



The open-source technology opportunity in Payments



Introduction

Payments transformation across banks globally is a must-have today. The exceptional pace of change coupled with the need to provide services faster to the market has led banks and other players to rely on COTS (Commercial-Off-the-Shelf) solutions to address their payments hub technology needs.

COTS no longer needs to be the default choice. Open-source options have proliferated over the recent past, bringing more choices to the table. With advancements in technology, players can now adopt and leverage open-source stack to build/augment their payment hub needs while realizing both quantitative and qualitative benefits.

Bouquet of options

There are clear alternatives for every layer and/or component of payments processing technology. Here are some examples to illustrate:

Capabilities	As-is options (typical)	Open source options*
 Orchestration, Parsing, Transformation – ESB	<ul style="list-style-type: none">• Software AG webMethods• IBM Integration Service Bus• TIBCO	<ul style="list-style-type: none">• Mule ESB• Apache Service Mix• WSO2• Open ESB
 Messaging	<ul style="list-style-type: none">• WebSphere MQ• Solace JMS	<ul style="list-style-type: none">• Apache Kafka• Rabbit MQ• Active MQ
 Database	<ul style="list-style-type: none">• Oracle• SQL Server• DB2	<ul style="list-style-type: none">• MongoDB• Cassandra• PostgreSQL• MySQL
 Memory	<ul style="list-style-type: none">• Apache HBASE• Software AG Terracotta	<ul style="list-style-type: none">• Apache ignite• Redis• HazelCast

*The open-source examples are indicative and are not meant to be recommendations. This list is non-exhaustive.

Hotspots for 'open source' in payments

While the payments landscape is complex, select functionalities, in our view, are more amenable for open source adoption. Here are some capabilities that can be considered:

 High	 Medium/Low
Authentication	Transmitter
Monitoring	Booking
Routing	Pricing and Billing
Monitoring	Sanctions & AML
Bulk file handling	Fraud Management
Business validation	Referential Data Management
Reporting	Persistor
Alerter	Logger
Security	
Messaging	
Format Transformation	
Business Rules management	
Entitlements handling	
Transaction Monitoring	
ODS	
Compliance	
Batching	
Data replication	



Capturing the benefits

Banks and other players can target several qualitative benefits apart from the quantitative benefits through open source adoption.

Considerations	Benefits
Lightweight containers	<ul style="list-style-type: none">• The memory footprint of a loaded container is smaller as open-source-based solutions bundle only the minimum required files, packages, and libraries and not the entire bundle of software typically associated with traditional software. This provides the benefit of customized integration runtime for microservices that can be managed relatively easier.
Faster startup	<ul style="list-style-type: none">• As the container size is optimized, the open-source applications provide faster start-up response time to consumers
Lesser memory or storage contention	<ul style="list-style-type: none">• More memory and storage space is available at runtime as open-source applications do not consume much space for the container and associated storage files, relatively. This optimizes the capacity utilization of the solution while requiring fewer resources.
Multi-layered approach	<ul style="list-style-type: none">• Open-source-based solutions provide the flexibility to deploy the solution in multi-layered containers, unlike traditional software where the software and code are deployed together usually in a single layer. The focus here is application-layer-specific and not enterprise level in one go.
Ease of maintenance	<ul style="list-style-type: none">• With a multi-layered approach, it is easier to recreate, manage, and distribute the runtime and application images. This results in focused monitoring and scalability of each layer.
Open standards-based solution	<ul style="list-style-type: none">• The emphasis on the usage of open standards like XPATH, XSLT, SAX, DOM parsing, etc. means that solution is more manageable and aligned to the latest technology innovations associated with such standards. This minimizes vendor lock-in and ensures that the solution road-map is aligned to industry trends.
Configuration-driven solution	<ul style="list-style-type: none">• In traditional software, the deployment package is custom and uses a proprietary code base. This causes maintenance overheads involving downtime for any change requests or new markets or clearing scheme rollouts. Open-source solutions provide the flexibility to tailor the solution to the requirement of a particular market/country by leveraging a configuration approach post the one-time deployment.• This sets the foundation to drive the ongoing deployments as self-service config change from UI or automated config deployments as needed. This ensures faster time-to-market while avoiding any downtime penalties levied by regulators.

Addressing the risks

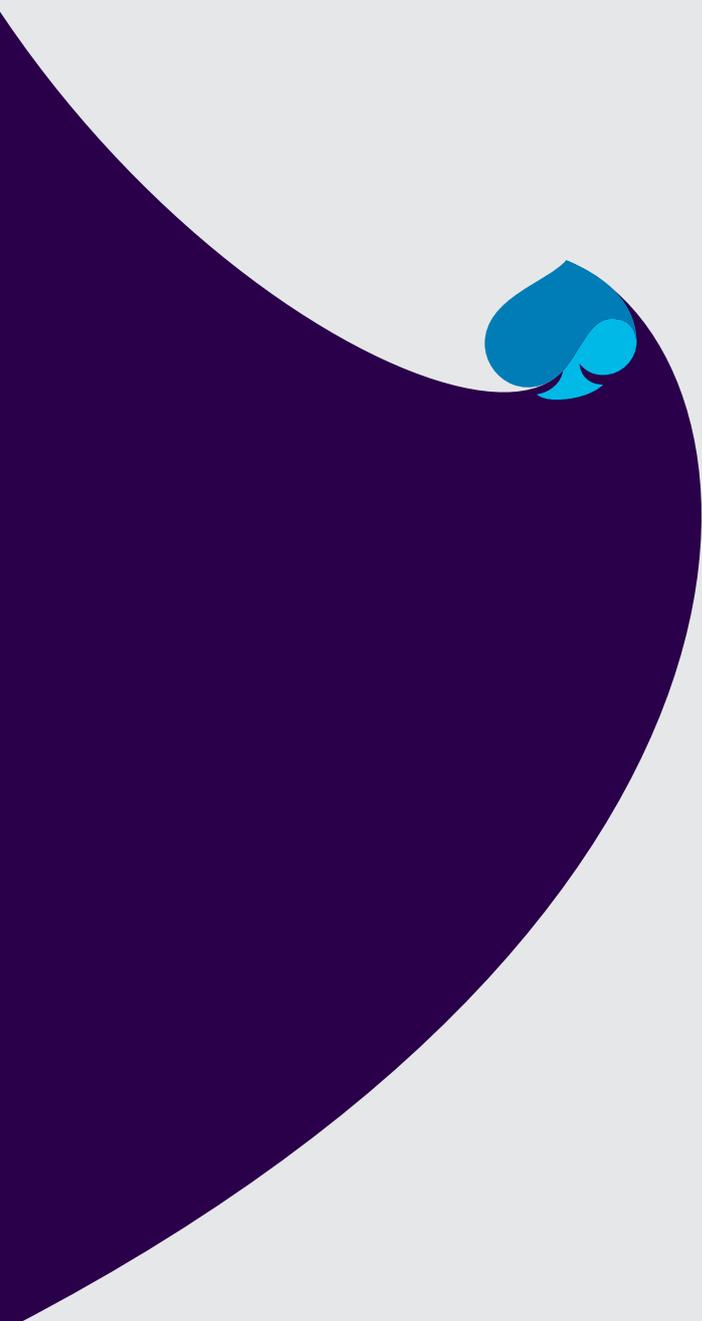
While traditional technologies have evolved and continue to work just fine, open-source solutions go beyond what's traditionally delivered, offering players a host of choices. However, open-source technologies are not without their own risks and challenges. From our experience, such risks need to be understood and managed to realize the targeted benefits.

Risks / Challenges	Mitigation themes
01 Stability	 Drive stability by ensuring sizing of hardware resources with adequate capacity while building redundant server farm to mitigate downtime possibilities
02 Performance	 Leverage advanced techniques such as segmentation to avoid overloading application memory
03 Security- or tool-related gaps	 Create custom API for sign and verify, message digest, encrypt and decrypt. This ensures an easier fix of any security vulnerabilities discovered in the adopted standards.
04 Higher 'run' cost	 Avoid cost escalation by in-time version upgrades. Deferring upgrades results in accumulated migration efforts (technical debt) while missing out on runtime improvements offered in the latest versions.
05 Software licensing compliance Risks	 Ensure if the software is allowed for production/commercial use. If it is only for development use, check with the software vendor on additional steps for commercial purposes.
06 Availability	 Drive high availability via methods such as clustering with horizontal and vertical scaling
07 Lack of dedicated support	 Develop skill base within organization/vendor partners to build expertise to quickly find solutions to known issues. Engage with open-source vendor on a maintenance contract to mitigate any product bug related issues.
08 Inadequate parser support	 Some formats such as 8583 are not widely supported across open-source ESB. Such format issues can be mitigated by developing custom parsers using open-source flat-file libraries.
09 Connector support	 Last-mile connectivity with regulator systems in a clearing gateway requires a wide variety of options like Web socket, MQ, Connect Direct, etc. It is advisable to create a custom adapter framework and be able to support multiple protocols and not rely only on out-of-the-box support.

Our approach and the way forward

The benefits of open-source solutions are clear, and they far outweigh the concerns/risks. We recommend the following aspects to drive an open-source adoption roadmap.





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