World Bank Project FASTT

Case Study: Iceland







Glossary of terms



S. No.	Term	Definition
1	Access Channels	Modes of communication used by customers to access the FPS services, e.g., branch, internet, mobile, ATM, kiosk, phone.
2	Account Verification	Pre-verification process to verify that a beneficiary account exists.
3	Alias (Proxy)	Alternative to bank account numbers for increased convenience of the customer, e.g., mobile number, social security number.
4	Beneficiary Verification	Pre-verification process using a social security number. When a customer inputs the social security number of the beneficiary, the system replies with the name of the individual/company linked to the provided social security number.
5	Business Payment Type	Person to Business (P2B) – Payment from an individual to a business entity Business to Person (B2P) – Payment from a business entity to an individual Business to Business (B2B) – Payment between two business entities
6	Card Top Up	Service that allows users to top up their cards instantly, i.e., increase their credit card limit by transferring money from their account.
7	Clearing and Settlement Mechanism (CSM)	Mechanism used by the FPS to establish the sums representing obligations from one participant to all others (Clearing) as well as processes that would resolve these obligations by debiting and crediting the respective accounts within the Central Bank, i.e., within the RTGS (Settlement).
8	Credit transfers	Payment instruments based on payment orders or possibly sequences of payment orders made for the purpose of placing funds at the disposal of the payee.
9	Deferred Net Settlement (DNS)	In this settlement model, the Multilateral Net Settlement Positions of participants are accumulated over a defined period of time (referred to as Settlement Cycle), and settlement is deferred until a specific time. The accumulated Multilateral Net Settlement Positions, i.e. the amount of all transactions processed over that period of time are then settled in the RTGS.
10	Direct Participant	A participant in the FPS (EXP) who is responsible for the settlement of its own payments.
11	EXP	The FPS that was implemented in Iceland.
12	Fast Payment System (FPS)	As per CPMI, a Fast Payment System is defined as payments in which the transmission of the payment message and the availability of final funds to the payee occur in real time or near-real time and on as near to a 24-hour and 7-day (24/7) basis as possible.

Glossary of terms



S. No.	Term	Definition
13	Government Payment Type	Person/Business to Government (P/B2G) – Payment from a person or business entity to a government institution. Government to Person/Business (G2P/B) – Payment from a government institution to a person or business entity.
14	High Value Payment (HVP)	A payment that is above the Transaction Limit defined and is therefore processed in the RTGS.
15	Income Category	Classification as per World Bank based on Gross National Income (GNI) per capita.
16	Individual Payment Type	Person to person (P2P) – Payment between individuals for non-business purposes.
17	Intra-day Liquidity Facility (ILF)	A facility that extends a loan to participants during the operating hours of the RTGS.
18	Iceland Krona (ISK)	The domestic currency used in Iceland.
19	ISO 20022	ISO 20022 is an open global standard for financial information.
20	Limit	It is the liquidity risk limit that is defined in EXP. It is the maximum debit position that a participant can have in EXP.
21	Low Value Payment (LVP)	A payment that is under the Transaction Limit defined and is therefore processed in EXP.
22	МВК	MilliBankagreiðsluKerfið or MilliBankaKerfið for short - directly translating as interbank payment system, consisting of the RTGS, EXP, and PAYHUB.
23	MBK Infrastructure	The collective term used to describe the MBK (RTGS, EXP and PAYHUB) including the integration with the RB Service Square.
24	Operator	The institution responsible for the operation of the payment system i.e., the Central Bank of Iceland (CBI).
25	Oversight	Regulating or governing body supervising the payments system i.e., the Central Bank of Iceland (CBI).
26	РАҮНИВ	The router/translator module.
27	Reiknistofa bankanna (RB)	The technical service provider of the Central Bank of Iceland (CBI).
28	RB Service Square	A collective name for referring to the VAS offered by RB.
29	RTGS	The Real Time Gross Settlement system.
30	Transaction Limit	A global value that is set in EXP for each payment. Any payment exceeding this value will be routed to the RTP by PAYHUB.
31	Value Added Service (VAS)	Value Added Services to the Fast Payment System (such as Account Verification, etc.).

Abbreviations



S.No.	Term	Expanded form
1	ΑΡΙ	Application Programming Interface
2	Apps	Applications
3	BIS	Bank for International Settlement
4	СВІ	Central Bank of Iceland
5	СОТЅ	Commercial Off The Shelf
6	СРМІ	Committee on Payments and Market Infrastructure
7	CSD	Central Securities Depository
8	GDP	Gross Domestic Product at current price
9	IBAN	International Bank Account Number
10	PSP	Payment Service Provider

Select Parameters





Sources: World Bank 2021 and GSMA 2022 * % of population age 15+ **World Bank 2021

How to read this report



- This deep dive report relates to the new Fast Payments System in Iceland
- It has been developed based on primary interviews with key stakeholders such as the regulator and operator in the system as well as by leveraging secondary sources
- Key secondary sources include the Central Bank of Iceland's website, the World Bank website, the Bank for International Settlements (BIS), and other publicly available documentation along with their publications
- The table below presents a legend to assist readers as they navigate through different sections of the report





The first slide of every section includes a chapter summary to provide readers with an overview of the section contents



The green box with the adjacent icon indicates **section/sub-section summary across** the report. Reader may choose to read through this for a **high-level overview on the selected topic**

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A. Executive Summary

MBK | The Icelandic Fast Payment System



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- Iceland had prior to 2002 used its RTGS (CBI-SG) system as a real-time payments system for high-value and retail payments. In 2002/2003, it implemented a Fast Payment System (FPS) known as CBI-JK to further drive digitization and fast payments in Iceland in both the gross and retail markets.
- Beginning 2015, the Central Bank of Iceland undertook a project that focused on upgrading the payment infrastructure in Iceland in order to minimize risk, comply with changing rules and regulations, and further drive innovation.
- As a part of this initiative the new Fast Payment System, EXP, which is a part of the MilliBankagreiðsluKerfið (MBK) infrastructure (translating as 'interbank payment system'), was launched in 2020. MBK consists of EXP, RTGS and PAYHUB. It represents a significant milestone in strengthening Iceland's financial Infrastructure, to facilitate alignment with international standards and best practices and further enable FinTech innovation.
- The design, development and implementation of MBK took approximately **3 Years (2018-2020).** The implementation of the FPS also included the implementation of a router/translator module that acts as the first point of contact for all payment instructions, referred to as PAYHUB. This router/translator model receives the payment message, analyzes the value of the payment instruction, and directs the payment instruction to either the RTGS for the processing of HVP or EXP for the processing of LVP.
- Today, MBK is available to all the banks in Iceland. Currently, there are nine (9) domestic banks participating in the system.
- Although there has been limited advancements to the FPS as of now, the reported downtime of the system itself has been zero since launch.
- The Central Bank of Iceland is the regulator and operator of the only FPS in the country.
- Reiknistofa Bankanna (RB) is the technical service provider and the current host of the MBK, alongside all the domestic bank's deposit systems and other payment system softwares.

KEY characteristics:

- Real-time Payments
- Proprietary Messaging Format

- Router/translator Module
- Fully Collateralized Settlement Method, i.e., no liability
 Direct participation for all regulated financial for the participants
- Operates 24x7x365
 - institutions
- Users can make payments via their providers' traditional applications and/or third-party applications that have been integrated with their provider.



Summary: The intention of EXPs' design was to upgrade the existing FPS in Iceland to dispose of the outdated underlying technologies and drive alignment with international standards and practices. The key features of EXP are listed below:



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Fast Payments

EXP, which forms a part of the MBK, is Iceland's **new modernized FPS**. It provides individuals, businesses, and government agencies the ability to **send and receive low-value payments in real-time through their service provider**.



Messaging Format

EXP is currently **based on a proprietary format**. The main benefits of using a proprietary messaging standard in Iceland are that:

- Irrespective of the intended system (RTGS or EXP), the payment instructions structure remains the same. The router/translator module will direct the payment to the appropriate system.
- When upgrading the FPS, the impact on the banks was largely limited.

However, there are plans to migrate both the RTGS and EXP to ISO 20022 by the end of 2025.



Settlement

Payments in EXP are settled on a **Deferred Net Settlement (DNS)** basis. Although settlement is deferred, **end-users receive any funds sent instantly** so they are not aware of this settlement mechanism. Limits defined in EXP are collateralized in the RTGS. This means that payments processed by EXP are cleared against collateral that the Central Bank of Iceland deems appropriate and acceptable at any time. There is thus no risk of participants not meeting payment obligations.

There are plans to migrate to a pre-funded model in the future.



System Architecture

The current FPS system architecture is comprised of two modules, the FPS module, and the router/translator module. The FPS module provides for the real-time processing of low value payments thereby enabling the instantaneous sending and receiving of money. The router/translator module is responsible for directing payments to either the RTGS or EXP depending on the transaction amount.

All payments are directed through the RB's Service Square prior to being processed by either EXP or the RTGS. The RB Service Square enables value-added services such as Bill Payments, Batch payments, etc.

Key Success Factors

- **Detailed Go-Live Runbook:** Throughout the implementation, CBI spent a significant amount of time and effort in creating a detailed go-live runbook. Although it evolved significantly throughout the project, the go-live was very successful in part due to the detailed go-live runbook.
- **Simplified Design:** One of the main principles during the requirements finalization phase was to ensure that the design of the system was kept as simple as possible to reduce the risk and complexity of the implementation while addressing Iceland specific circumstances.

Lessons learned

- **Focus on non-functional testing:** non-functional testing (such as load/stress testing, architectural setup and failover, and general technical operations of the system) is as important as functional testing to verify that the system is being developed and implemented in line with all the operational needs. CBI started non-functional testing far too late in the implementation process and it affected their business testing, general testing, overall solution setup, and timelines significantly.
- **Participant involvement and readiness:** it is important to factor in the impact of change required for banks. Implementing an FPS is a long process and requires a lot of time, effort, and money. Plugging off-the-shelf solutions into the proprietary framework of the financial community does not necessarily reduce the time, effort, or money required, which should not be underestimated. It is common to understate the scale of change required by participants as it is not only a technological one, rather all areas in an entity are impacted from governance, policy, and strategy to back-office operational processes.
- The use of RTGS as an FPS: Iceland's usage of the RTGS system is slightly different because it uses this system mainly as an FPS, which has some downsides since RTGS systems are generally not designed for this purpose.
- Development of EXP: EXP was not developed in alignment with the international FPS standards as this would have had an impact on legacy systems. At the time, a decision to limit the impact was taken. Although it was a fair decision, it does require CBI to now undertake an upgrade project which will impact market participants and legacy systems.

B. Detailed Report

1. Overview



Chapter sections:

- 1.1. Background
- 1.2. Objectives
- 1.3. System Development and Key Timelines



Chapter Summary:

- The payments market within Iceland has seen rapid changes in the past few years. New payment solutions and technologies are the driving force behind these changes. The digitization of payments started as early as the 1980s. Payments are arguably the most important and successful endeavor when considering the financial infrastructure. The citizens have embraced this transformation and the value it added to their lives (over ninety percent of Icelanders own a smartphone, and customers prefer to do their banking via their mobile phones).
- Part of the Central Bank of Iceland's mandate is to drive initiatives that further promote a safe and effective financial system.
- The FPS, EXP, was developed as a result of the payment infrastructure upgrade initiative launched by the Central Bank. The upgrade initiative focused on minimizing risks, enabling further innovation, and driving compliance with changing international standards, rules, and regulations.
- The upgraded FPS was designed with the ultimate goal of providing an infrastructure that is more capable of evolving with the ever-changing, fast-moving payment trends and technologies. An innate benefit of the upgrade was the ability to align the systems to international standards and best practices.
- EXP is **based on ISO 20022**, however participants communicate with the MBK infrastructure in a proprietary messaging standard format that is transformed by PAYHUB into an ISO-like messaging format. This messaging standard allowed CBI to minimize the overall impact of implementing the new FPS.
- All modules included in the payment infrastructure upgrade (RTGS, EXP, PAYHUB) were acquired from SIA/Perago, now Nexi/SIA.
- The implementation took approximately three (3) years and was launched in 2020.
- Post launch, there has not been any significant enhancements and/or innovations rolled out, however the system has experienced zero downtime.
- The Central Bank of Iceland manages all interbank payments in the country: it currently processes up to one million payments per day with peaks of 160,000 per hour - despite the small population of just over 370,000 inhabitants.

1.1. Background





- Iceland had an FPS system called CBI-JK which facilitated interbank transactions.
- CBI-JK was mainframebased. The cost of ownership was not sustainable, and the system was not fully compliant with PFMIs. Furthermore, the system's evolution was somewhat stunted as a result of the underlying technology.
- It was decommissioned with the launch of the new FPS, EXP, in 2020.
- CBI's requirements in many ways tried to limit the impact of the implementation on participants by ensuring the new solution at a minimum had the functionality of the older system and integrated to the participants' backoffice systems in a similar manner.

In 2015, a Request for Information (RFI) was issued. There were **five different vendors which qualified for the RFI** and subsequently, four were invited to respond to the Request for Proposal (RFP). The RFP detailed the need to **replace older mainframe solutions (CBI-SG and CBI-JK)** that had long been in operation. The CBI-SG was the high-value payment (HVP) system and the CBI-JK was the low-value payment (LVP) system. The previous systems already catered for the real-time functionality based on Central Bank money.

The RFP detailed that the Central Bank of Iceland was looking for a system that can handle both HVP and LVP; vendors were free to propose one system or two systems that are integrated. Irrelevant of the COTS solution proposed, CBI highlighted the importance of the solution communicating with the participants' core banking systems. The reason is that the current CBI-SG and CBI-JK and the participants' core banking systems worked very efficiently together through the infrastructure of CBI's IT service provider, RB, and ensured smooth STP based on non-SWIFT messages between customers, the participants' core banking systems, and the two interbank systems.

The introduction of a new updated FPS was primarily driven by the Central Bank of Iceland in support of the payment infrastructure upgrade initiative. The initiative called for the decommissioning of older systems based on dated technologies and the implementation of forward-looking systems that meet the future financial and economic needs of Iceland

The MBK infrastructure's design inherently supports integration with the RB Service Square. The Service Square ensures integration between the MBK and participants' banking systems per the tender requirements. The Service Square furthermore supports the development and provisioning of 'overlay' services that offer innovative payment services to end-users. An example of such value-added services is batch or bulk payments, account verification, and beneficiary verification.

The MBK infrastructure consisting of the RTGS, EXP and PAYHUB (the router/translator), including the integration with the RB Service Square has been designed to be interoperable and extensible, meaning it will evolve to meet the future needs of citizens, businesses, and government agencies.

The MBK infrastructure was **designed and developed to provide** the necessary infrastructure for fast payments that aims to **minimize operational** risks, operate on a 24x7x365 basis in real-time, and enable secure straight-through processing (STP) between CBI and the participants.

1.2. Objectives





- The main objectives were to minimize risk, drive compliance with international standards, and implement a system that was capable of keeping in step with the ever-changing payments trends.
- Furthermore, the system-specific objectives included the design and implementation of a safe, efficient, interoperable, modern and robust payment system. A system that will provide an equitable and stable digital financial system enabling every individual and business to make any payments digitally in a simple, fast, low-cost, and secure manner.

The purpose of this project was to decommission the older systems utilizing outdated technology, drive compliance with international standards and best practices, and identify areas in which innovation in the payments system may be improved.

Objectives

The following objectives formed the basis of the payments infrastructure upgrade initiative:

- Decommissioning of older technologies i.e., moving away from mainframe technology.
- Support compliance with the Principles for Financial Market Infrastructures (PFMIs).
- Replacement of previously-developed in-house core banking systems with standardized solutions.
- Optimize the total cost of ownership.
- Ensure the seamless integration between:
 - Central Bank-owned systems and other privately owned systems, such as the CSD that similarly underwent replacement/upgrades.
 - Participant back-office systems that were similarly undergoing replacement/upgrades.
 - Other CBI front, middle, and back-office systems that are being replaced with commercial-off-the-shelf (COTS) software.





MBK was a COTS solution with some customization that was developed and implemented in 3 years.



* The implementation, costs, and timelines include those related to the RTGS, EXP, and PAYHUB modules

2. Business and Operating Model

Chapter sections:

- 2.1. Governance Structure
- 2.2. Architecture
- 2.3. Participants
- 2.4. Payment Instruments and Transaction Types
- 2.5. Aliases and Access Channels
- 2.6. Scheme Pricing and Fee Structure
- 2.7. Use Cases



Chapter Summary:

- The Central Bank of Iceland is the owner, operator and regulator of the FPS.
- Clearing happens in the EXP system and settlement takes place in the RTGS on a Deferred Net Settlement (DNS) basis. Settlement is guaranteed through the reservation/earmarking of liquidity, the credit that is then extended for clearing in the EXP system is subject to the limit set.
- The core capabilities of EXP provide users with the ability to **initiate and receive real-time payments** in a safe and secure manner. There are a number of overlay services enabled by the RB Service Square.
- The EXP infrastructure has been developed in order to manage up to 5 million payments per day and each transaction is on average processed in less than 40 milliseconds.
- The core capabilities coupled with the value-added services lay the foundation upon which participants can build and offer innovative products and services.
- The EXP infrastructure currently only supports domestic banks joining as direct participants.
- The **commercial banks** within Iceland were **not mandated to participate in EXP**. However, due to the design and integration (the 'set-up') of the legacy systems, banks could not offer banking services without significantly altering the services offered or requesting the CBI to change the setup.
- All transactions below ISK 10 000 000 (USD 71 000) must be routed through EXP. Transactions above the aforementioned limit are routed through the RTGS. These limits may be adjusted based on market needs.
- EXP processes payments only in the domestic currency, Iceland Krona (ISK).
- The EXP system alongside the value-added services (account verification, bulk payments, etc.) can be accessed by end customers through their service providers' accepted channels.
- The pricing scheme developed for participants is based on a cost recovery model and aims to cover the full costs of developing, maintaining and operating EXP. Participants are charged a fixed monthly fee based on their balance sheet size and the volume of transactions initiated. The cost of operating the system is evaluated and adjusted on a yearly basis, the participants are charged for a certain percentage of these costs.
- Customers are not directly charged for making real-time instant credit transfers.
- Currently, EXP supports the following transaction types: Individual, Business and Government.
- The EXP integrated with PAYHUB and the RB Service Square supports bulk/batch payments, P2P transfers, B2B transfers, bill payments, wholesale payments (if less than ISK 10M), and card top ups.

Source: Central Bank of Iceland | Public Information

2.1. FPS Structure



	• The Central Bank of Iceland is the regulator			
	and operator of all the payment systems in Iceland.	Regulator and Operator	Technical Service Provider	Participants
	RB is the technical			
	service provider of the Central Bank and hosts	Seðlabanki Íslands 'Central Bank of Iceland (CBI)'	Reiknistofa bankanna (RB)	Banks
	 various payment systems on behalf of the Central Bank. Currently only domestic banks participate in EXP. Although foreign banks are not banned by any 	As the regulator, the CBI is responsible for ensuring the safety and stability of the financial system. Performs supervision and oversight of the financial systems, schemes, and participants. As the operator the CBI is responsible for day-to-day operations .	Responsible for hosting MBK. Moreover, RB provides value-added services through the RB Service Square that are not offered as a part of the FPS.	Only Domestic banks participate in EXP as direct participants subject to fulfilling the relevant eligibility criteria. Foreign Banks/other entities cannot participate in EXP due to the technical architecture and technical setup of the MBK Infrastructure
ru pa ag sy te	rules, regulations, or participation agreements, the current system has some technical limitations that prevent foreign	 The Central Bank of Iceland (CBI) as the central bank of Iceland, was established by an Act of Parliament in April 1961. It is a state-owned institution 	• RB's service square platform creates a layer between the basic systems and the implementation of the customer's business functionalities. In this way, it greatly facilitates the adoption of new systems and minimize the need for specific adoptations	 Banks are licensed under the rules and regulations mandated by the Financial Supervisory Authority (FSA) of the Central Bank of Iceland which describes amongst other items the requirements for obtaining a banking license.
	banks/other entities from participating in the	administered by a Board of Governors. The Board of	• RB performs the following roles within the	• The FSA and the Central Bank are one entity. The

ecosystem:

• Harmonized web service interface

between banks and financial institutions

• Operational control and operational safety

• Load controls and logging

• Service Agreements / SLA

Access control and authentication

Metadata - Metadata and instructions

Governors consists of three members appointed by

• The Central Bank was assigned most of the

traditional central banking functions, including the

sole right to issue notes and coins and manage the

• The scheme rules define the minimum business,

technical, availability, and security requirements for

the Minister.

participation.

foreign exchange reserves.

- The FSA and the Central Bank are one entity. The FSA is responsible for monitoring and supporting the regulatory and compliance activities of the participants on a regular basis.
- Participants must sign and comply with the terms of the agreement (mandated compliance with the scheme rules) in order to participate in EXP.

Source: Central Bank of Iceland | Public Information

EXP.

Iceland.

• The clearing and

settlement mechanism

(CSM) is achieved as a

independent systems.

by the Central Bank of

two-step process by two

Both systems are owned

ILLUSTRATIVE

2.1. FPS High-level Architecture **MBK** Infrastructure **MBK** Ę Settlement System **RB** Service RTGS Square Interbank Settlement on a DNS basis **Participant Banks** Batch/Bulk Account Payments Verification **Back Office** • The Central Bank of Fast Payment System and Other Beneficiary Iceland is the owner, **Bill Payments** Applications **PAYHUB Router** Verification regulator, and operator EXP of the FPS. Translator • The FPS, is hosted by RB, Module the technical service **Clearing of Instant** Card Top Up provider of the Central **Credit Transfers** Bank of Iceland. • EXP is a Systemically **Important Payment**

- EXP provides for the clearing of low-value payments in real-time.
- Clearing happens in EXP subject to limits collateralized in the RTGS. Settlement is managed on a Deferred Net Settlement (DNS) basis via multiple settlement cycles during the business day.
 - The collateralized limits guarantee settlement thereby reducing the liquidity and settlement risk.
 - EXP today provides for individual/single-shot payments.
- The system is available **24x7x365** for payments.
- The system is based on a proprietary message format.
- End users can access MBK infrastructure-based services via their service providers.
- Participants connect to MBK via the RB Service Square provided by RB, the technical service provider of the Central Bank.
- The RB Service Square provides other functionality that participants have access to such as Batch/Bulk Payments, Account Verification, Beneficiary Verification, Bill Payments etc.

System (SIPS) in the financial infrastructure of

Iceland.

2.2. Participants – membership and architecture _ILLUSTRATIVE



Documentation Participants have signed the

Fees Participants have agreed to pay fees,

penalties, and operating charges related to

relevant participant agreement.

EXP.

Currently, the MBK infrastructure technically only caters for direct participants. Moreover, currently, only domestic banks participate in MBK. All banks are regulated and supervised by the Central Bank of Iceland. Entities participating in MBK are continuously monitored for their compliance with the necessary requirements, activities, agreements, rules, and regulations as defined in the scheme.



- In general, any domestic bank can become a participant if:
 - The entity has obtained the required license from the Central Bank of Iceland to be a participant.
 - The entity has successfully undergone the onboarding process mandated by the Central Bank.
 - The entity has signed the relevant participant agreement.
 - The entity has the ability to manage its activity in EXP in accordance with the requirements as stipulated in the participant agreement.

Source: Central Bank of Iceland | Public Information

Eligibility Criteria

for Participants

2.3. Payment Instruments and Transaction Types







2.5. Scheme Pricing and Fee Structure



Pricing for any payment system is an important aspect that directly affects the adoption of the solution. The Central Bank of Iceland has adopted a pricing scheme that aims to recover the full costs of developing, maintaining, and operating the MBK without affecting its adoption adversely.



2.6. Use Cases 1/2



	Individual Tran	sfers		Business Transf	ers
•	Used by individuals within their banking apps or on their	Payment Instruments			Payment Instruments
	mobile or browser. There are additionally apps that allow individuals to connect debit and credit cards and then transfer from	Credit Transfer	Pusinesses use instant payments for	or various reasons either	Credit Transfer
these cards to individual bank accounts. These apps leverage the instant payment infrastructure so that when an individual makes a payment using their card, these companies make an instant payment transfer to the beneficiary. Some of these companies also offer their own smart addressing service.	Access Channels	using net banks, a browser, or indirectly through bill	Access Channels		
	verage the instant payment infrastructure so that when individual makes a payment using their card, these mpanies make an instant payment transfer to the eneficiary. Some of these companies also offer their own mart addressing service.	Mobile, Online	payments.	Mobile, Online	



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Account Verification and Beneficiary Verification (via Proxy) **Payment Instruments** These services are tied together. Credit Transfer Step 1: Beneficiary verification (via Proxy). **Access Channels** Step 2: Account Verification. Mobile, Online Step by step, when making a payment through a mobile banking app or browser, the individual must first input the beneficiary's social security number (Beneficiary Verification via Proxy) and only once verified is an individual able to move on to the account verification step. If the account information inputted is valid then the individual may input the amount. If the payee party was previously paid, then the individual can select them from the quick select / previously used transfers list i.e., step 1 and step 2 above are circumvented.

2.6. Use Cases 2/2



Batch/Bulk Paym	nents	7	Bill Payment	s
	Payment Instruments			Payment Instruments
• This system, offered by the Service Square, enables businesses and government bodies to send in a batch file that is then broken down into individual instant payments	Credit Transfer	•	The bill payment system is facilitated through the Services Square. It has various applications and is widely used by businesses to charge customers, governments to charge individuals, businesses to charge other businesses, or even	Credit Transfer
	Access Channels			Access Channels
and processed through MBK. Government makes use of this service for salary payments.	Mobile, Online	•	government bodies to charge other government bodies. Every domestic bank shows unpaid bills through their apps and when these bills are paid it uses EXP.	Mobile, Online
Wholesale Paym	ients	8	Card Top Up	S
	Payment Instruments			Payment Instruments
	Crodit Transfor			Credit Transfer
EXP is used when domestic banks are paying other			The instant payments are used when individuals are	
EXP is used when domestic banks are paying other domestic banks.	Access Channels	•	The instant payments are used when individuals are topping up their cards, i.e., users can increase credit card	Access Channels

3. User Adoption





Chapter Summary:

• Iceland has had an FPS since 2002/2003. In 2020 they launched the new upgraded system. As such the volumes have remained unchanged.

3. User Adoption



User Adoption

Iceland has had an FPS since 2002/2003. In 2020 they launched the new upgraded system. As such the volumes have remained unchanged.

Banking and FPS adoption were hand-in-hand at the start of the century. The FPS evolved alongside digital banking largely due to the fact that it was all created and hosted by a single technical service provider. **Financial inclusion has therefore been very high in Iceland (nearly 100%)** and the digital penetration and early FPS adoption has no doubt had positive impact on economic development.

Icelanders are avid users of debit and credit cards which constitute most (>90%) retail payments in Iceland, but they currently have no direct contact with EXP. Debit cards used to be dependent on clearing through the EXP but have now been moved to international rails to coincide with the clearing and settlement of credit cards. Non-cash payments have been very prevalent since 2000.

The implementation of the current FPS added nothing to the previous use cases or volumes and has only recently reduced slightly due to the off railing of debit cards, as previously mentioned.

Statistic insights





Transaction Values (ISK Mil)

4. Technical Details and Payment Process



Chapter sections:

- 4.1. Technical Details | Messaging Format, QR Codes, and Initiation Technology
- 4.2. Transaction Process (Transaction Fulfilment, Liquidity Management, and Settlement)



Chapter Summary:

- The MBK Infrastructure uses a proprietary messaging standard. There are plans to adopt ISO 20022 messaging standard by 2025.
- EXP-destined payments are subject to the same customer authentication standards banks use for all of their transactions.
- The payment process does not require any customer registrations other than is required for banks by KYC / AML law.
- Customers are not required to register with their participating financial institution if they want to use the smart addressing service to send/receive payments into their account. The process is automated in that when a customer creates a bank account the bank automatically adds it to this registry linking it to the social security number.
- There are a number of confirmation and clearing steps and settlement steps that occur in quick succession to enable users to make payments with immediate funds available to the payee cf. slides 29-30.
- Transactions are settled via the RTGS, on a Deferred Net Settlement (DNS) basis at predefined intervals.
- Settlement is guaranteed as participants are required to pledge collateral to cover their exposures in EXP. A limit is extended to the participant in EXP subject to the amount of funds reserved in the RTGS.
- Participants have access to an **Intra-day Liquidity Facility (ILF)** in the event they require additional liquidity to meet their daily settlement obligations.
- Currently the MBK infrastructure **cannot be accessed via API.** However, the CBI is in the process of conducting the necessary studies to **determine how the use of APIs could be used to increase P2B payment usage**, for example exposing MBK to third-party providers via APIs.
- QR code-based payments are not yet a part of the MBK infrastructure.

4.1. Technical Details | Messaging Format, Customer Authentication, and Initiation Technology





Proprietary – Lean content

- Communication between the MBK infrastructure and its participants is based on a proprietary protocol.
- This protocol was established with the purpose of making the exchange of information efficient and includes security checks that validate the authenticity of the participant that generates instructions.
- The uniqueness of the proprietary messages are related to the fact that it does not matter which system (RTGS/EXP) the payment instruction is intended for, from the participant's perspective they send in the same payment instruction. The information in the messages is very limited. PAYHUB, the router/translator module converts the proprietary messages to pacs.008 for the EXP or MT202 for the RTGS.
- The CBI considers its proprietary standard quite efficient, however, plans to migrate to ISO 20022 have already been set in motion. The target completion date for the aforementioned migration is 2025.
- The immediate perceived benefits of ISO 20022:
 - The identification of fraud/fraudulent activities happens in mere minutes (historically it took hours).
 - It aids the ecosystem and participants by facilitating consistent, predictable, and manageable operational behavior.
 - It contributes to the real-time payments experience.

EXP payments are made by logging into the Internet and mobile banking application of a participating financial institution and authorizing the payment. This means that EXP payments are subject to the same fraud and security protections including customer authentication standards banks use for all of their internet and mobile banking transactions i.e., biometrics, two-factor authentication, etc.

No Specific Customer authentication standards

• There are no specific customer authentication standards for making an EXP payment.

4.2. Transaction Process | Instant Credit Transfer Transaction Fulfilment

ILLUSTRATIVE



4.2. Transaction Process | Instant Credit Transfer Transaction Fulfilment



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چ	The customer does not need to register to make payments through EXP. The customer simply accesses the service through his/her preferred channel. Should the customer want to receive funds using aliases then the customer needs to register an alias. Various aspects of these steps are covered in the ensuing pages.
0	If a customer (the originator) is paying a new beneficiary he/she must first successfully pass the Beneficiary and Account Verification Processes prior to allowing the customer to input the amount of the transaction.
1	A customer (the originator) initiates an instant payment through his/her preferred channel (mobile, online, branch etc.).
2	Upon confirmation, the Originator participant creates the payment message and sends it to the RB Service Square for processing.
3	The RB Service Square sends the payment instruction to EXP for processing.
4	Within EXP the instant credit transfer is validated and processed.
5	EXP processes the payment. If there is insufficient liquidity the payment is rejected. If there is sufficient liquidity the payment is accepted and finalized i.e. clearing finalization.
6	The EXP will send the payment confirmation to the RB Service Square.
7	The RB Service Square sends the confirmation/rejection to the originator participant and the beneficiary participant.
8	The originator participant sends the confirmation of debit to the originator. The beneficiary participant sends the confirmation of credit to the beneficiary.
9	Per the DNS mechanism, EXP will send the settlement obligations to the RTGS at predefined intervals throughout the day. Once the RTGS has processed the settlement obligations it will send a message to EXP confirming the same.

4.2. Transaction Process | Liquidity Management and Settlement





5. Governance Framework



Chapter sections:

- 5.1. Legal and Regulatory Aspects
- 5.2. Risk Management
- 5.3. Dispute Resolution



Chapter Summary:

- The legal framework, Act No. 92/2019 on the Central Bank of Iceland, gives the Central Bank of Iceland an explicit mandate to promote price stability, financial stability, and sound and secure financial activities in Iceland.
- The Central Bank of Iceland plays multiple roles in the MBK infrastructure: oversight, regulator, and operator.
- The Central Bank of Iceland has a **risk management framework to identify and manage the risks** to which the payment and settlement systems may be exposed. This framework **enables CBI to identify and routinely assess the risks** that might arise from the operation of the payment and settlement systems, from its interdependencies with other systems, and the risks that participants pose to the system.
- EXP is not exposed to credit risk as it does not extend credit to participants, nor does it establish procedures for participants to extend credit among themselves.
- The **MBK Infrastructure was designed and built with security front of mind**. The integrity and performance of the MBK Infrastructure are safeguarded by minimum technical, operational, and security obligations that must be met by participating banks.



The legal framework in Iceland provides an explicit mandate to CBI for regulating the payment and settlement systems.

Institutional and Governance Framework

Legal Framework

Act No. 92/2019, Act No. 90/1999, Act No. 114/2021, Rules No. 1030/2020

> Regulator, Overseer and Operator:

The Central Bank of Iceland

Technical Provider:

Reiknistofa Bankanna

Along with the states of the European Union, Norway, Liechtenstein and Iceland are a party to the Agreement on the European Economic Area (EEA Agreement), but the agreement was ratified in Iceland by Act No. 2/1993.

Iceland's regulatory framework for payments is therefore mainly based on EU's regulatory framework i.e., the latter mentioned has been transposed into national law. As an example, EU's Directive 98/26 (the Settlement Finality Directive, SFD) has been transposed into <u>Act No. 90/1999 on the Security of Transfer Orders in Payment Systems and Securities Settlement Systems</u> but the MBK falls under the scope of that Act and the system has been notified to ESA and ESMA, cf. Art 3 cf. also Art 1.

The implementation of the MBK did not as such call for amendments or modification of the Act but the aforementioned notification needed to take place once the MBK went live in October 2020. At the same time, new <u>Rules No. 1030/2020 on the Central Bank of Iceland Interbank Payment System</u> (MBK-Rules) entered into force, but their issuance is based on Article 46 (Para2) of <u>Act No. 92/2019 on the Central Bank of Iceland</u> cf. Article 34 in the Rules.

It should also be mentioned that EU's Directive 2015/2366 (PSD2) has been transposed into Icelandic law cf. Act No. 114/2021 on Payment Services.

A more detailed list of existing laws and rules on payments in Iceland and regulatory instruments pertaining to the Central Bank of Iceland may be accessed on the Central Bank's website, <u>here</u>.

Act no. 92/2019 on the Central Bank of Iceland Act No. 90/1999 on the Security of Transfer Orders in Payment Systems and Securities Settlement Systems Act No. 114/2021 on Payment Services Rules No. 1030/2020 on the Central Bank of Iceland Interbank Payment System



The legal framework in Iceland provides an explicit mandate to CBI for regulating the payment and settlement systems.

Institutional and Governance Framework

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Legal Framework

Act No. 92/2019, Act No. 90/1999, Act No. 114/2021, Rules No. 1030/2020

Regulator, Overseer and Operator:

The Central Bank of Iceland

Technical Provider:

Reiknistofa Bankanna

- The Central Bank of Iceland which is an independent, state-owned institution, cf. Article 1 of Act on The Central Bank of Iceland, No. 36/2001, with subsequent amendments. CBI owns and operates the payment system. It also has oversight responsibilities over the system. CBI also acts as a participant in its capacity as the Treasury's bank.
- The Central Bank of Iceland is required by law to promote financial stability and sound and secure financial activities. The CBI shall also undertake
 such tasks as are consistent with its role as a central bank, such as promoting a safe, effective financial system, including domestic and cross-border
 payment intermediation.
- The Bank's oversight of financial market infrastructure aims at promoting security, efficiency, and efficacy of core infrastructure in the Icelandic financial system, or systemically important financial market infrastructure (including the MBK), thereby safeguarding financial stability.
- According to Governor's Decision no. 1452 of 10 May 2023, the criteria laid down in the BIS/IOSCO Core Principles for Financial Market Infrastructures (PFMIs) shall form the basis of the Central Bank's oversight and operation. As for the MBK, this is also stipulated in Article 31 of the aforementioned MBK-rules No. 1030/2020. Decision no. 1452 also states that the BIS-(CPMI)/IOSCO Guidance on cyber resilience for financial market infrastructures (2016) shall apply.
- Based on a self-assessment against the PFMIs criteria and the cyber guidance, oversight will evaluate compliance and if needed advice in order to seek to ensure compliance. In the unlikelihood of significant non-compliance, it may be expected that oversight would raise such issues to the audit and/or to the Financial Stability Committee that operates according to Chapter IV of the Central Bank Act, No. 92/2019. The Committee is amongst others comprised of the Governor and the bank's three Deputy Governors.
- As already mentioned, the technical operation of MBK is outsourced to Reiknistofa Bankanna (RB) which needs to comply to Annex F of the PFMIs.
- Further reading about CBI's oversight of Icelandic financial market infrastructures, please see here.*

*Note: The website refers to Governor's Decision no. 1242 but that decision has been replaced by Governor's decision no. 1452.

5.2 Risk Management



The Central Bank of Iceland has extensive contingency plans and a risk management framework that supports the reduction of risks related to the payment systems in Iceland. Moreover, Iceland has wideranging legal laws, rules, and regulations that support the reduction of risks.

	 Iceland has a sound legal and regulatory framework underpinning its Payment systems, see below (non-exhaustive):
Legal and	Act no. 92/2019 on the Central Bank of Iceland
Regulatory	Act No. 90/1999 on the Security of Transfer Orders in Payment Systems and Securities Settlement Systems
Framework	Act No. 114/2021 on Payment Services
	Rules No. 1030/2020 on the Central Bank of Iceland Interbank Payment System
	 Iceland is a party to the Agreement on the European Economic Area (EEA Agreement) but the agreement was ratified in Iceland by Act No. 2/1993. Iceland's AML/CFT regulatory framework is therefore mainly based on EU's regulatory framework i.e., the latter mentioned has been transposed into national law. Parliament has passed Act No. 140/2018 on measures against Money Laundering and Terrorist Financing but its objective and scope can be seen from Articles 1 and 2. The Act, that
AML/ CFT	constitutes the implementation in law of Directive (EU) 2015/849 cf. Art. 57, uses the term "Obliged entities" but those are entities that carry out activities that can be used for money laundering or terrorist financing, namely those listed under Article 2. The function of the Financial Supervisory Authority, now operating within the CBI, is to supervise these entities and ensure that they comply with the provisions of the aforementioned Act i.e., that they know the identity of their customers and their activities and notify the competent authorities of suspicious transactions.
	 As for CBI's interbank system (MBK) <u>Rules No. 1030/2020</u> require that a party requesting to become a participant in the MBK shall demonstrate upon filing an application that it satisfies among other things that it has adopted written rules and maintains internal controls aimed to prevent the operations from being used for money laundering or terrorist financing, cf. the provisions of the abovementioned Act (No. 140/2018) and the relevant rules and guidelines, cf. Art. 3 (Para 1, Point 3). According to the Article branches of financial institutions outside EEA (the European Economic Area) shall demonstrate that their rules and internal controls are comparable to those required according to Act No. 140/2018. According to Article 25 (Para2) of Rules No. 1030/2020, participants in the MBK shall at all times have in place a reliable system for monitoring risk in connection with the use of the interbank system, including in respect to money laundering.
	For further information please see CBI's Financial Supervision website, <u>here</u>
	• To mitigate credit and liquidity risks, a limit is set in FXP which is collateralized in the RTGS
Credit Risk and	 The Central bank has a special list of accepted collateral. To minimize any liquidity risks a discount is applied on the value of collateral so the participants can't create an unsecured position within the system.
	 Each participant has a "counter"/ "limit" in MBK which shows their net position during that settlement cycle. Two times a day, at 08:30 and at 16:00 there is a settlement cycle where funds are moved between participants based on their net position in MBK and the counters are reset.

5.2 Risk Management



The Central Bank of Iceland has extensive contingency plans and a risk management framework that supports the reduction of risks related to the payment systems in Iceland. Moreover, Iceland has wideranging legal laws, rules, and regulations that support the reduction of risks. Clearing finality ensures that all successful transactions within MBK are irrevocable and final. Clearing finality ensures that the transactions of a defaulting participant would be honoured as final or cannot be considered void or voidable by liquidators and relevant authorities. **Clearing &** Settlement • Settlement finality ensures that all successfully cleared transactions in EXP are successfully settled in the RTGS. Once a payment has been settled in the RTGS, it is considered final and irrevocable regardless of insolvency procedures or judicial sanctions concerning civil or commercial matters in which the participant may have engaged, Finality including any insolvency resolution or bankruptcy declaration concerning any participant. Participants have to meet predefined criteria at a business and technical level. Moreover, participants are subject to active monitoring and continuous oversight. This includes undergoing a **certification testing process before being admitted** to participate in the system. The Central Bank of Iceland has extensive disaster recovery plans and business continuity plans in place that have been tried and tested. • The entire system is actively monitored and managed at a business (positions of participants and industry as a whole) and technical level (at a network, infrastructure, and application), **Operational Risk** to ensure that the overall health of the system and the interfaces remain operational. • The CBI has Incident Management policies in place at several levels. There are policies in place with the MBK vendor, Nexi, and the RB Service Square provider, RB. The Incident Management policies define response/SLAs for identified risk/event types and require that 24x7x365 response teams be in place. Participants are required to have 24/7 operational support teams and resourcing to respond to alerts or incidents in place, however, all domestic participants rely on RB for round-the-clock surveillance of infrastructure hosted there. The CBI requires each participant to have an incident response plan. CBI safeguards the sensitive data of the users and ensures that it remains completely secure. This is underpinned by the below-cited laws and rules: • Chapter VI in Act No. 114/2021 on Payment Services has provisions on data protection (Art. 98), how the processing of personal data shall be handled, and security issues (Art.

- 99 and 100). The Act applies to payment services provided in Iceland cf. Art. 1. According to Art. 102 the CBI's Financial Supervisory Authority shall supervise the implementation of the Act with regard to supervised entities as provided for in Act No. 87/1998 on Official Supervision of Financial Activities.
- The principal provisions concerning the regulatory functions of the Financial Supervisory Authority are laid down in Chapter III of Act No. 87/1998 on the official supervision of financial operations, as subsequently amended for more information cf. see here.
- As for the information in MBK, it is not traceable to individuals, cf. the MBK-rules No. 1030/2020, Art. 10 (Para 2).
- Data Management

- In addition to the above, the processing of personal data shall be carried out in accordance with the Act on Data Protection and the Processing of Personal Data (No. 90/2018) and the Act on Processing of Personal Data for Law Enforcement Purposes (No. 75/2019). As also stipulated in Art. 98(Para 2), PSPs shall only obtain, process, and retain personal data necessary for the provision of their payment services, with the explicit consent of the payment service user.
- Iceland's data retention regulations are underpinned by the below-cites laws and rules:
 - Payment service providers are under requirements in this respect cf. Act on Payment Services No. 114/2021 and also in Act. No. 161/2002 and need to comply with Act No. 90/2018 on Data Protection and the Processing of Personal Data that incorporates EU Regulation 2016/679 (GDPR) into Icelandic law. Art. 25 of the MBK-rules No. 1030/2020 requires participants to always have in place a reliable system for monitoring risk in connection with the use of the interbank system, which would include ensuring data retention. As for the MBK system itself, PFMI requirements would prevail.

The Central Bank of Iceland furthermore has proven contingency plans in place in case of a data security breach.

5.2 Risk Management



The Central Bank of Iceland has extensive contingency plans and a risk management framework that supports the reduction of risks related to the payment systems in Iceland. Moreover, Iceland has wide-ranging legal laws, rules, and regulations that support the reduction of risks.

	 Iceland is a party to the Agreement on the European Economic Area (EEA Agreement) but the agreement was ratified in Iceland by Act No. 2/1993. Iceland's Cybersecurity and data protection regulatory framework is therefore mainly based on EU's regulatory framework i.e., the latter mentioned has been transposed into national law. In this context, the following may be mentioned (non-exhaustive):
	• Act No. 90/2018 on Data Protection and the Processing of Personal Data that incorporates EU Regulation 2016/679 (GDPR) into Icelandic law cf. Art. 2.
	• Act No. 114/2021 on Payment Services incorporating EU Dir. 2366/2015 (PSD2) numerous requirements both in respect to data protection and security issues (including cyber).
	 <u>Act No. 161/2002</u> on Financial Undertakings w. later amendments, different provisions e.g., Art 60(a) stating that the processing and handling of personal data shall be in accordance with the aforementioned Act No. 90/2018. Also, Chapter IX on managing of risk factors in the operations of a financial undertaking including Art. 78(g) on operational risk (including cyber).
	• Act No. 78/20019 on Security of Net- and Information Systems of Critical Infrastructures (only available in Icelandic), implementing EU Dir. 2016/1148 (the NIS-directive).
	• The constituency of <u>CERT-IS</u> is by law a registered telecommunications provider in Iceland and serves as the national CSIRT for the Icelandic implementation of the implementation of the NIS directive and serves the ministries of the Icelandic government under the same law. In addition, CERT-IS serves as the national point of contact for cybersecurity-related incidents.
Cybersecurity	 In addition, the criteria laid down in the BIS/IOSCO Core Principles for Financial Market Infrastructures (PFMIs) shall form the basis of the Central Bank's oversight and operation of systemically important financial market infrastructures in Iceland. As for the MBK this is also stipulated in Article 31 of the aforementioned MBK-rules No. 1030/2020 and Art. 25 (Para 2) states that participants shall at all times have in place a reliable system for monitoring risk in connection with the use of the interbank system, including in respect to both data protection and Cybersecurity.
	 The technical operation of EXP is outsourced to Reiknistofa Bankanna (RB) which needs to comply with Annex F of the PFMIs. In this context, it should also be mentioned that EXP shall comply with the requirements in the <u>BIS(CPMI)/IOSCO cyber guidance</u> from 2016.
	 The CBI Financial Supervisory Authority has published its <u>Supervisory Strategy for 2022-2024</u>. Accordingly, Cyber- and IT security and anti-money laundering and terrorist financing measures are set forth as priorities.
	The Central Bank of Iceland has taken a number of steps in order to safeguard against a cyber security attack, some include:
	• Disaster Recover site. The DR site provides the ability to ensure the continued operation of EXP in case of system failure or corruption.
	EXP operates in an active/passive format at two data centers.
	• CBI has developed an in-house STIP solution (Stand In Processing) that can handle all the real-time payment traffic. This solution is used when the system has scheduled downtimes or in case of an emergency.
Information	
Security Risk	 The Central Bank of Iceland operates in accordance with the ISO/IEC 2/001 International standards which is a standard to manage information security. The Central Bank of Iceland has published policies and procedures to enforce compliance with the standard.

5.3 Customer Complaints and dispute resolution





Interbank Dispute Management

- Disputes can be raised in two ways:
 - 1. Via email
 - 2. Via the helpdesk
- The process is further explained below:
- Interbank disputes are raised via the CBI Helpdesk or via email.
- Customer complaints are dealt with by participants unless the customer complaint stems from an error within EXP.
- CBI has a Change Management process that allows for the open and transparent management of changes related to EXP.

 The CBI helpdesk allows participants to log a dispute by sending an e-mail. The email once received will be automatically logged into the CBI JIRA tool. When CBI responds to the participant within the JIRA tool similarly an automatic email will be generated and sent out to the requestor.

Customer Complaints

- Customer complaints are received from customers of participants, these complaints are dealt with in the participant's own system unless the complaint is a result of an error that occurred within MBK.
- Participants are required to have **full customer complaint and dispute resolution systems with the associated processes in place**.

Change Management

- A **key objective of the Central Bank of Iceland** is to facilitate the smooth functioning of the MBK infrastructure. With that CBI allows participants to raise change requests against the system.
- Although there is no automated change management system in place, there is in fact a change management process that **is structured**, **transparent**, **and open**.

The Change Management Process:

- A requestor may send a completed change request form to the Central Bank of Iceland.
- The request will be reviewed internally, and an impact analysis conducted by a special MBK committee. The requestor will be informed of the outcome of the evaluation.
- The EXP committee decides on a change request's cost and impact and will additionally decide whether the requestor (individual participant) should pay for the whole request or if the request is a "whole industry" change request. Once decided, the CBI has a special change management process in place where it is evaluated if the said change will affect participants or not. If the change request does affect participants, there is a UAT phase required for the implementation.



Chapter sections:

• 6.1. CSM



Chapter Summary:

- The Central Bank of Iceland (CBI) is the owner, regulator, and operator of the FPS.
- EXP is the system that is responsible for the processing of low-value payments in real time.
- Clearing and Settlement of transactions in EXP is achieved via a two-step process managed by two independent systems, EXP and the RTGS. Clearing happens in EXP subject to limits collateralized in the RTGS. Settlement is managed in the RTGS on a Deferred Net Settlement (DNS) basis via multiple settlement cycles within the RTGS's business operating hours.
- The collateralized limits guarantee settlement thereby reducing the liquidity and settlement risk.

6.1 CSM Structure



- - LVP transactions processed in MBK are cleared in real-time in EXP and the settlement of these transactions will occur in multiple daily settlement cycles.
 - There are currently two settlement cycles per day.
 - Clearing and settlement is a **two-step process.**
- ILLUSTRATIVE EXP **Fast Payments System** Routing / **RB** Services Bank Routing / **RB** Services Bank Square Translating Channels Channels Translating Square (Payment Exchange, Notifications and Clearing) Paying Receiving Customer Customer Settlement Request & Notification Settlement Services RTGS The RB Services Square processes the payment. It then prepares the proprietary A customer initiates an instant credit transfer. payment instruction to be sent to the routing/translating module. The routing/translating module routes the EXP processes the payment. EXP prepares the settlement batch to be sent to the RTGS. payment to EXP. The RTGS processes the settlement batch and notifies EXP once the settlement is A customer receives money in real-time. successfully completed.
- Transactions are cleared in real-time in EXP and the settlement of these transactions will occur in multiple daily settlement cycles. There are currently two settlement cycles per day. EXP is configurable, thereby allowing for additional settlement cycles.
- Clearing and settlement is a two-step process:
 - In step 1, EXP facilitates the continuous netting and clearing of transactions including the preparation of the final step of Settlement.
 - Step 2, EXP leverages the interface to the RTGS for the actual resolutions of obligations resulting from the multilateral netting process and thus for the movement of funds between the RTGS Settlement Accounts which represents settlement finality.