Information Paper

Guidelines for the next generation of Real-Time Retail Payments Systems (RT-RPS)

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Background

The case for implementing real-time retail payments is becoming increasingly apparent.

The use of mobile technology has increased dramatically over the last decade and consumers now expect to be able to pay anywhere at any time.

Some countries and regions already have a real-time retail payment system (RT-RPS), and the pace of adoption is clearly accelerating as more countries are building, planning or exploring the opportunity to modernise their retail payment infrastructures.[1]

Real-time payments offer a convenient alternative to cards, which are often the only way to pay on the internet or at points-of-sale.

They can also aid financial inclusion and instil a formal economy, because they provide an alternative to expensive cash and cheques.

Real-time retail payments do not only benefit consumers, they also help to accelerate overall economic growth. If a business is paid in real-time, it is able to speed up its cash conversion cycle, generate necessary working capital and reduce the need for expensive short-term financing.

Although there are already a number of RT-RPS in place, their design and implementation approaches are very different. More recent systems have the advantage of being able to build on what has been learnt and achieved in the past.

The purpose of this paper is to provide a set of guidelines for developing the next generation of real-time retail payment systems.

It examines the major trends impacting the real-time retail payment business, summarises the challenges faced by market infrastructures, reviews 'lessons learned' and offers a set of practical guidelines to be taken into account when designing a real-time retail payment system.

[1] "The global adoption of real-time retail payment systems (RT-RPS)" SWIFT, published Q1 2015

Trends impacting retail payments

There are a number of key trends that are impacting banks and forcing reconsideration of the way they manage their payments businesses:

Advent of mobile and Internet technology

High growth of mobile phone and Internet usage provides users with the ability to consult information and do business on-line, anywhere, anytime.

High customer expectations

Widespread mobile and e-commerce leads customers to expect a similar experience when making payments – simple and immediate, with greater certainty and transparency on costs.

Competition from new entrants

Agile new entrants, particularly digital payment providers, are offering new business propositions and improved customer experience which could have the potential to disintermediate banks. New third party players are not hindered by existing legacy, and in some regions, regulators are levelling the playing field by allowing direct access to customers' accounts, e.g. E.U. Payment Services Directive 2.

Increased regulation

Consumer data protection, transparency requirements, financial inclusion, financial crime compliance, caps on credit card interchange fees and regional harmonisation are all impacting the payments landscape, with knock-on effects for banks on costs and profitability.

The emergence of new technologies

New technologies, such as block-chain and distributed ledgers, will likely facilitate the implementation of new payment systems in the medium- to longer-term, as open questions on latency, security and resiliency are currently being addressed by their respective providers.

Threat from cybercrime

The need to make payments ubiquitous and immediate also increases the vulnerability of consumers and businesses to cybercrime. As widely reported in the media this threat is significant and growing, and as a result banks are strengthening their security provisions.

This rapidly evolving environment presents banks and payments market infrastructures with a number of significant challenges.

Challenges in developing real-time retail payment systems

New real-time payment systems must meet a multitude of requirements to live up to the expectations of all their stakeholders, from regulators to banks through to end-customers. They must be cost-effective, resilient and fast. Simply put, the 'plumbing' should be transparent and must work all the time.

What is interesting from a global perspective is that, irrespective of where the system is implemented or what the existing infrastructure looks like, best practice design principles are beginning to emerge.

Design guidelines

Provide the rails so that banks can offer a real-time 24/7/365 service

— Cater for **low latency** and **high transaction volumes,** interfacing with banks' back-office systems and **processing transactions individually in real time,** instead of intraday or end-of-day batches.

— Support **all payment types:** high-value payments and low-value payments, attended or unattended, originating from the internet, mobile phones or at the Point-of-Sale, across P2P, B2B, P2B or B2P segments, in addition to bulked or batched non-real time payments.

— Operate at the **highest levels of resiliency**, availability, site redundancy, business continuity and disaster recovery.

— Provide the highest levels of **operational support:** transaction and system monitoring, customer support, pro-active intervention and problem management.

Ensure that interbank settlement risk is efficiently managed

— Implement either a **deferred net settlement** model (efficient use of liquidity, but requires collateral and a 'share loss agreement') or a **pre-funded/gross settlement** model (less efficient use of liquidity, but eliminates counterparty credit risk completely).

Provide convenience and confidence to end-users

— Allow payers to specify the beneficiary based on a mobile phone number, an e-mail address or another **personal identifier.** Banks and the RT-RPS use a secure, robust and scalable 'proxy' database to associate bank accounts with personal identifiers.

— Ensure the highest levels of **security:** end-to-end authentication, data confidentiality and cybercrime prevention.

— Enable banks to provide **certainty** of execution, or non-execution, within seconds.

Enable easy integration of overlay/value-added services

— Provide access via a simple and open **Application Program Interface (API) integration framework.** This set of software services allows communication between systems and enables innovative services, such as personal identifier/alias resolution, fraud detection and e-commerce services, mobile and e-invoicing functions. These enable banks to re-intermediate themselves in the transaction process.

Cater for richer data

— Specify the use of the well-established **ISO 20022 message standard** which caters for rich data such as extended and structured remittance information (which improves reconciliation) as well as non-Latin character sets.

Be cost efficient

— Use **lean and open architecture**, re-using existing technology and existing implementations to minimise setup and operating costs and reduce time-to-market.

Cater for ubiquity

— Provide easy access to all participants so that they can join the system, directly or indirectly in order to extend reach and **achieve critical mass.**

Leverage common industry standards

— Use of the common ISO 20022 message standard and specify an associated market practice, as part of a commercial and operational scheme, to avoid multiple integrations with disparate regional systems, facilitate system interoperability, and promote **critical mass and ubiquity.**

Building a new real-time retail capability that meets these requirements is challenging enough. But the complexity is significantly higher when there is legacy infrastructure, and the design, implementation and deployment of these requirements has to be made taking into account existing system or operational constraints.

With this in mind, SWIFT has designed a set of components that can be used as part of the design of any real-time payments system.

SWIFT's modular design approach

SWIFT provides a number of components that can be combined and re-used to meet the requirements for the processing of real-time payments.

These include:

Domestic Messaging Channel (DMC)

The DMC is an in-country messaging solution that allows participants to exchange a high volume of messages with low latency, on a 24/7/365 basis, with no downtime. The DMC adheres to SWIFT's highest levels of integrity, resilience and uses Public Key Infrastructure (PKI) security.

Payment Gateway (PAG)

The PAG is SWIFT software deployed to orchestrate the exchange of clearing messages between the participants and the settlement messages which are exchanged with the market infrastructure responsible for calculating the net positions. The PAG supports a set of APIs that enable direct integration with value-added services, such as an addressing database, fraud detection and merchant platforms.

Addressing database

The addressing database facilitates simpler and more efficient addressing of payments, by linking short name aliases, email addresses, mobile phone numbers and other identifiers with the customer's bank account number.

ISO 20022 standards

The messaging standard which enables long-term interoperability with other infrastructures thanks to its widespread deployment in the payments space.

Round the clock support

Provided to all participant institutions, on a 24/7/365 basis.

Case Study – Australia's New Payments Platform (NPP)

The latest RT-RPS is being built in Australia. Its design adopts a modular approach that will deliver considerable benefits.

In response to the strategic review of innovation[2] by the Reserve Bank of Australia (RBA) the payments industry is developing the New Payments Platform (NPP). SWIFT is developing infrastructure components for the NPP, the country's new infrastructure for real-time payments.

SWIFT will deliver several infrastructure components to NPP Australia Ltd, who will operate the infrastructure.

The NPP will allow for various 'overlay' services to join and use the payments infrastructure for commercial ventures that wish to offer payments-related services.

Through these overlays it is expected that participating members will provide real-time payments capabilities to their customers utilising various customer channels, such as mobile phone apps and online banking portals.

Clearing will happen directly between debtor and creditor banks, and successful clearing triggers immediate settlement in a central settlement engine built by the RBA.

The NPP is scheduled to go live in 2017. SWIFT believes that the development of the NPP, overlaid with ISO 20022 standardisation, the re-use of existing infrastructure, fast time-to-market and single-window access through SWIFT to a global community, will bring significant value to the Australian community.

Benefits of the Australian approach

SWIFT believes the design, with a distributed clearing and a centralised settlement, has a number of benefits:

Cost Efficiency
The distributed nature of the design removes the need for an extensive and costly central infrastructure and allows participants to focus on innovation and differentiation through their customer-facing channels whilst utilising a simple, reliable, fast and secure system to switch payments with other participants. In addition, by re-using some existing SWIFT infrastructure, participants experience fast time to market with reduced costs of implementation.

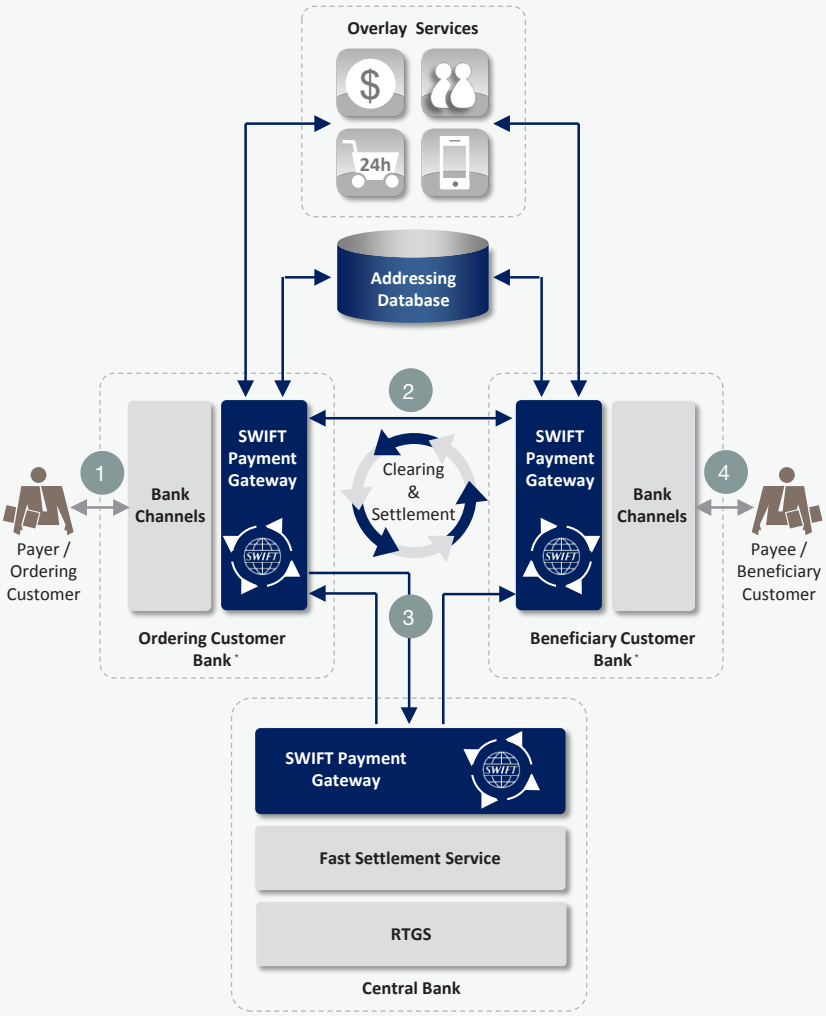
[2] Strategic Review of Innovation in the Payments System: Conclusions. Reserve Bank of Australia, published June 2012

Reliability and Trust
As the core Domestic Message Channel uses the SWIFT Multi-Vendor Secure IP Network, it offers the highest levels of security, reliability and resilience, as demanded by financial mission-critical systems. The distributed nature of the design means that there is no single point of failure and that customer data remains in-country, under the sole control and supervision of financial institutions.

Additional Resiliency
SWIFT's design allows banks the choice of posting the funds after clearing and before settlement. This makes the process more resilient as it allows for payments to be processed even if the settlement party is not available, e.g. for technical reasons.

Maximum Speed but Reduced Processing Burden
All actors within an RT-RPS must process each payment quickly, efficiently and safely. This means that clearing, settlement and confirmation of fully-validated messages, between parties with full PKI authentication and encryption needs to take place at speeds of +1000 transactions per second (TPS), or more. SWIFT's advanced design achieves maximum speed, but eases the processing burden, through advanced PKI processing, powerful decentralised pre-validation and pre-processing beneficiary details.

Neutral In-Country Platform
An RT-RPS designed and implemented in such a manner results in new, in-country payment 'rails', which can be used by any payment service in the future. For example, these rails could be used by corporates to facilitate the integration of e-commerce, e-invoicing and payments.



1 The payer initiates a transaction via any of the banks' channels such as on-line banking, mobile phone, branch, etc. These bank channels may make direct use of the addressing database to resolve alternative end-customer identifications into account numbers.

2 The payer's bank sends a message with all the payment details to the beneficiary's bank via SWIFT's 24/7/365, low latency Domestic Messaging Channel (DMC), using its SWIFT Payment Gateway (PAG). The beneficiary's bank clears the payments by checking the payment details and sends a response back to the payer's bank again using the DMC via its SWIFT PAG, confirming it is able to credit the beneficiary.

3 The payer's bank PAG then initiates the settlement by sending a settlement request via the DMC to the central bank which transfers value between Exchange Settlement Accounts. The central bank then returns a settlement confirmation to both banks.

4 The beneficiary's bank credits the beneficiary customer sometime after either a valid clearing message or settlement confirmation has been received, subject to any specific overlay requirements.

(*) "Banks" refer to any authorised deposit-taking institution that is a participant in the NPP.

Conclusions

Communities that are looking to implement new systems can learn lessons from the past. This principle also applies to real-time systems. Real-time retail systems have a rich set of common characteristics, such as instant clearing confirmation, real-time posting by the bank and 24/7/365 operation. But, despite these strong areas of commonality, the approach for clearing and the approach for settlement vary from system to system to suit local market needs.

Although one-size does not fit all, and these differences are expected to remain as communities make different implementation choices, there are considerable benefits in re-using components that have been designed in other markets. Re-use will help keep costs down and will also facilitate coexistence and interoperability if systems need to work cross border.

Need for coexistence and interoperability

Because the current focus is mostly domestic, functional requirements of existing systems are limited to the needs of the local market. However, in the medium- to longer-term there will be a need for these systems to interconnect with each other to facilitate the clearing and settlement of cross-border payments, especially within single currency zones.

Interoperability will be key to avoid fragmentation, ensuring ubiquity, and avoiding the cost of multiple integration projects with multiple systems. This cross-system interoperability will span message standards, business flow market practices, exception handling procedures, approach to APIs, settlement methods, participation models, risk coverage and service levels.

SWIFT is well placed to facilitate such a cross-industry dialogue.

SWIFT's role

SWIFT is a bank-owned not for profit cooperative, that is uniquely placed to facilitate dialogue and to support the industry in developing the next generation real-time retail payments systems. It offers:

Deep standards expertise
SWIFT is the Registration Authority and content contributor for many standards, including ISO 20022. It participates in all relevant ISO 20022 Standards Groups, and participates in the maintenance process of ISO 20022 message sets. In addition, SWIFT is a trusted facilitator and harmoniser of global market practices for ISO 20022, working closely with the Payments Market Practice Group (PMPG).

Strong payments and market infrastructure expertise
SWIFT has a strong track record in implementing complex and large-scale market infrastructure projects. Deeply experienced in facilitating industry dialogue, SWIFT has supported numerous initiatives, such as SEPA, TARGET2, TARGET2-Securities, SADC, JASDEC, DTCC, CPA, CLS, SGX, ASX, EBA STEP2, EBA EURO1/STEP1, etc. These market infrastructures use SWIFT to reduce the overall industry costs and sustain the competitiveness of its members, as well as to ensure resilience and security.

Compliance with CPMI-IOSCO Principles
SWIFT offers solutions that assist market infrastructures in meeting the 24 CPMI-IOSCO principles which impose strict rules on the efficiency, safety, recovery and resolution of market infrastructures.

Solutions enabling real-time payments
As described, SWIFT is currently developing infrastructure components for the NPP. The underlying modular technology components, such as SWIFT's low latency, high volume 'Domestic Messaging Channel' and the 'Payment Gateway' can be re-deployed into other markets, irrespective of the local market topology.

Finally, the evolution, implementation and deployment of real-time retail payment systems have been identified as key components in SWIFT's 2020 strategy. We are committed to support our community in its move to real-time retail payments.

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About SWIFT

SWIFT is a member-owned cooperative that provides the communications platform, products and services to connect more than 10,800 institutions in more than 200 countries. SWIFT enables its users to exchange automated, standardised financial information securely and reliably, thereby lowering costs, reducing operational risk and eliminating operational inefficiencies. SWIFT also brings the financial community together to work collaboratively to shape market practice, define standards and debate issues of mutual interest.

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