Payments **Modernization**
Achieving the Promise

Accelerating value and mitigating risk in the implementation of a modern payments ecosystem

Globally, many banks are faced with the prospect of undertaking major payments modernization programs. Historically, the success rates of such programs have been extremely low. This paper outlines a pragmatic architectural approach that increases the likelihood of program success, delivers business benefits in a timely fashion and provides future market-response agility.

Financial institutions are facing an unprecedented level of change and challenge in the payments space. The drivers of this change and challenge include the following:

- Downward pressure on payment revenues

- Rising customer expectations

- Global movement to real-time payments processing

- Increasing levels of cybersecurity risk

- Continued intense regulatory pressure

- Competitive threats from new, non-traditional market entrants

In facing these challenges, many banks are burdened by complex legacy payment ecosystems. These legacy ecosystems frequently contain multiple payment engines with overlapping functionality and complex processing rules that are undocumented and not well understood. In addition, they are often implemented using technologies that are dependable but burdensome to maintain and adapt to changing regulatory, business and market requirements.

To address these challenges, many financial institutions find themselves undertaking payments modernization programs. In most cases, these programs are not simple application replacement projects. Instead, they are major business and IT programs to re-architect and re-design business processes and the IT ecosystem that supports those processes. Such a program represents a major multi-year investment for financial institutions and a once-in-a-career opportunity for

the program sponsor. Given the critical nature of payment systems, the success or failure of the program can have huge ramifications for the institution and the sponsor.

Unfortunately, as we look across the industry over the past several years, the majority of payment modernization programs have not delivered on their promise. They have come in late and over budget, failing to deliver business value in a timely fashion. Further, in many cases, the result is a siloed solution that addresses a single payment type or a subset of payment types. The net result is the addition of duplicative components to the ecosystem—in essence, adding to the legacy environment, not transforming it.

Through our experience in working with financial institutions around the world, we have developed a pragmatic architectural approach that improves the success rate for these programs. This approach mitigates integration and delivery risk and enables value to be delivered more rapidly and incrementally versus traditional modernization approaches. The purpose of this white paper is to share that approach and demonstrate how it enables payment modernization programs to deliver on the promise of timely achievement of business benefits and greater agility to compete in an ever more competitive and challenging payments market.

An introduction to a pragmatic payments hub and engine model to accelerate value realization and reduce the risk inherent in payments modernization.

Unprecedented market changes and competitive pressures are forcing financial institutions to undertake payment modernization programs. While these programs are highly risky and expensive, they are an imperative for most firms and cannot be deferred or avoided. These programs, when successful, promise to deliver the following benefits:

- Lower cost of payments processing

- Improved customer experience

- Higher straight-through processing

- Greater safety and security

- Faster time to market for new products

- Greater agility in responding to competitive threats and adopting new innovation

Unfortunately, most payment modernization programs fail to deliver on that promise. Like most major transformative IT initiatives, payment modernization programs are inherently complex, risky and frequently late to market. More than 50 percent of software projects end up costing twice the original estimate (widely quoted Standish Group report) and payment modernization programs have an even worse record. In many cases, these programs deliver solutions for market needs that already have passed by, resulting in a significant lag between program initiation and value realization. In other cases, they address a subset of the overall business needs, but without providing the agility to continue to keep pace with the market. The several million dollar question is how to unlock and realize value sooner while lowering the overall risk profile of the program.

As we look at the challenges facing payment modernization programs, the following themes emerge:

- Late and over-budget delivery

- Long lead time for the realization of any business value

- Changes in scope that frustrate stakeholders

- Lack of agility to capitalize on new innovation

Late and over-budget delivery is frequently driven by a poor understanding of the complexity and details of the legacy environment. In many cases, legacy payment platforms have been in place so long that institutional knowledge of their inner workings is poor or non-existent. And, while many of them may have begun life as a vendor-provided, commercial-off-the-shelf (COTS) package, most of them have been highly customized and diverged away from the original package. The critical path for the program becomes centered on reverse engineering of the business logic in the legacy payments engine, which is a difficult and time-consuming task. Further, most engines are connected to a myriad of point-to-point interfaces that have to be analyzed and re-implemented.

Long lead times for delivery of business value are usually the result of a program plan that focuses on replacing all functions end-to-end for the processing of a payment type. The delivery of business value becomes an "all or nothing" proposition, which inherently results in a long critical path to value. Once that first piece of value is delivered, we frequently see that the end-to-end delivery process is then repeated to deliver the next increment of value. Meanwhile, the market and business priorities continue to shift and windows of opportunity repeatedly pass by.

The all or nothing, end-to-end implementation approach also tends to drive scope changes and compromises. Business stakeholders frequently become frustrated with the long time to market and find themselves compromising on features and functionality to get something delivered. The business impact is that many times the features that get de-scoped are the differentiating capabilities that drove the need for modernization. Those features then end up on a "next phase" list, competing with other priorities, including providing basic functionality for other payment types that are in the end-to-end implementation queue.

Lack of agility to capitalize on innovation results when the overall program approach delivers a new set of capabilities that are designed to meet a specific business need, but have not been factored and designed for re-use. In many instances, the focus of the program becomes "implementing the new payments engine for xyz payments." The result is a set of new components added to the legacy system to address a particular payment type, not a truly modernized payments ecosystem. The good news is that we now have an improved solution for xyz. What about other payment types? What about new emerging technologies?

We recognize that many factors contribute to the complexity and risk of these programs, including such things as organizational dynamics, program management, and availability and quality of resources and expertise. However, we believe that the underlying architectural approach taken by most programs is a major contributor to the challenges that they face and the resulting poor track record in the industry. Further, we believe that an alternative architectural approach would provide a basis for mitigating some of the key organizational and program management factors.

There is so much change in the industry that, by the time you have delivered, the market has moved.

Many payment modernization programs are centered on acquiring and implementing a new contemporary COTS payments processing solution or payments engine. While we agree that it makes sense to buy rather than build payments engine functionality, we believe that an engine-centric approach is an underlying driver to the challenges that most banks face.
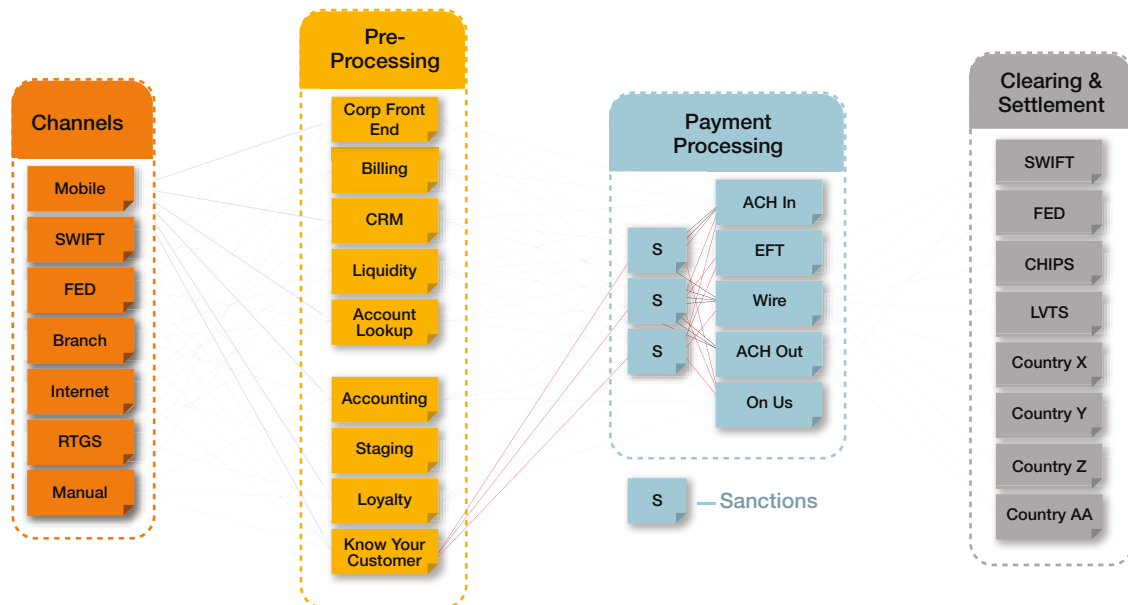
Many vendors offer standard "off the shelf" products with all the features for payments processing. However, implementation of even an off the shelf engine is no simple task. To implement and deploy the engine, the bank will still need to undertake the following types of tasks:

- Configure the engine to implement the bank's business rules

- Potentially customize the product to meet some of the bank's business needs

- Integrate the solution with the rest of the bank's legacy payments ecosystem

- Performance test and tune the solution

Underlying all of this is the discovery and reverse engineering of the bank's business rules latent in the existing payment platforms that are to be replaced by the new engine. Under any approach, this activity will be one of the most critical and time consuming elements of the modernization program. However, in an engine-centric approach, this activity elongates the critical path for the delivery of any business value by requiring the definition of an end-to-end set of business rules to implement an initial increment of functionality.

Once initial end-to-end functionality is delivered, much of the implementation process must then be repeated to deliver the next increment of functionality. Each increment becomes, in essence, another end-to-end implementation exercise, with the attendant complexities and long cycle times. In many ways, this approach is similar to the "waterfall" system life cycle methodology from which firms are migrating in favor of agile methodologies.

Processing speed and performance is critically important given the mission critical nature of payments processing. Typically, in such situations, performance testing is a key component of developing and implementing the solution. In many cases, for engine-centric implementations, truly indicative performance testing cannot be performed until late in the implementation life cycle, once all business rules have been configured, customizations implemented and interfaces put in place. This late execution of performance testing activities frequently results in the discovery that the solution, as configured, will not meet the performance and processing requirements. This discovery can cause further elongation of delivery times as the solution is re-worked and retrofitted to meet the performance requirements; or worse, the solution is abandoned because of the mismatch between desired functionality and performance.

Further, in an engine-centric approach, the pace at which the bank will be able to adopt new innovations is largely driven by the pace at which the COTS vendor incorporates those innovations into the purchased solution. Further, implementation of new innovation from the vendor may be impeded by the level of customization the bank did during initial implementation of the engine. Upgrading or replacing the payments engine once again becomes a nightmare as all the critical wirings and bespoke upgrades then have to be replicated in the new platform at a high cost and complexity. In essence, there is a significant risk of creating a new legacy environment in which new technology has been deployed with the limitations of the past. This approach does not provide sufficient agility to meet the innovation challenges and opportunities that banks face, given the unprecedented pace of innovation in the payments industry today and especially with that innovation coming from non-traditional sources.

CGI's approach

ONE HUB, MANY ENGINES

Our approach adheres to the following design principles for successful payment modernization programs:

- Deliver early revenue-generating benefits

- Reduce operating costs as quickly as possible

- Build flexibility and agility into the architecture

In our view, the key to adhering to these principles is to take a hub-centric approach, rather than an engine-centric approach. In our parlance, the "engine" is the component of the payments ecosystem that is responsible for payment execution. These functions tend to be unique for particular payment types. All other services in the ecosystem are part of the "hub" and can be shared by multiple engines.
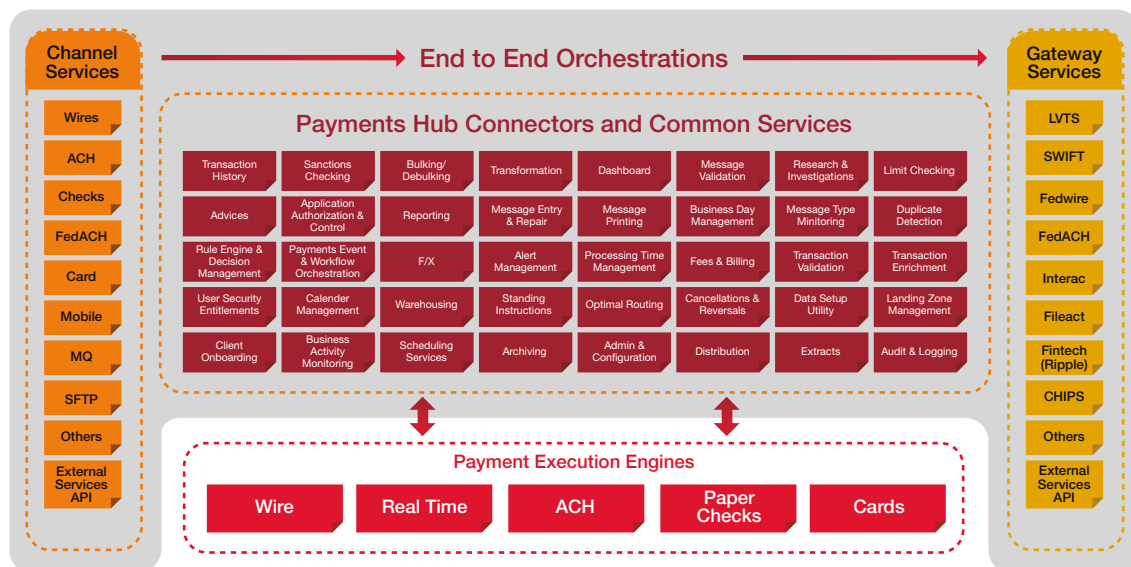
The disaggregation of services in this fashion provides the following benefits:

- Common services in the hub can be built once, maintained in one place, and shared, resulting in a lower total cost of ownership and greater agility in implementing modifications to the ecosystem

- Performance testing can be performed iteratively as the common services are built, enabling earlier visibility into system performance characteristics and more lead time to make adjustments, if necessary

- Once built, the common services can be integrated with legacy payments engines to provide business value without, or in advance of, full engine replacement

- The common services can be leveraged to enable the implementation of alternative payment engines to address changing business needs or to take advantage of new industry innovation

This architectural approach also enables a "hub-first" program planning and implementation approach in which construction of hub services can be initiated at the start of the program, even before a COTS solution has been selected. In our experience, the lead time for construction of these services is shorter than implementation of the engine and also can be typically multi-threaded once an overall hub services blueprint has been created.

CGI's approach disaggregates services from the payments engine, creating a hub-centric architecture and approach.

These surrounding ecosystem components can be built iteratively to provide features like file validation, message validation, message transformation, warehousing and other preprocessing functionalities. As these services are developed and deployed, they can be leveraged with the existing legacy core engine to meet near term business needs, thereby delivering business value earlier and sustaining program momentum.

Additionally, this approach results in a "thinner" engine, meaning that less functionality has to be implemented within the engine. Doing so reduces the complexity and risk associated with the engine implementation tasks and reduces some of the "opportunity" for customization within the engine. This approach results in easier implementation of vendor upgrades in the future. Further, it reduces dependency on the COTS vendor and enables alternative engines to be implemented in the future.

The overall result of this approach is a program of iterative, incremental delivery, providing visible and tangible results to program stakeholders. New capabilities are introduced in ways that frequently satisfy multiple stakeholders. Fewer elements are stakeholder-specific, reducing the queue of unmet needs, as opposed to the cycle of repetitive end-to-end implementations and "next phase" requirements seen with the engine-centric approach.
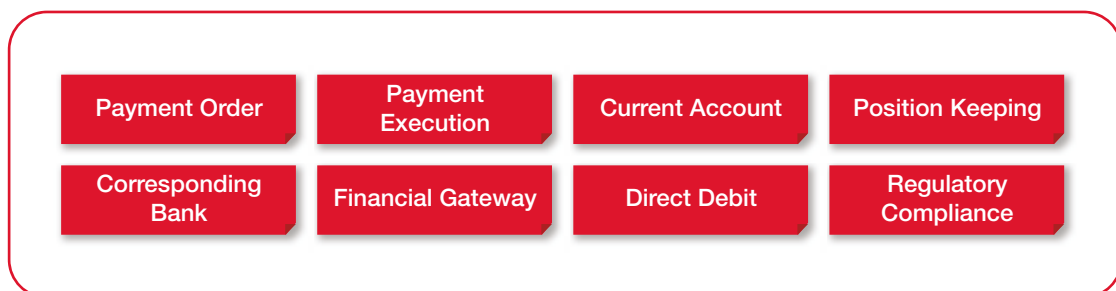
CREATING THE SERVICES BLUEPRINT

If we accept the premise of disaggregating services from the payments engine, we then need to have a methodology for deciding what stays in the engine versus what is part of the larger ecosystem. In doing so, we are presented with a couple of challenges:

- Developing an inventory of all of the services in the ecosystem can be complex and daunting. Many of the requisite services are buried in silos of what are typically multiple payment platforms and business operations groups in the legacy environment

- The COTS solution vendors have each defined what their engine solution contains and will argue the merits of fully utilizing the solution. This argument will typically run counter to our objective of achieving a "thin" engine implementation

To address both of these challenges, we utilize a vendor-agnostic reference model. The advantage of using such a model is that it provides a comprehensive list of relevant services and provides an objective basis for adjudicating between direction from the COTS vendor and the overarching architectural objectives.

One such model is the BIAN Payments Service Landscape. BIAN, the Banking Industry Architecture Network, is an association of banks, solutions providers and educational institutions with the shared aim of defining a service operation standard for the banking industry. The BIAN Payments Service Landscape provides a comprehensive specification of payment business services and standardizes those services based on service-oriented architecture (SOA) principles. It has been established to enable more efficient and effective development and integration of payment systems, improving the operational efficiency within banks and providing the opportunity for greater solution and capability re-use within and among banks. Please refer to BIAN Payment Service Landscape for details.

BIAN Payment Service Landscape

| Payment Order | Payment Execution | Current Account | Position Keeping |
| Corresponding Bank | Financial Gateway | Direct Debit | Regulatory Compliance |

CGI's hub-centric approach provides a "future proof" solution that will enable the bank to adapt to future market changes, competitive threats and new innovation. Of equal importance, the hub-centric approach drives more effective program planning and management and stakeholder engagement that will help ensure the overall success and sustainment of the payments modernization program. From a program planning perspective, the approach enables more multi-threading within the overall program plan and incremental, iterative delivery. The approach also enables more effective program management because there are clearer, more tangible deliverables and milestones. The approach results in more frequent and timely delivery of capabilities to the market, which in turn demonstrates value to stakeholders and sustains the investment in the program.

Further, the CGI payments modernization approach can help banks unlock the value in the large investment already made in their existing payments systems and rapidly deliver incremental value while positioning the bank for the future.

A properly implemented payments hub can serve the following key functions:

- Improve processing efficiency and consistency across all payments transactions

- Provide greater transparency on end-to-end transaction processing

- De-risk the bank's heavy dependence on the payments engine

- Leverage payment hub services with the existing legacy engine while the new engine implementation is in progress to deliver business value earlier and enable a smooth and stable migration path to the new engine

- Facilitate the connection to new services and clearing mechanisms, enabling the bank to more quickly take advantage of new innovation.

Many times, a large software product implementation appears to be a black hole to senior management, requiring continued increasing investment before any benefits are delivered. A properly designed and implemented payment modernization program should enable shareholders and leaders to reap benefits throughout the modernization journey, with the need to wait until the end of the journey to see any value from the program.

Why CGI

CGI has considerable experience helping our clients around the globe modernize their payment ecosystems, and we work to ensure the change is smooth and cost-effective. We collaborate as a partner, not just a provider. Through a disciplined and accountable delivery approach, we have achieved an industry-leading track record of on-time, within-budget delivery. As a result, our average client satisfaction score for the past 10 years has measured consistently higher than 9 out of 10.

More than 13,000 CGI financial services professionals based in 40 countries are helping top banks and insurers to reduce cost, increase efficiency and improve customer service. We have helped shape the payments market since our role in the design of the SWIFT banking network in the early 1970s. Based on implementing more than 80 payment solutions

globally, we developed our CGI Payments360 solution to help clients develop strategies to move money smarter, while preserving existing investments and gaining the agility to adapt rapidly.

We help banks quickly and efficiently modernize payment systems with complete solutions for consolidated multi-entity payment processing, financial messaging, liquidity management, and watch list filtering. We also offer robust consulting and systems integration expertise to transform operations across the payments lifecycle.

Learn more at www.cgi.com/payments

About CGI

Founded in 1976, CGI is one of the largest IT and business process services providers in the world. We combine innovative services and solutions with a disciplined delivery approach that has resulted in an industry-leading track record of delivering 95% of projects on time and within budget. Our global reach, combined with our proximity model of serving clients from 400 locations worldwide, provides the scale and immediacy required to rapidly respond to client needs. Our business consulting, systems integration and managed services help clients leverage current investments while adopting technology and business strategies that achieve top and bottom line results. As a demonstration of our commitment, our client satisfaction score consistently measures 9 out of 10.

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