



# **Real-Time Payments:** The Unstoppable Tide

Cheryl Gurz, CGI

Peter Hazou, Microsoft

Consumers now expect to be able to access a full array of bank services around the clock. Whether checking a balance, transferring money between accounts, paying a friend, paying a bill, or making an online purchase, they don't expect to wait until the next morning. They want to complete their business immediately and through the most convenient channel. This presents significant challenges for financial institutions whose payment infrastructures are not yet ready to satisfy these expectations and provide real-time payments and information.

This paper provides a framework for organizations evaluating methods to meet real-time payment demands. It covers the following:

1. Global trend towards the adoption of real-time payments
2. Implications and challenges for banks
3. What banks should expect from a real-time payments solution
4. CGI's BESS All Payments solution



## GLOBAL TREND TOWARDS THE ADOPTION OF REAL-TIME PAYMENTS

Globally, there are currently at least 18 real-time payment schemes already in operation in Bahrain, Brazil, Chile, China, Denmark, Iceland, India, Japan, South Korea, Mexico, Nigeria, Poland, Singapore, South Africa, Sri Lanka, Sweden, Switzerland, Turkey and the UK. Additional schemes are under development in Australia, the Netherlands, Spain and the U.S., and other countries, such as Canada, Malaysia, the Philippines and Vietnam, are evaluating their options.

As noted above, real-time payments already exist in Europe (the UK, Poland, Sweden and Denmark have launched domestic instant payment solutions). In November 2017, the European Payments Council's SEPA Instant Credit Transfer (SCT Inst) scheme will be launched, which will provide customers with instant payments in euros all across SEPA countries and not just for individual countries. This will be the latest real-time payments scheme and the first that is not restricted by national boundaries.

Real-time payments—also referred to as immediate or instant payments—offer many benefits to all payment stakeholders, whether end-users or service providers, including the following:

- Real-time payments are the **closest substitute to cash**—the transfer of money is immediate and available 24/7/365.
- They have the potential to impact both **person-to-person** and **person-to-business** segments in situations where cash and checks are currently widely used. They may, in fact, **reduce the cost** of managing cash and checks, which are the most expensive payment methods.
- They provide the **enabling technology and infrastructure** to expand electronic and mobile commerce payments.
- The **24/7 availability of funds** can help business customers **improve their cash-flow management** and reduce

## IMPLICATIONS AND CHALLENGES FOR BANKS

The requirement for around-the-clock IT operations has not existed previously for many financial institutions, and the requirement to post incoming and outgoing payments in say under 10 seconds isn't something that can be handled currently by today's payment infrastructures. Here are just a few of the implications and challenges of real-time payments for banks:

- **24/7/365 availability:** Around-the-clock availability requires highly resilient, non-stop technology solutions that require no down time—that is, solutions you would normally associate with card, ATM and wire transaction processing and not with the processing of retail, batch-based payments.
- **Overnight batch processing:** This is still prevalent in banks, and most core ledger systems are shut down overnight to refresh account activity and balances.
- **Debits and credits:** The ability to debit and credit items to accounts in real time on a 24/7/365 basis requires substantial enhancement to existing payment infrastructures and the probable requirement for the use of stand-in processing, which again is something that you would normally associate with the card world.
- **Immediacy:** The completion of end-to-end processing within a few seconds will be a new requirement for the majority of banks. It will involve available funds checking, authorization, watch list and fraud screening, and instant response and will require throughput speeds way above the norm today.
- **Payments infrastructure:** The introduction of any new payment scheme will bring uncertainty about the likely take up speed by customers and the expected volumes. As a result, the payment processing infrastructure needs to be not only non-stop and highly resilient, but also highly and readily scalable.
- **Payments modernization:** Many large volume financial institutions are likely to move to configurable, flexible solutions capable of scaling quickly as transaction volumes grow and products mature. This payments modernization journey will include payments hubs and infrastructure transformation.
- **Targeted approach:** Those banks without large volumes will likely pursue a more targeted approach that helps meet regulatory demands and customer expectations without completely overhauling the bank's technology. Many of these banks will look for a solution that sits alongside their existing infrastructure, and one that not only complies with the new instant payments scheme but comes with an appealing total cost of ownership.
- **Operational change:** The implications and challenges of real-time payments for banks will not be restricted to technology. The scheme requirement for 24/7/365 processing introduces the need for operational change in other areas of the bank, such as customer support, call center activities, transaction monitoring, etc. Unfortunately, these impacted areas often are either ignored at the outset or underestimated and looked at after the fact.

## WHAT BANKS SHOULD EXPECT FROM A REAL-TIME PAYMENTS SOLUTION

As organizations consider their options for providing real-time payments, solution buyers must consider the following: scalability and speed, resiliency, stand-in processing, total cost of ownership and service, and compliance capability in real time.

### **Scalability and speed**

Scalability and speed of processing is a major challenge in finding an effective real-time payments solution. Both are unknown at the time a solution is introduced, and both determine whether a system chosen today will need to be replaced again in the near future as demand increases. This variable needs to be considered when designing and implementing the infrastructure as well to ensure that any need for increased performance is built into the design and not just bolted on. The functional capability of the payment hubs database, including its ability to read and write at a transaction-per-second rate that equals fractions of a second must be evaluated. The ideal solution can truly scale, providing linear scalability in its design and one-for-one expansion of hub capabilities as additional databases are added. It can thus deliver increased capability without sacrificing performance.

### **Resiliency**

Around-the-clock availability demands highly resilient, non-stop technology that requires no down time and delivers high performance. Ideally, the solution should run based on an unlimited number of active instances for smooth failover. It also should be possible to deploy changes to the operating system, middleware and even the application itself without any impact on the quality of service and with zero downtime. In addition, it's important to ensure high availability and resiliency in the design from the outset.

### **Stand-in processing**

When a core banking system becomes unavailable due to daily processing, upgrades or performance issues, accounting records cannot be accessed. Systems that handle real-time payments processing require full-time availability, and stand-in processing provides continued functionality with direct links to the core banking system. In addition, it allows data to be collected from the core system prior to going offline, thus continuing real-time processing, regardless of the time of day or night.

### **Total cost of ownership and service**

Banks without large payment volumes will need to pursue a targeted approach that helps meet regulatory demands and customer expectations. This needs to be achieved without the high cost of completely overhauling the bank's existing technology. The objective should be to ensure effective total cost of ownership and service.

### **Compliance capability in real time**

Lastly, the demands of real-time payments on compliance require a robust system that is architected for rapid scalability while maintaining effectiveness and efficiency. The solution should support complete Office of Foreign Assets Control (OFAC) and anti-money laundering scanning to ensure that compliance doesn't become a bottleneck in processing. It also must work in coordination with the financial messaging layer and provide a transactions-per-second rate in line with real-time payment demands.

## CGI'S BESS ALL PAYMENTS SOLUTION

Banks are likely to choose configurable, flexible solutions capable of scaling quickly as transaction volumes grow and products mature. Implementing an "off the shelf," modular solution that provides targeted instant payment capabilities is definitely a preferred option. This approach will enable banks to optimize existing IT resources, protect legacy investment, lower costs, remain compliant with scheme changes, develop future products, and compete with other banks and non-bank payment providers. Banks should consider pursuing a targeted approach that helps meet regulatory demands and customer expectations without completely overhauling the bank's technology.

CGI's BESS All Payments solution is architected to provide a modular, single engine replacement option. Additionally, it can handle multiple back-office systems and country-specific variations all from one location, simplifying the process of updates and code changes that will be required as real-time payments progress.

In the previous section of this paper, we described the features of a payments solution a prospective purchaser should consider. CGI's BESS All Payments solution meets those expectations in the following ways:

### **Scalability and speed**

The real time engine at the core of the CGI BESS All Payments solution is based on a technical architecture that includes an elastically scalable and distributed in-memory computing platform. This is backed up with a scalable and fault tolerant data store that provides cold storage for processed payments, processing history and static data. In addition, an API provides system management and monitoring.

CGI has performed benchmark testing of this core architecture on the Microsoft Azure cloud. The testing was performed on the 6, 9, 15 and 21 commodity nodes, and, in the last test of the 21 commodity node, processing speed reached 8,000 SCT Inst payments per second, or 380 transaction-per-second (TPS) per 8-core node. For all of the configurations tested, the average TPS per node was always around 380 TPS, demonstrating true linear scalability. This proves that, for every extra amount spent on hardware capacity, the bank may get the same extra TPS, and the business can grow without being limited by technology.

### **Resiliency**

High availability of the real time engine at the core of the CGI BESS All Payments solution is achieved by redundancy and transparent failover. This includes synchronous in-memory replication and asynchronous persistence to protect from data loss. The system incorporates a configurable redundancy factor allowing the use of a number of copies of the data, and there is asynchronous replication to a disaster recovery site, which can either be maintained as a warm or a cold site. Whole cluster startup of the disaster recover site can be achieved in just 30 seconds.

The architecture delivers zero downtime as new versions of the application software are deployed. This is achieved by running two versions of the application in parallel with automatic data migration between the two. In a similar fashion, rolling upgrades of the operating system can be achieved by temporarily switching off nodes while continuing processing on the other nodes. This ability to switch nodes in and out of operation provides elasticity of performance, with new nodes being added to enhance performance or nodes being taken out of service when demand subsides and acceptable performance can still be achieved on a reduced number of nodes.

### **Stand-in processing**

Support for 24/7/365 operations on a stand-in basis without the need to make radical changes to existing IT and bank operations is a valuable option Bess All Payments offers. In these circumstances, the stand-alone solution can be provided as a hosted solution or as a cloud offering using Microsoft Azure. For those banks that don't require stand-in processing, the solution can be provided on an in-house basis.

### **Total cost of ownership and service**

Highly effective total cost of ownership and service can be achieved by the utilization of community hardware running on private or public clouds and by using the best mix of what the current technology landscape provides to achieve an optimum cost per payment processed. BESS All Payments also has an advantage in that it's built using ultra-high performance open source technology, which includes much of the complex resiliency and recovery software out of the box and removes all of the required runtime licenses. As instant payment volumes grow, this can have a huge benefit on future upgrades and running costs.

### **Compliance capability in real time**

BESS All Payments provides a robust system that is architected for rapid scalability while maintaining effectiveness and efficiency. The solution fully complies with all requirements of real-time payment schemes and provides enough room for the business of the bank to grow. The system can be easily scaled up with stronger nodes and scaled out with more nodes with no impact on the quality of service. It's designed to process transactions faster than 10 seconds and allows enough processing time to accommodate call outs to any hot list screening and anti-fraud systems that are to be used.

## SUMMARY

CGI's BESS All Payments solution is a "best of breed" option for your participation in real-time payments. From a technical viewpoint, it's architected using state-of-the-art technology to deliver high performance and provide true 24/7/365, non-stop availability. It's also highly scalable and can be deployed using multiple options. In addition, it can be delivered either on a bank's premises or is available via the Microsoft Azure cloud.

From an operational viewpoint, BESS All Payments can be provided as an off-the-shelf modular solution, with minimal impact on existing systems and can provide 24/7/365 operation through its stand-in processing capability. It's a fully scheme compliant solution, achieving a market leading low total cost of ownership and service optimization.

From a delivery viewpoint, the solution is implemented by a team of CGI experts with extensive domain know-how and a proven track record for delivering quality solutions on time and within budget. CGI also provides the advantages of a true local presence.

CGI's BESS All Payments solution provides everything needed for successful real-time payments processing. Please contact us at [info@cgi.com](mailto:info@cgi.com) for more information.

## CGI in payments

For more than 40 years, CGI has specialized in payments, not only providing strategic consulting services to banks worldwide, but also making substantial contributions to major developments in payment infrastructures, schemes and systems.

CGI is a global leader in delivering end-to-end IT and business services to banks on all continents, combining local strength with global reach, scale and capabilities. We also offer a diverse portfolio of solutions (proprietary and third party), along with a strong global ecosystem of partnerships, to bring the very best capabilities to our clients.

	Retail & business banking	Capital markets	Wealth management
Leading clients	<ul style="list-style-type: none"> <li>• 23 of the top 25 banks in North America, and 21 of the top 25 in Europe</li> </ul>	<ul style="list-style-type: none"> <li>• Major provider to 8 of the top 10 global capital market firms</li> </ul>	<ul style="list-style-type: none"> <li>• More than 50 major clients across North America and Europe</li> </ul>
Global support & deep expertise	<ul style="list-style-type: none"> <li>• 10,000 professionals</li> <li>• Deep capabilities across all banking domains</li> <li>• Significant and complex programs, including core banking replacement, cash management implementations, payments and customer analytics</li> <li>• Application outsourcing</li> </ul>	<ul style="list-style-type: none"> <li>• 2,000 professionals</li> <li>• Significant application outsourcing using unique global delivery model</li> <li>• Application development and testing across the domain</li> <li>• Business consulting in risk and regulation</li> </ul>	<ul style="list-style-type: none"> <li>• 1,000 professionals</li> <li>• Unmatched technology and business knowledge in the space</li> <li>• Major front- and back-office transformation and architecture</li> <li>• Application outsourcing and testing</li> </ul>
Packaged IP solutions (CGI & Partner)	<ul style="list-style-type: none"> <li>• Payments, credit and collections, deposits and plan accounts, cash management, financial crime, supply chain finance, treasury, FX, and risk and reporting</li> </ul>	<ul style="list-style-type: none"> <li>• Support more than 70 clients with CGI's capital markets IP products in the area of FX trading, trade finance, and mortgage-backed securities</li> </ul>	<ul style="list-style-type: none"> <li>• Over 50 leading financial institutions using CGI's portfolio management solution</li> <li>• End-to-end wealth management solutions for banks, brokerages, investment counselors and insurers</li> </ul>





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