    | ✓  |                |                | ✓                   | ✓        | ✓    |                |
| Euro area    | TIPS                   |  | ✓              |                | ✓                   | ✓        | ✓    |                |
| France       | SEPA EU                | ✓  |                |                | ✓                   | ✓        | ✓    |                |
| HK SAR       | FPS                    |  |                | ✓              | ✓                   | ✓        | ✓    | ✓              |
| India        | IMPS                   |  |                | ✓              | ✓                   | ✓        | ✓    | ✓              |
|              | UPI                    |  |                | ✓              | ✓                   | ✓        | ✓    | ✓              |
| Indonesia    | BI-FAST                |  | ✓ <sup>5</sup> |                | ✓                   | ✓        | ✓    | ✓              |
| Japan        | Zengin System          | ✓ <sup>6</sup>                                 |                |                | ✓                   | ✓        | ✓    |                |
| Korea        | EBS                    | ✓  |                |                | ✓                   | ✓        | ✓    | ✓              |
|              | CD/ATM                 | ✓  |                |                | ✓                   | ✓        | ✓    | ✓              |
| Mexico       | SPEI                   |  | ✓              |                | ✓                   |          | ✓    | ✓              |
| Netherlands  | equensWorldline IP CSM | ✓  |                |                | ✓                   | ✓        | ✓    |                |
| Russia       | FPS                    | ✓ <sup>7</sup>                                 |                |                | ✓                   |          | ✓    | ✓ <sup>8</sup> |
| Saudi Arabia | sarie                  |  |                | ✓ <sup>9</sup> | ✓                   | ✓        | ✓    | ✓ <sup>9</sup> |
| Singapore    | FAST                   |  |                | ✓              | ✓                   |          | ✓    | ✓              |
| South Africa | RTC                    | ✓  |                |                | ✓                   |          | ✓    |                |
| Spain        | SNCE                   |  | ✓              |                | ✓                   | ✓        | ✓    |                |
| Sweden       | BiR                    |  | ✓              |                | ✓                   | ✓        | ✓    |                |
|              | RIX-INST               |  | ✓              |                | ✓                   | ✓        | ✓    |                |

<sup>25</sup> The ways to access the NPP in Australia are broader than direct access to clearing and settlement; see [www.nppa.com.au/accessing-the-platform](http://www.nppa.com.au/accessing-the-platform). For example, the NPP allows for “identified institutions” which connect indirectly and can offer NPP payment services to their customers without a central bank settlement account and “connected institutions” which may be non-banks (eg billers or service providers) which submit payment instructions directly into the network for subsequent clearing and settlement by the paying participant bank.



|                |                                      |   |   |   |   |   |                 |
|----------------|--------------------------------------|---|---|---|---|---|-----------------|
| Switzerland    | Twint<br>SIC IP                      | ✓ | ✓ |   | ✓ | ✓ | –               |
| Turkey         | FAST                                 |   |   | ✓ | ✓ | ✓ | ✓ <sup>10</sup> |
| United Kingdom | FPS                                  |   | ✓ |   | ✓ | ✓ | ✓               |
| United States  | RTP®<br>FedNow Service <sup>11</sup> | ✓ | ✓ |   | ✓ | ✓ | –               |

<sup>1</sup> Participation criteria: more restrictive (" $<$ "), broadly aligned (" $=$ "), less restrictive (" $>$ "). <sup>2</sup> The participation criteria are in line with those of the RTGS system. However, non-banks may not be direct participants (although the CEC rule book provides for the possibility of technical direct access for indirect participants). <sup>3</sup> The requirements for non-bank PSP participation in the RTR are to be determined. <sup>4</sup> Participants of the RTGS system can also be participants of IBPS. <sup>5</sup> Both banks and non-banks are eligible to become members of the FPS. Details regarding participation criteria are still under discussion. <sup>6</sup> While some non-deposit-taking institutions (eg securities companies, money market brokers and FMIs) are allowed to participate in the RTGS system (BOJ-NET) but not allowed in Zengin System, small deposit-taking institutions (mainly credit cooperatives) are allowed in Zengin System but not allowed in the BOJ-NET. <sup>7</sup> Systemically important banks and banks with a universal banking licence are obliged to participate in the FPS by law (<https://www.cbr.ru/eng/press/event/?id=2700>). <sup>8</sup> The Federal Treasury of the Russian Federation is to join in future. <sup>9</sup> This participation criterion will be widened to facilitate indirect participation and access to the system by large corporates/government entities and other FMIs (including non-banks) in due course. <sup>10</sup> Since 30 June 2021. <sup>11</sup> The Federal Reserve will have the authority to provide the FedNow Service to the same institutions that participate in its RTGS system; however, the FedNow Service is still under development, and the Federal Reserve has not determined whether it will restrict access to the service based on policy, risk or other considerations.

Source: CPMI FPS survey.

## 2.6 Additional services<sup>26</sup>

A majority of the surveyed FPS<sup>27</sup> provide value-added services that render the systems more attractive to end users (see Annex Table A3 for more details). These include:

- *Proxy lookup functionality*: an increasingly common service that allows the use of national identification, a social security number, a mobile phone number and/or an email address to identify the payee instead of a bank account identifier (eg IBAN). This can, for instance, allow the payer to have immediate notification of the payee's name before the payer authorises the payment. This further enhances the ease of making fast payments, and can also reduce occurrences of payments to wrong payees and fraud.<sup>28</sup>
- *Request-to-pay functionality*: the ability of individuals and businesses to request a payment from another account. It is usually overlaid on the existing payments infrastructure and provides a flexible way of payments such as settling bills between payers and payees.

## 3. Central bank roles in operating FPS

As outlined in CPMI (2016), central banks can take on three roles in the FPS: as a catalyst, overseer or operator. The survey shows that in terms of catalyst role, central banks' practices range from no involvement to being highly active. Many central banks fall into the latter category, having provided the initial impetus for the launch of their domestic FPS by bringing together the relevant stakeholders (AU,

<sup>26</sup> FPS, by definition, provide users with speed, 24/7 service availability and, in most cases, enhanced data capacity.

<sup>27</sup> Sixteen out of the 25 systems that answered this question.

<sup>28</sup> Such as "authorised push payment fraud", where victims are manipulated into making real-time payments to fraudsters, typically by social engineering attacks involving impersonation.

CH, EA, IN, JP, SE (RIX-INST), SG and US) and even leading the entire project (BR, HK and RU). In terms of the oversight role, some central banks may have formal regulatory oversight authority over the system or its operator. The decision to oversee the system and level of oversight involvement depends on judged importance of the FPS. Finally, in terms of the operation of the FPS, a central bank's involvement also varies markedly across jurisdictions. The remainder of this section examines the operational role of central banks in more detail.

Based on the survey responses, the role of the central bank in *operating* the FPS can be grouped in three buckets: (i) limited role, (ii) intermediate role or (iii) fully active role (Table 3).

| Central bank role in the operation of FPS |  | Table 3 |
|---|--|---------|
| <b>System (Jurisdiction)</b>              |  |         |
| <b>Limited<sup>1</sup></b>                | IT (AR), CEC.IP (BE), RTR (CA), SEPA EU (FR), Zengin (JP), eW IP CSM (NL), SNCE (ES), BiR (SE), Twint (CH), FPS (UK), RTP (US) RT1 (EA) and RTC (ZA) |         |
| <b>Intermediate<sup>2</sup></b>           | NPP (AU), <sup>4</sup> FPS (HK), IMPS (IN), UPI (IN), EBS (KR), CD/ATM (KR) FAST (SG) and SIC IP (CH)  |         |
| <b>Fully active<sup>3</sup></b>           | Pix/SPI (BR), IBPS (CN), TIPS (EA), BI-FAST (ID), SPEI (MX), FPS (RU), sarie (SA), RIX-INST (SE), FAST (TR) and FedNow Service (US)                  |         |

Acronyms of the systems are used. For the complete name of the system, please refer to Annex Table A1.

<sup>1</sup> The central bank does not own or operate the FPS and is not (or is only marginally) involved in the governance of the FPS. <sup>2</sup> The central bank is directly involved in some governance aspects of the FPS. <sup>3</sup> The central bank owns and/or operates the FPS. <sup>4</sup> The RBA is a shareholder of the FPS operator and is represented on its board.

Source: CPMI FPS survey.

## Limited operational role

In the majority of surveyed FPS, central banks' ongoing operational interactions with fast payments are limited to their roles as RTGS operators and settlement institutions, ie providing final interbank settlement and being the source for liquidity in central bank money. This role is core to the safe implementation of fast payments, and in many cases central banks have changed the way in which they provide settlement services to address the specific needs of their domestic FPS.

Actions taken or planned by central banks in this field include providing FPS operators with RTGS accounts, acting as settlement agents<sup>29</sup> for FPS (eg RTR (CA)) and adopting more frequent settlement cycles to support those FPS with DNS models (eg FPS (UK) and UPI (IN)). Some central banks have also implemented special arrangements enabling PSPs participating in privately operated FPS to back their in-system positions with central bank money (eg RT1 (EA), SNCE (ES), BiR (SE), FPS (UK) and RTP (US)). Although these special arrangements exhibit great diversity in design, in all cases liquidity may only be moved during the operating hours of the RTGS system.<sup>30</sup>

<sup>29</sup> A settlement agent is an entity that manages the settlement process for transfer systems or other arrangements that require settlement. The settlement agent sometimes differs from the owner or settlement institution of the system.

<sup>30</sup> At launch, the FedNow Service (US) will include functionality to support liquidity transfers between FedNow participants, as well as liquidity transfers to or from an account at a Reserve Bank being used to support a private-sector FPS. This liquidity transfer functionality will be available outside the operating hours of the Fedwire Funds Service.

## Intermediate operational role

In some cases, the central bank is directly involved in the governance of the FPS.<sup>31</sup> For instance, the RBA is a shareholder of the Australian FPS operator and is represented on its board. This board participation reflects the RBA's role in developing and operating a tailor-made settlement infrastructure separate from its RITS RTGS system to support its FPS. This separate infrastructure has the advantage of operating 24/7/365, allowing real time settlement in central bank money of interbank obligations arising from fast payments even when RITS is closed.

Hong Kong has taken a similar approach to its governance framework as NPP. In Hong Kong, the domestic FPS is operated by the Hong Kong Interbank Clearing Limited (HKICL), which is jointly owned by the Hong Kong Monetary Authority (HKMA) and the Hong Kong Association of Banks. The HKMA plays a central role in the FPS's design and implementation by coordinating major stakeholders.

Box 2

### Coexistence of private and public FPS within jurisdictions

In a number of countries, there are (or will be) both public and private FPS. This development is driven by a number of considerations, including regarding competition, innovation and minimising market fragmentation:

- The Eurosystem decided to develop TIPS because it considered that the pan-European reach of fast payments was unlikely to be achieved by simply relying on the establishment of a network of bilateral links between privately operated FPS. Using TARGET2 as a basis, TIPS has the potential to provide wide reach and scale by tapping into an established network of over 1,000 participants and more than 50,000 reachable institutions. In doing so, it serves as the building block for truly pan-European end user solutions leveraging real-time payments and helping mitigate potential future market fragmentation. Significant further steps to support the full deployment of instant payments across the euro area were taken by the Governing Council of the Eurosystem in July 2020. These steps are aimed at ensuring pan-European instant payments by the end of 2021.<sup>1</sup>
- The Federal Reserve's recent decision to develop its own FPS (FedNow Service) in addition to the privately operated RTP system is motivated by its assessment that a single private-sector operator would not be able to connect to the thousands of small and midsize banks necessary to yield nationwide reach, even in the long term. Reflecting its historical role in the US payments system, the Federal Reserve has a nationwide infrastructure to provide service to more than 10,000 depository institutions across the country, which can be leveraged to provide a key channel to reach thousands of smaller institutions that might not otherwise have access to fast payments. Additionally, the Federal Reserve sees the risk that having a single provider without competition could lead to undesirable outcomes for pricing, innovation and service quality. Moreover, a single provider could constitute a single point of failure whereas an additional FPS would promote resiliency through redundancy.
- The Riksbank's project to leverage the Eurosystem's TIPS platform (RIX-INST) to settle fast payments denominated in Swedish kronor aims to mitigate the risks associated with interbank settlement in commercial bank money (backed by the funds held at the central bank) at a time when fast payments

<sup>31</sup> Even in the absence of direct ownership, some central banks exert significant influence on the governance of their domestic FPS. For example, the Reserve Bank of India must pre-approve all changes made to the products, processes and procedures of its domestic FPS (IMPS and UPI) as well as acting as arbiter in disputes. The Swiss National Bank has similar prerogatives vis-à-vis the privately owned and operated SIC system.

provided by private-sector systems could quickly expand beyond mobile payments to include a broader range of account-to-account transactions. As these latter transactions are currently settled in central bank money, their inclusion in the private FPS (BiR) would represent a step backwards in terms of risk mitigation.

<sup>1</sup> For more details, see [www.ecb.europa.eu/paym/intro/news/html/ecb.mipnews200724.en.html](http://www.ecb.europa.eu/paym/intro/news/html/ecb.mipnews200724.en.html).

<sup>2</sup> See CPMI (2016) p 63.

## Fully active operational role

In some jurisdictions, central banks directly operate (or will do so in the future) their domestic FPS (eg BR, EA (TIPS), RU, SA, SE (RIX-INT) and US (FedNow Service)). In a number of these instances, the provision of fast payments is simply a continuation of central banks' historical role of providing both clearing and settlement services to their domestic financial institutions. In others, central banks' direct involvement is motivated by the existence of network externalities and economies of scale, and more importantly is deemed necessary to promote specific policy objectives (Box 2). These objectives notably include preserving settlement safety, ensuring access neutrality and a level playing field, promoting reachability, encouraging innovation in the local payments landscape, and minimising market fragmentation.

## 4. FPS challenges

Projects to implement new FPS are often lengthy, costly and complex. Survey respondents provided a range of insights on the challenges (that central banks and/or other involved parties) faced during and after their FPS implementation phase.<sup>32</sup>

### 4.1 During implementation

Survey respondents reported the following challenges during the implementation phase:

- The system build for participants (ie commercial banks) is invariably difficult due to the complexity and age of their current systems. Upgrading those systems to enable real-time posting and 24/7 operation takes time. Significant effort is also spent on ensuring that compliance monitoring systems (eg fraud detection, AML/CFT) are in place to support real-time payments.
- It can be difficult to onboard the initial set of participants. Some of this relates to overcoming the perceived lack of business cases for banks to make the necessary investments to change their systems in order to accommodate 24/7 fast payment processing.
- Determining liquidity arrangements for the FPS, particularly where settlement occurs in real time on a 24/7 basis but the RTGS system is not open 24/7.
- Achieving industry-level agreement on a wide range of issues including governance, funding, compliance and fraud mitigation processes.

### 4.2 Post implementation

Survey respondents reported the following challenges post-implementation:

<sup>32</sup> The relevance of these challenges for central banks varies and depends on the level of involvement of the central bank in the various stages and aspects of the FPS implementation.

- The initial lack of ubiquity and account reach. For an FPS to be successful, there needs to be a critical mass of banks and accounts that are reachable.
- Slower than anticipated initial rollout of faster payments by participants to their customers may delay the launch of additional initiatives by the FPS. For example, in Australia the slow rollout by some major banks made it harder to secure industry agreement on subsequent real-time services such as payment-with-document and request-to-pay.
- Divergence in the level of service offerings by participating banks (eg in the channels available to end users to initiate their payments) may hamper the widespread/consistent promotion of the FPS and deter end users due to poor initial experience with the FPS.
- The 24/7 availability of FPS requires high system availability and reliability. This can be difficult when FPS participants are using legacy systems. End users can witness service downtime if FPS participants' systems experience outages. Some of the mitigation measures used by FPS include having more than one processing site working simultaneously, and a dedicated IT team working shifts to provide 24/7 support.

## 5. Impact of FPS

### 5.1 On the broader retail payments ecosystem

FPS are generally expected to have a positive impact on the retail payments ecosystem through a combination of factors, such as better meeting end user needs for faster speeds, enabling innovative payment products and services, and potentially improving financial inclusion. In addition, more diversity or competition in payment products and services can lead to a more resilient payments ecosystem. Finally, FPS also have the potential to improve cross-border remittance payments (eg by providing (near) 24/7 funds transfers in the "last mile" of these payments).

For many jurisdictions, it is too early to detect concrete (quantitative) effects of FPS on other parts of the retail payments market. However, the general view among survey respondents is that FPS will mainly result in a decline in the use of cash, cheques (if still in use) and, to a certain extent, debit card payments. Additionally, payment instruments such as direct debits and (traditional) credit transfers currently processed with a lower speed and via batch procedures can potentially be affected as well. However, credit card payments are not expected to be significantly impacted.

### 5.2 On RTGS transaction volumes

The majority of survey respondents indicated that they see limited scope for migration of payments from RTGS systems to FPS. This could, however, change if FPS transaction limits are raised, participation criteria are widened, more systems move to real-time settlement, and/or the relative cost of FPS transactions falls.

A few jurisdictions (HK, RU and SG) indicated that they have seen no observable trend in the early stages of their FPS to suggest that they are cannibalising transactions from RTGS systems. Some jurisdictions (notably, EA countries) consider it too early to evaluate the size of any substitution effect, as FPS are still in a "ramp-up phase".<sup>33</sup> Other jurisdictions (AR, IN, JP and KR) believe that the two systems

<sup>33</sup> However, anecdotal evidence on the use cases of TARGET2 suggests that some payments (especially MT 103s) and instant payments may act as substitutes for each other.

aim at different user types and hence are unlikely to be viewed as substitutes. A small number of respondents (eg AU and SE) see a natural migration of a proportion of RTGS payments to FPS.

### 5.3 On RTGS operating hours

RTGS systems provide the venue for interbank settlement of fast payment transactions and provision of liquidity to FPS. The implications for RTGS operating hours can differ depending on the choice of settlement model in the FPS.

If the interbank settlement for an FPS (FPS settlement) takes place in real time (which is increasingly the case for FPS), the RTGS operating hours may need to adjust but there are other alternatives:

- When FPS settlement is carried out through participants' core central bank RTGS accounts, the RTGS system will need to adopt similar (near) 24/7 operating hours to the FPS to support round-the-clock processing of FPS transactions.
- Alternatively, FPS settlement can occur through a "satellite" real-time settlement system (Section 2.3). In this case, the satellite system must have the same (near) 24/7 operating hours as the FPS, although the core RTGS system need not.<sup>34</sup>
- Where a private-sector FPS performs (near) 24/7 real-time interbank settlements on its private ledger, whose process relies on the existence of balances in an account held by the FPS (or its designated agent) at the RTGS system for the benefit of all the FPS participants (Section 2.3), this may mitigate the need for extension of RTGS operating hours.<sup>35</sup>

If the FPS uses DNS, there may also be no need for a change in the operating hours of the RTGS system. However, this would lead to an accumulation of settlement risk among FPS participants over the period during which the RTGS system is closed and no interbank settlement can occur.

More broadly, the case for the alignment of the operating hours of the RTGS system and the FPS will depend on a range of factors including:

- The ability to reliably forecast FPS transactions, which may be easier in markets where there are relatively low limits on the size of individual transactions<sup>36</sup> and/or the total value of transactions in an FPS remains relatively small. The greater the predictability, the lower the case for extension, and alignment, of operating hours.
- Liquidity provision arrangements, overall liquidity conditions<sup>37</sup> in the money market, and potential competing use of that liquidity for other purposes (such as securities settlement) outside RTGS operating hours. Among other things, a higher liquidity demand for other purposes may increase the case for aligning operating hours between an FPS and the RTGS system.

<sup>34</sup> For example, in Australia the RBA's Fast Settlement Service operates 24/7/365 although its core RTGS system RITS does not.

<sup>35</sup> An arrangement in the RTGS system, or an alternative arrangement with the central bank, may still be needed so that a participant can top up the FPS balances at the RTGS (and thus the level of liquidity available to the participant on the private ledger) outside the RTGS operating hours.

<sup>36</sup> The availability of a broad set of payments data would be a prerequisite for developing reliable forecasts for FPS transactions.

<sup>37</sup> Many jurisdictions are currently characterised by very ample liquidity for banks. Should liquidity conditions tighten, liquidity management on RTGS will become more pressing.

- The survey responses also suggest that, in considering changes to the operating hours of the RTGS system, it is important to involve all participants. This is because increased operating hours will trigger additional operational costs for the central bank and RTGS participants.<sup>38</sup>

Lastly, there may be potential synergies and interactions between considerations for (domestic) fast payments and those for cross-border payments. Extended operating hours of a RTGS system could facilitate both types of payments although potential challenges may differ depending on the type of payments that use the extended window.<sup>39</sup>

## 5.4 On value dating

The introduction of 24/7 fast payment processing has important implications for the value dating of transactions.<sup>40</sup>

End users naturally expect that a payment sent through an FPS would have the same value date for both the debit and credit sides of the transaction, and that this date should align with the timing of the availability of the funds to the payee. However, this is not always achievable in practice. For instance, there are also times when PSP's settlement accounts cannot be immediately updated due to restrictions on overnight processing.<sup>41</sup> An additional complexity in jurisdictions that cross time zones is that a payment initiated today in one time zone may be received on the next day in another time zone (or vice versa), even though the actual fast payment processing is completed in seconds.

There are also instances where banks have expressed concerns about the possible misuse of FPS by corporate customers for interest arbitrage purposes. Time zone differences and varying bank cut-off times for customer account interest accruals provide the potential for overnight balances to earn interest for a given day more than once (eg if funds are moved from one bank to another immediately after the first bank's interest calculation cut-off time).<sup>42</sup>

## 6. Inferences from survey responses

Some inferences related to the impact on central banks and potential lessons for FPS owners/operators can be drawn from the survey:

- An FPS can be a catalyst/trigger for other significant changes in domestic payment systems (eg moving towards 24/7 in other parts of the financial system, additional services such as easier

<sup>38</sup> There can be other factors that could trigger a potential expansion of the RTGS operating hours. For instance, central banks may want to have overlap with operating hours of other RTGS systems to reduce settlement risk, eg payment vs payment processing outside CLS to synchronise payments across distant markets (Europe/America/Asia).

<sup>39</sup> See CPMI (2021) for the benefits, challenges and policy considerations associated with extending operating hours of RTGS systems in the context of cross-border payments.

<sup>40</sup> In the euro area (for SEPA Instant Credit Transfers), guidelines have been published to address these issues. See [https://www.ecb.europa.eu/paym/intro/governance/shared/pdf/Value\\_dating\\_SEPA\\_Instant\\_Credit\\_Transfers\\_-\\_non-binding\\_AML\\_-\\_Pay\\_market\\_best\\_practice.pdf](https://www.ecb.europa.eu/paym/intro/governance/shared/pdf/Value_dating_SEPA_Instant_Credit_Transfers_-_non-binding_AML_-_Pay_market_best_practice.pdf).

<sup>41</sup> A related issue is whether the associated settlement account bears interest or not, although this factor may be less important in the current low to negative interest rate environment.

<sup>42</sup> At the moment, this risk is mitigated by the low interest rate environment. Paying banks can also address this risk by setting value limits on faster payment transactions.

addressing). However, these changes can require significant investment to commercial banks' back-end systems.

- As FPS increasingly move towards real-time settlement, RTGS systems are being pressed to adapt. In particular, operating hours of RTGS systems are being extended and some central banks are considering the efficacy of 24/7 operations (at least in satellite arrangements) to support settlement of faster payment transactions. In some cases, RTGS systems are also having to examine their participation policies.<sup>43</sup>
- In the limit, FPS could push the RTGS system (or any satellite service provided by it) to move to 24/7 operations. In this event, there are significant implications for staffing, shift work, building facilities etc.<sup>44</sup> In addition, periodic RTGS system changes become much more complicated when moving to 24/7 operations. The move can also impact processes for resolution of financial entities: resolution planning is typically set up around a “weekend”, and this will need to be calibrated in a 24/7 world.
- Regulators and overseers will need to (continue to) pay close attention to risk, access and competition issues in markets where only a single private-sector FPS emerges. These concerns have underpinned recent decisions by the central banks in the Euro Area, United States and Sweden to have an active role in the governance and/or operation of their FPS.<sup>45</sup> It is not clear whether having both private and public FPS in a given jurisdiction will have a positive or negative impact on end users' experiences and, by extension, on the uptake and usage of fast payments.
- The increasing use of ISO 20022 in payments can provide commercial banks with more flexibility in choosing payment channels (between correspondent banks, RTGS and FPS). The move by many FPS to adopt ISO 20022 can also prompt both financial institutions and customers/end users to change their internal systems, thus allowing greater use of straight through processing.<sup>46</sup>
- Finally, FPS adoption rates in a given jurisdiction can depend on a range of factors, including cost, types of payments in scope, end user interfaces, marketing to users, and limits on the value of individual transactions and inertia due to network externality. The survey shows that, in some cases, the use of FPS can be aided by effective marketing to consumers, and having an open payment setup. For instance, in Sweden the Swish mobile app promoted convenience and frictionless payment experience for users. In Australia, the NPP can process all types of payments (all-to-all) and has provided banks with a strong incentive to migrate their bilateral/ACH system payments from existing payment rails to the NPP.
- System-wide transaction value limits can also impact FPS use. However, there are trade-offs involved. Relatively low limits may be beneficial in terms of reducing fraud risk and any issues with liquidity management. On the other hand, they may limit the expansion of FPS use, especially by businesses.

<sup>43</sup> See CPMI (2020) for a description of the work underway on the costs, benefits and policy implications of improving (direct) access to payment systems (including RTGS systems) to enhance cross-border payments.

<sup>44</sup> See also CPMI (2021) for possible impact of extending operating hours on the operation of RTGS systems.

<sup>45</sup> Similar dual arrangements already exist for large-value payments in both Europe and the United States, and for retail/ACH payments in the United States.

<sup>46</sup> However, the move to a new messaging standard could be difficult (and expensive) for some participants and end users, which could slow the adoption/use of the FPS.



## 7. Conclusion

FPS continue to proliferate across the globe, having risen from under a dozen in 2010 to around 60 in 2021. The implementation of these systems varies across jurisdictions, in part reflecting local needs and policy objectives. However, one commonality across these varied implementations is the impact on the operations and services of RTGS systems. This report identifies a number of these impacts, including in terms of pressure to modify access to and extend the operating hours at the RTGS system. The analysis also highlights key features of FPS and some recent trends, such as the move towards ISO 20022 messaging format and real-time settlement. The G20 cross-border payments programme could further support these trends through its ambitious multi-year efforts to harmonise, standardise and apply common features to payment systems.

The insights from this study can be relevant for jurisdictions considering implementing a new FPS, or modifying an existing one and, more generally, for further enhancing cross-border payments.

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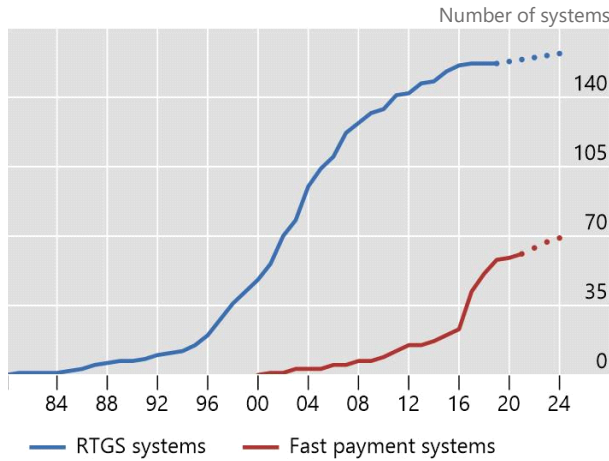
# Annex 1: Supplementary tables and graphs

## Diffusions and usage of FPS

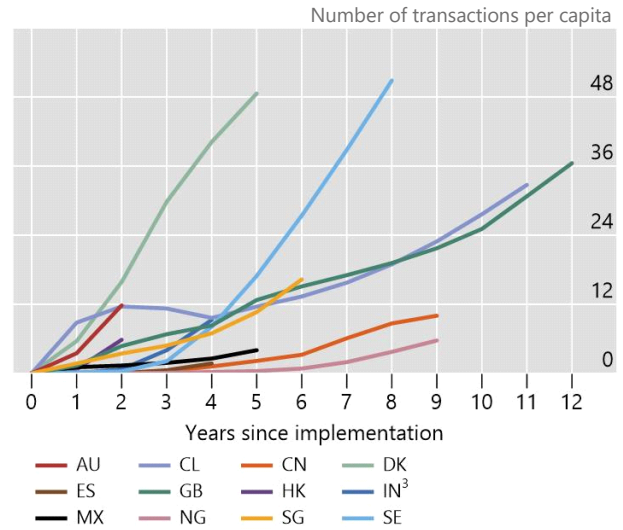
Selected systems

Graph A1

Diffusion<sup>1</sup>



Usage of FPS<sup>2</sup>



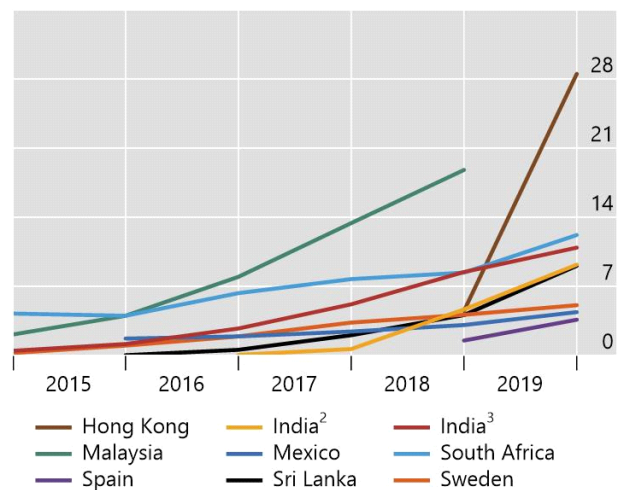
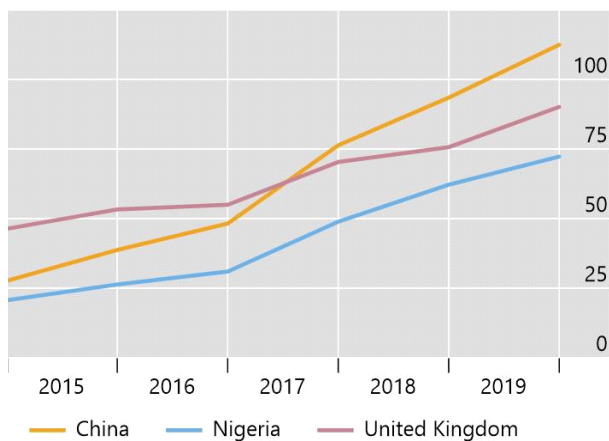
<sup>1</sup> The dashed part of the lines corresponds to projected implementation. <sup>2</sup> Systems were selected based on data availability. Includes both CPMI and non-CPMI jurisdictions. Data are available until 2019, except for CL and DK where data are available until 2018. <sup>3</sup> Figures comprise only fast payments via Unified Payments Interface (UPI).

Sources: [Bech et al \(2017\)](#); central bank websites; CPMI FPS survey; [FIS \(2019a\)](#); [Instapay](#); national data.

## Value of fast retail payment transactions<sup>1</sup>

Selected FPS; total value settled as a percentage of GDP

Graph A2



<sup>1</sup> Systems were selected based on data availability. Includes both CPMI and non-CPMI jurisdictions. <sup>2</sup> Immediate Payment Service (IMPS). <sup>3</sup> Unified Payments Interface (UPI).

Source: CPMI FPS survey; IMF; national data.

## Chronology of fast payment systems

Table A1

| Year | Country/Area           | System name  | Year           | Country/Area      | System name  |
|------|------------------------|--|----------------|-------------------|--|
| 2001 | Korea                  | Electronic Banking System (EBS)                            | 2018           | Euro area         | TIPS   |
| 2003 | Chinese Taipei         | ATM, FXML and FEDI systems                                 |                | Euro area (FR)    | SEPA EU  |
|      | Iceland                | CBI Retail Netting System (JK)                             |                | Hong Kong SAR     | Faster Payment System (FPS)                                    |
| 2006 | Malaysia               | Instant Interbank Fund Transfer                            |                | Japan             | Zengin System  |
|      | South Africa           | Real-Time Clearing (RTC)                                   |                | Euro area (LT)    | CENTROlink   |
| 2007 | Korea                  | CD/ATM system  |                | Malaysia          | RPP  |
| 2008 | Chile                  | Transferencias en línea (TEF)                              |                | Philippines       | InstaPay   |
|      | UK                     | Faster Payments Service (FPS)                              |                | Euro area (PT)    | Sistema de Compensação Interbancária                           |
| 2010 | China                  | Internet Banking Payment System (IBPS)                     |                | Serbia            | Instant Payments Serbia  |
|      | India                  | Immediate Payment Service (IMPS)                           | 2019           | Aruba             | Instant Payments Clearing and Settlement Mechanism             |
| 2011 | Argentina              | Immediate Transfer (IT)                                    |                | Euro area (BE)    | CEC.IP   |
|      | Costa Rica             | Transferencias de Fondos a Terceros del SINPE              |                | Bulgaria          | SCT Inst for local currency                                    |
|      | Nigeria                | NIBSS Instant Payments                                     |                | Croatia           | SCT Inst for local currency                                    |
| 2012 | Ecuador                | Pago Directo   |                | Mexico            | Cobro Digital (CoDi)   |
|      | Poland                 | Express ELIXIR   |                | Euro area (NL)    | equensWorldline Instant Payment CSM                            |
|      | Sweden                 | BiR  |                | Euro area (SI)    | Bankart  |
| 2014 | Denmark                | Nets Real-time 24x7  |                | Norway            | Straksbetaling   |
|      | Singapore              | Fast and Secure Transfers (FAST)                           |                | Romania           | Plăți Instant  |
| 2015 | Bahrain                | Fawri+   |                | Russia            | Faster Payments System (FPS)                                   |
|      | Mexico                 | SPEI   | 2020           | Brazil            | Pix/Sistema de Pagamentos Instantâneos (SPI)                   |
|      | Sri Lanka <sup>1</sup> | LankaPay CEFTS   | 2021           | Pakistan          | RAAST  |
| 2016 | Belize                 | Automated Payment and Securities Settlement System (APSSS) |                | Saudi Arabia      | sarie  |
|      | Ghana                  | GhIPSS Instant Pay (GIP)                                   |                | Turkey            | Instant and Continuous Transfer of Funds (FAST)                |
|      | India                  | Unified Payments Interface (UPI)                           |                | Indonesia         | BI-FAST <sup>2</sup>   |
|      | Euro area (ES)         | SNCE   | <b>Planned</b> | Azerbaijan        | Instant Payment System (IPS)                                   |
| 2017 | Bhutan                 | Immediate Payment Service                                  |                | Canada            | Real-Time Rail (RTR)   |
|      | Euro area              | RT1  |                | Colombia          | CENIT  |
|      | Euro area (FI)         | Siirto   |                | Czech Republic    | CERTIS   |
|      | Euro area (IT)         | BI-COMP  |                | Hungary           | Instant Payments   |
|      | Kenya                  | PesaLink   |                | Maldives          | The Maldives Payment System Development (MPSD)                 |
|      | Euro area (LV)         | Zibmaksajums   |                | Peru              | <i>To be determined</i>  |
|      | Switzerland            | Twint  |                | SADC <sup>3</sup> | Transactions Cleared on an immediate basis (TCIB) <sup>4</sup> |
|      | Thailand               | PromptPay  |                | Sweden            | RIX-INST   |
|      | United States          | RTP®   |                | Switzerland       | SIC IP   |
| 2018 | Australia              | New Payments Platform (NPP)                                |                | The Nordics       | P27  |
|      | Czech Republic         | RTPE   |                | United States     | FedNow <sup>SM</sup> Service                                   |

<sup>1</sup> Based on Central Bank of Sri Lanka, *Payments Bulletin*, First Quarter 2020. <sup>2</sup> To go live on 21 December 2021. <sup>3</sup> Southern African Development Community. <sup>4</sup> Cross-border payment system.

Sources: BIS; FIS (2019b); national data.

## FPS: selected characteristics

CPMI and selected non-CPMI jurisdictions

Table A2

| Country/Area | System name                            | Speed <sup>1</sup>   | Transaction value limit (USD) <sup>2</sup>   | Charges to customers (USD) <sup>2</sup>                               |
|--------------|--|----------------------|--|---|
| Argentina    | Immediate Transfer                     |                      | 5,000 for ATMs and 12,500 for online banking   | None for individual customers.  |
| Australia    | New Payments Platform                  |                      | No limit   | Set by banks  |
| Bahrain      | Fawri+                                 | Less than 30 seconds | 2,653  | 0.27 for transactions between 266 and 2,653                           |
| Belgium      | CEC.PI                                 | Within seconds       | No limit   | Set by banks  |
| Bhutan       | Immediate Payment Service              |                      | 1,402 per day  | ...   |
| Brazil       | Pix/SPI                                |                      | No limit <sup>3</sup>  | Pix <sup>4</sup>  |
| China        | IBPS                                   |                      | 141,354.98   | Set by banks  |
| Denmark      | Nets Real-time 24x7                    | A few seconds        | 74,710   | ...   |
| Euro area    | TIPS                                   | Less than 10 seconds | No limit   | Set by banks  |
| Euro area    | RT1                                    | Less than 10 seconds | 110,967  | Set by banks  |
| France       | SEPA EU                                | Within seconds       | No limit for domestic transactions; 110,967 for foreign (intra Euro area) transactions   | Set by banks  |
| HK SAR       | Faster Payment System                  |                      | Set by participants (incl banks and SVFs)  | Set by participants (generally zero for small-value P2P transactions) |
| India        | Immediate Payment Service              |                      | 2,802  | Set by banks  |
| India        | Unified Payments Interface             |                      | 2,802  | ...   |
| Indonesia    | BI-FAST                                | Less than 25 seconds | 69,190   | ...   |
| Japan        | Zengin System                          |                      | There is no transaction limit in principle; however, a transaction of USD 90 million or more can only be sent in lots due to system configurations | Set by banks  |
| Kenya        | PesaLink                               | Less than 5 seconds  | 9,678  | Set by banks  |
| Korea        | Electronic Banking System              |                      | Set by participants  | Set by participants   |
| Malaysia     | Instant Interbank Fund Transfer (IBFT) |                      | ...  | Set by banks  |
| Mexico       | SPEI                                   | Less than 30 seconds | 406  | ...   |
| Netherlands  | equensWorldline Instant Payments CSM   | Less than 5 seconds  | No limit   | Set by banks  |
| Nigeria      | NIBSS Instant Payments                 |                      | 2,749 per transaction; 13,7745 per day   | ...   |

(continued)

| Country/Area   | System name                          | Speed                | Transaction value limit (USD) <sup>2</sup>                          | Charges to customers (USD) <sup>12</sup>                       |
|----------------|--------------------------------------|----------------------|---|--|
| Philippines    | InstaPay                             |                      | 954   | Sender may bear charges; receiver is not charged               |
| Portugal       | Sistema de Compensação Interbancária | Less than 10 seconds | 110,967   | Set by banks   |
| Romania        | Plăți Instant                        | Less than 10 seconds | 11,729  | Set by banks   |
| Russia         | Faster Payments System (FPS)         | A few seconds        | ~8,000  | Set by banks; the Bank of Russia sets caps for banks' tariffs. |
| Serbia         | Instant Payments Serbia              | A few seconds        | 2,828   | Set by banks   |
| Singapore      | Fast and Secure Transfers (FAST)     |                      | 144,420   | Set by banks   |
| Spain          | SNCE                                 | Less than 10 seconds | 110,967   | Set by banks   |
| Sri Lanka      | LankaPay CEFTS                       |                      | 28,179  | Set by banks   |
| South Africa   | Real-Time Clearing (RTC)             | Less than 1 minute   | 330,845 on working days and 17,827 after hours and non-working days | Set by banks   |
| Sweden         | BiR                                  | A few seconds        | No limit set by the FPS   | Set by banks   |
| Switzerland    | Twint                                |                      | 10,000 per month for prefunded end user accounts                    | ...  |
| Switzerland    | SIC IP                               |                      | <i>tbd</i>  | Set by participants  |
| Turkey         | FAST                                 | Less than 25 seconds | 230; planned to increase gradually                                  | Set by banks; the CBRT sets caps for banks' tariffs.           |
| United Kingdom | Faster Payments Service              |                      | 304,500   | ...  |
| United States  | RTP®                                 | Within seconds       | 25,000  | ...  |

<sup>1</sup> The blank cells mean either real time or near real time (where no specific figures are provided or publicly available). <sup>2</sup> Using exchange rates as per September 2019, rounded up to the nearest integer. <sup>3</sup> SPI does not impose any transaction value limit. The FPS payment scheme (Pix) regulation does not impose any limits, but participants are allowed to set individual limits to their customers. <sup>4</sup> Pix regulation defines the exemption from charging fees for peer-to-peer transactions, as long as the receiver gets up to 30 transactions per month. Business related transactions charges are set by participating institutions.

Sources: BIS; CPMI FPS survey; ECB; national data; World Bank.

FPS in CPMI jurisdictions: additional services

Table A3

| Jurisdiction   | Name of fast payment system  | Proxy lookup/directory | Request to pay           | ISO 20022       |
|----------------|------------------------------|------------------------|--------------------------|-----------------|
| Argentina      | Immediate Transfer           | –                      | –                        | – <sup>1</sup>  |
| Australia      | NPP                          | ✓                      | –                        | ✓               |
| Belgium        | CEC.IP                       | –                      | –                        | ✓               |
| Brazil         | Pix/SPI                      | ✓                      | – <sup>2</sup>           | ✓               |
| Canada         | RTR                          | ✓ <sup>3</sup>         | ✓ <sup>4</sup>           | ✓               |
| China          | IBPS                         | ✓                      | –                        | ✓               |
| Euro area      | RT1                          | ✓                      | ✓                        | ✓               |
| Euro area      | TIPS                         | ✓ <sup>5</sup>         | –                        | ✓               |
| France         | SEPA EU                      | ✓                      | –                        | ✓               |
| Hong Kong SAR  | FPS                          | ✓                      | ✓                        | ✓               |
| India          | IMPS                         | –                      | –                        | – <sup>6</sup>  |
|                | UPI                          | ✓                      | ✓                        | ✓               |
| Indonesia      | BI-FAST                      | ✓                      | –                        | ✓               |
| Japan          | Zengin System                | –                      | –                        | ✓               |
| Korea          | EBS                          | –                      | –                        | – <sup>7</sup>  |
|                | CD/ATM                       | –                      | –                        | –               |
| Mexico         | SPEI                         | –                      | ✓                        | – <sup>8</sup>  |
| Netherlands    | equensWorldline IP CMS       | ✓                      | –                        | ✓               |
| Russia         | FPS                          | ✓ <sup>9</sup>         | ✓ <sup>10</sup>          | ✓               |
| Saudi Arabia   | sarie                        | ✓ <sup>11</sup>        | –✓                       | ✓               |
| Singapore      | FAST                         | ✓                      | –                        | ✓               |
| South Africa   | RTC                          | –                      | –                        | –               |
| Spain          | SNCE                         | ✓                      | ✓                        | ✓               |
| Sweden         | BiR <sup>12</sup>            | ✓ <sup>13</sup>        | ✓                        | ✓               |
|                | RIX-INST                     |                        | ✓                        | ✓               |
| Switzerland    | Twint <sup>14</sup>          | ✓                      | ✓                        | – <sup>15</sup> |
| Switzerland    | SIC IP                       | –                      | <i>tbd</i>               | ✓               |
| Turkey         | FAST                         | ✓                      | <i>tbd</i> <sup>16</sup> | –               |
| United Kingdom | FPS                          | –                      | –                        | ✓ <sup>17</sup> |
| United States  | RTP®                         |                        | ✓ <sup>18</sup>          | ✓               |
|                | FedNow Service <sup>19</sup> | <i>tbd</i>             | <i>tbd</i>               | <i>tbd</i>      |

<sup>1</sup> AR uses proprietary messaging format. <sup>2</sup> Request-to-pay functionality is planned to be implemented by 2023. <sup>3</sup> RTR does not have a proxy lookup/directory. However, the Interac e-Transfer competitive service, which is expected to clear and settle through RTR, has a proxy directory for email addresses and mobile numbers accessible by its participants. <sup>4</sup> While request-to-pay will be in scope, the exact timing and potential features are to be determined. <sup>5</sup> TIPS provides a mobile proxy lookup functionality. <sup>6</sup> IMPS uses ISO 8583 messaging. <sup>7</sup> Both Korean systems use proprietary messaging. <sup>8</sup> SPEI uses a proprietary message format, available only to the participants according to the Manual. <sup>9</sup> Proxy lookup. <sup>10</sup> P2P pull. <sup>11</sup> A consumer profile database will facilitate the use of proxies/aliases for addressing/identification in connection with mobile payment offerings. <sup>12</sup> Swish app has a proxy directory; the Riksbank has not decided whether to provide a proxy directory. <sup>13</sup> BiR does not have a proxy directory; however, the Swish mobile app has a proxy directory of mobile numbers. <sup>14</sup> Twint provides loyalty services such as non-cash P2P payment solution for end users of different banks. <sup>15</sup> Proprietary. <sup>16</sup> Turkey is planning to integrate the request to pay service in 2023. <sup>17</sup> The United Kingdom currently uses ISO 8583 and will migrate to ISO 20022. <sup>18</sup> RTP features the possibility for payees to send payment requests to payers through the platform. <sup>19</sup> Potential features of the FedNow Service are still under consideration.

Source: CPMI FPS survey.

## Annex 2: Real-time Gross Settlement Working Group

### Chair

Reserve Bank of Australia Tony Richards

### Members

|  |   |
|--|---|
| Reserve Bank of Australia              | Warren Wise   |
| Central Bank of Brazil                 | Irvys Rennan Bonfim   |
| Bank of Canada                         | Annetta Ho (since December 2019)<br>Christopher Reid (until December 2019)                          |
| European Central Bank                  | Sylvain Debeaumont  |
| Bank of France                         | Quentin Michel (until February 2020)<br>Jérémy Cuny (since February 2020)                           |
| Deutsche Bundesbank                    | Christoph Heid  |
| Hong Kong Monetary Authority           | Kitty Lai   |
| Reserve Bank of India                  | S Ganesh Kumar (until February 2020)  |
| Bank of Italy                          | Paola Masi<br>Giandomenico Scarpelli (until December 2020)<br>Diana Scarpetta (since December 2020) |
| Bank of Japan                          | Hironori Ishizaki (since June 2019)   |
| Bank of Korea                          | Soo Han Kwon (until February 2021)<br>Jin Uk Jang (since February 2021)                             |
| Netherlands Bank                       | Frits Clevis  |
| Central Bank of the Russian Federation | Vladimiiir Kulipanov (until August 2020)<br>Irina Avdakushina (since August 2020)                   |
| Saudi Central Bank                     | Aiman Alrabiah  |
| Monetary Authority of Singapore        | Nicholas Chan   |
| South African Reserve Bank             | Nomwelase Skenjana  |
| Sveriges Riksbank                      | Eva Hellström   |
| Swiss National Bank                    | Giuseppe D'Alelio (until January 2020)<br>Raphael Reinke (since January 2020)                       |
| Central Bank of the Republic of Turkey | Nilgün Ş Gedik Ünal (until April 2021)<br>Esat Koç (since April 2021)                               |
| Bank of England                        | John Jackson<br>Michael Jones<br>Clare Griffiths (until August 2020)                                |



Board of Governors of the  
Federal Reserve System  
Federal Reserve Bank of New York

Mark Magro  
Hampton Finer  
Ken Isaacson

**Secretariat**

Committee on Payments and  
Market Infrastructures<sup>47</sup>

Umar Faruqui (Until July 2021)  
Boniswa Khohliso (from August 2020)  
Thomas Nilsson (from January to July 2020)  
Takeshi Shirakami (from April 2021)  
Wei Zhang (until December 2019)

<sup>47</sup> Ilaria Mattei (BIS) provided data support to the working group.

## Annex 3: Acronyms and abbreviations

|            |   |
|------------|---|
| ACH        | automated clearing house                                    |
| AML        | anti-money laundering                                       |
| API        | application programming interface                           |
| B2P        | business-to-person  |
| BIC        | Business Identifier Code                                    |
| BIS        | Bank for International Settlements                          |
| CFT        | combating the financing of terrorism                        |
| CPMI       | Committee on Payments and Market Infrastructures            |
| CPSS       | Committee on Payment and Settlement Systems                 |
| DNS        | deferred net settlement                                     |
| FMI        | financial market infrastructure                             |
| FPS        | fast payment system   |
| FX         | foreign exchange  |
| IMF        | International Monetary Fund                                 |
| ISO        | International Organization for Standardization              |
| LVPS       | large-value payment system                                  |
| P2G        | person-to-government  |
| P2P        | person-to-person  |
| PFMI       | Principles for Financial Market Infrastructures             |
| PSP        | payment service provider                                    |
| RBA        | Reserve Bank of Australia                                   |
| RITS       | Reserve Bank Information and Transfer System (Australia)    |
| RTGS       | real-time gross settlement                                  |
| SWIFT      | Society for Worldwide Interbank Financial Telecommunication |
| <i>tbd</i> | to be decided   |