Escaping the legacy mindset:

How to approach modernising your payments ecosystem

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Introduction

For decades now, vendors and analysts have been heralding the death of legacy systems, but still, they remain in use. Over the past 20 years, FIs have been threatened with obsolescence and plummeting market share for failing to embrace the power and flexibility of modern technology platforms with their many demonstrable benefits. Evolving is a necessity and yet, somehow, inertia rules. The industry continues to spend ever-increasing effort and money on countless tweaks to prolong the lives of their aging platforms, rather than deploying their resources to address the fundamental problem.

Some may imagine modern payment architectures as cloud-based systems, inherently customisable and API-first, endlessly scaling and adapting to meet customer needs as volumes grow and requirements change. The reality is very different. In practice, the payments industry has become one of quick fixes, patches, plug-ins and a huge assortment of integrators, with FIs partnering to deliver functionality that legacy systems cannot support. These external hubs of multiple stakeholders, and reliance on 'payment orchestration layers' are prolonging the shelf-life of antiquated, not-fit-for-purpose systems by making them more complex. In order to remain competitive, banks, FIs and dedicated payment processors, tend to focus on the front-end, with little thought for the powerhouse back-end systems required to drive it all.

When not properly managed and controlled, an organisation can end up with a tangled web, where critical business functionality is offloaded to partners who quickly become essential to servicing customers. This results in a solution architecture that is no longer a platform but a complex processing ecosystem with many parts.

This paper will consider the architectures that modern banks, FIs and processors are using, the different architectural options available to them and the technologies and skills needed to support them. Importantly, it will look at how decisions are made in relation to maintaining or upgrading the core.
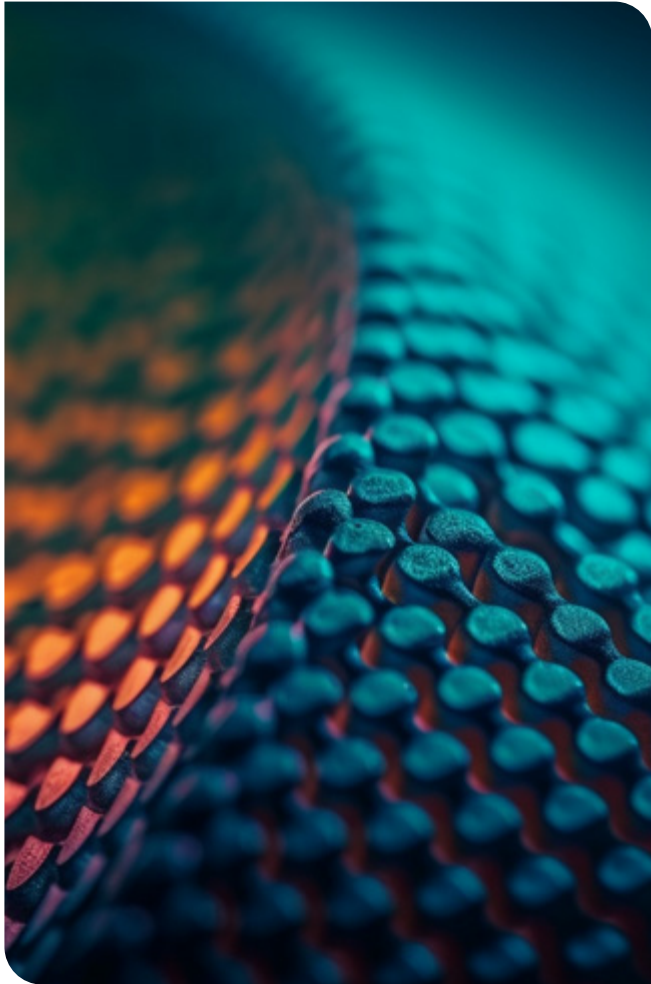
Hyper-focus

Front-end fixation

For too long we have seen how FIs extend the life of a system by focusing on a better front-end. This false economy, with ever diminishing returns, is often realised too late.

Eager Fintechs tout their wares at trade shows, presenting their wrappers, plug-ins and niche add-ons in a bid to become yet another addition to an established bank's increasing repertoire of legacy system resuscitation tools. Those selected to join find themselves part of a very overcrowded ecosystem.

The desire for immediate returns, focused on the consumer front-end, eclipses all other considerations. Whilst the core struggles, the deployment of new digital channels and the hyper-focus on digital transformation creates more silos, complexity, and puts increasing stress on the core. This is an approach lacking in foresight, where even medium-term rewards are overlooked.

There is a danger that banks, FIs and processors running on older systems can become "metric driven", counting downloads/subscribers/cards issued, rather than more fundamental values. Customer-centricity should not be treated as an end in itself, but rather a means to an end. Blindly following this path can lead to spiralling costs, whilst the legacy system is consuming resources and money, hitting both profits and capability.

This single-minded focus on the front-end limits the capacity for significant and game-changing innovation, as it does nothing to resolve the restrictions and limitations placed on banks, FIs and processors by their legacy core systems. Each partner integration is another tie binding organisations to other systems, their providers, their restrictions, their timelines and processes, whether these are technological or business-related.

There is evidence that in industries with high levels of competitive activity, very little is typically gained from innovating to meet unaddressed customer needs, i.e. being hyper-customer-focused. The key is starting from the ground up, building a powerful back-end with a robust technology platform.

Architectures – Origins and new directions

Payment architectures

Unless a bank, FI or processor pays attention to their core, they may lose sight of their overall architecture and its capabilities, or lack thereof. It is vital that the core system receives as much attention as the rest of the ecosystem so that it does not lead to a future where excessive time and resources are needed to keep an overly complex and aging system running.

The car analogy

Let us consider the car analogy: you start off wanting the best car on the road, so you research and buy the best you can afford. Over time you replace the bodywork, upgrade the upholstery, buy new tyres so that it looks like a newer model, but under the hood it still has the original engine.

The same principle applies to payment platforms. There are only so many bolt-ons you can apply before the weakness of the core becomes apparent, restricting what you can deliver to the end customer. Truly great performance demands an equally great engine. As future technologies emerge, the gap between aspiration and reality increases further.

Monolithic legacy platforms (1st gen)

Many legacy payment processing systems were based (initially at least) on a monolithic architecture, built by early entrants to the world of payments systems (pre-1990s). This architecture bears the weight of old languages, high maintenance, high costs, inflexibility, and susceptibility to occasional system crashes. There are minimal customisation options, with changes requiring huge costs and effort. As a result, change is kept to a minimum.

Modular card-based platforms (2nd gen)

Developed using languages and methodologies prevalent in the 1990s, these platforms were designed for financial institutions offering card-based payments in a pre-e-commerce, non-mobile era. Non-card-based payment instruments, new payment channels, and Open Banking are not well supported, resulting in a propensity for wraparounds and orchestration. Although deployable in the cloud, these platforms struggle with many cloud-based features and benefits. Customisation is challenging, costly, slow and, as the industry progresses, may not be possible long-term.

Open development payments platforms (ODPP) (3rd gen)

ODPPs were first introduced in the late 2000s and tend to be API-first, cloud-ready or cloud-native depending on their age. Their greatest strengths are that they are payment instrument agnostic, offering much more than just cards, and allow extensive vendor independence at different levels: payment instruments, other objects, workflows, and integrations. They support extensive customisation by virtue of native toolboxes, UDFs and layered architectures enabling the rapid development and deployment of new payment products. They do require highly skilled developers to achieve true vendor independence.

Micro-services architecture (3rd gen)

Since the mid-2010s the technology trend, and new kid on the development block, is micro-services which offer cloud-native, modular, resilient, inexpensive, low code innovation. Micro-services enable a platform to scale rapidly, allowing for diverse development teams to operate with little interdependence. Where each micro-service is relatively self-contained, micro-services work well, increasing overall system resilience. The downside is that this can result in data being duplicated across the ecosystem and there is significant potential for technical debt. Understanding what constitutes the data master is vital here. Complex communications between micro-services can become overwhelming; caution is required to protect system integrity, and prevent increased CPU time and costs.

Micro-services require skilled and precise management: with each service launched, tested, debugged individually, integrated with the other micro-services and then retested. Significant customisation beyond predefined components and templates requires vendor involvement.

Orchestration

Orchestration/integration layers became increasingly popular in the early 2000s when e-commerce started to gain momentum. There is a clear role for orchestration in a payment tech stack, but it must be appropriate and part of an overall balanced ecosystem. Orchestration has become a popular approach to bridging various technology gaps. Orchestrators provide an additional layer, with the aim of supporting integration and interoperability for disparate system elements.

While it has a real role to play when used as part of a wider growth strategy, it is not appropriate to use for crisis management as yet another legacy system prolongation tool.

When core client features are being provided by orchestration, rather than by the core platform, there is a fundamental issue to be addressed. Problems can escalate quickly, causing ecosystem-wide issues, whereby it becomes unmaintainable with workflows and data silos, causing latency and availability issues.

Architectures in operation

Modern architectures

Three real-life examples have been provided below in order to better understand how banks, FIs and processors currently choose to navigate, circumnavigate and, in the case of FI C, escape the challenges associated with legacy architectures.

FI A: Operating on legacy

This is an established FI, who has had an operational core platform for many years, based on a legacy core which is 1st or at best 2nd generation monolithic or modular monolithic.

Maintenance and change are expensive, with the result that the core platform is often left untouched, providing only vanilla capability. This 'if it ain't broke don't fix it' approach results in this FI innovating only in response to necessity. New payment methods, objects and features are implemented through extensive orchestration, involving a myriad of other providers including FinTechs innovating from afar.

The time lag to innovation and provision of new services can lead to the perception of poor service and the inability to keep up with more agile competitor offerings. With the core lacking features to improve customer outcomes, the focus, and innovation budget, is firmly on the front-end of the ecosystem. The back-end budget is large and allocated almost entirely to maintenance, with many updates and changes repeatedly postponed.

FI B: New tech, legacy architecture

This FI is operating on older technology, such as in FI A, and has realised that it can no longer continue with its current core and migration is necessary.

However, they approach their technology refresh by simply replacing their legacy core with newer technology yet keeping a like-for-like mentality. They fail to realise the potential to innovate at an architectural level and use this opportunity to take a fresh approach to designing their ecosystem. They previously had multiple legacy systems providing their products and services. Instead of innovating at the core, their "renovation" project results in multiple new systems operating under the same old architectural principles with the same restrictions.

While FI B has taken the plunge to innovate by implementing a new core, they adopt a similar approach to innovation to FI A. The orchestration layer is used as a tool to provide them with an exit strategy from partnerships. However, by continuing to operate with the same historical strategy and vision, they face the same issues as newer technologies and payment methods emerge.

FI C: Digital-first

FI C takes a digital/mobile-first ethos and approach to delivering their services building everything from the ground up, with no legacy. Innovation is from the core up, partners are not required to deliver core services, rather partners are used selectively and strategically. New services provided by partners can be tested quickly, with failures easily removed and successes integrated into the core at appropriate points. Orchestration is used as part of their over-arching technology strategy as a helpful tool rather than as an essential "life support" system.

Innovation is quick and pain-free, and, if it doesn't work out or the FI's strategy evolves, can easily be disposed of cost-effectively. The innovation budget is distributed evenly across the platform involving both the front- and back-end, unlike FIs A & B. The level of innovation and success of industry leaders such as Klarna and Starling demonstrates the value of this approach.

Challenges and risks

FI C

FI C represent the ideal architecture for modern FIs. However, many established banks and FIs struggle to attain this as modernising when you already have working systems in place is never straightforward. Company politics and culture aside, effective change requires adopting a long-term view, perseverance and thinking outside the box.

FI A

FI A are risk averse and vulnerable to the sunk cost fallacy, where choices made consider the amount of money already invested, rather than taking purely evidence-based decisions. They risk being trapped in an endless cycle of technological deficits and rising costs, selecting short-term solutions to meet short-term goals. They focus firmly on the front-end, without a strategic plan for their core platform.

FI B

FI B have recognised the shortcomings of their platform, but the sunk cost fallacy still influences their decision making. They invest heavily in terms of time, resources and financial outlay on their platform upgrade, without fundamentally changing their mindset to that of a digital-first FI. Like FI A, they are risk averse, they replicate their existing architecture in the confidence that it will operate in the expected way and somehow meet their long-term goals. Their core platform is built on newer technology but their mindset remains legacy.

Conclusions

For an FI to maintain control of its technology and innovation strategy, it needs a future-proof core built across a select number of mission-critical systems. This way, it can embrace change from a position of strength, rather than being constantly swayed by the technical limitations of its existing systems and their suppliers.

A frequent response to these challenges is to introduce an orchestration layer and build around it. While orchestration can be a valuable tool, without a sound strategy there is a real risk of lock-in to this single supplier that holds all the power to make or break your payments ecosystem.

Equally, micro-services have been hailed as a modern quick fix to an aging architecture, but this approach must also be part of a carefully engineered wider strategy, rather than simply a means to an end.

Another popular remedy is engagement into multiple micro-partnerships to provide solutions. However, these types of partners should not supply core, mission-critical ecosystem components. There is a need for continuous reassessment of the overheads associated with core and auxiliary feature sets, and when to move features to core.

The fundamental requirement is for strong architectural supervision within the FI, alongside active operational management to ensure that the FI stays in control. The operational view ensures that the outcomes of innovation, both positive and negative, are instantly identified and adjustments can be made.

FIs should guard against being hyper-focused on any single aspect of their business, as this implies other areas may be neglected. Maintaining long-term business and technology roadmaps around a capable core system is essential to lasting success. Change must be done on the organisation's terms and needs, not due to ecosystem deficiencies.

Organisations must face up to these challenges, knowing that their core platform is just as essential to their long-term success as their front-end system. This is the only reliable way to ensure that their technical capabilities meet the demands of their products, services and most importantly, their customers.

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