Architecture Standardization
Using the IBM Information Framework

A standardized information model that leverages IBM’s Information Framework can prove useful in an enterprise-wide digital transformation project, as one of our clients, a Middle Eastern banking major, learned.

Executive Summary

As a part of its digital transformation journey, a Middle Eastern banking major wanted to create a service-based infrastructure, founded on a standard-based information model, for its banking domain.

This standardization program spanned diverse technology platforms across all of its banking applications, including core banking systems and several other legacy systems built with many products and technologies. The IBM Information Framework (IFW) was chosen as the preferred standard.

This white paper describes the major architectural decisions undertaken as a part of this implementation, the approach used and the learnings achieved at various stages of this journey, as well as some of the benefits our client realized along the way.
IN SEARCH OF A BETTER BANKING ARCHITECTURE

With a large customer base, this financial institution has a presence in the United Arab Emirates, Singapore, India, China, Qatar and Libya. It has operated with an average profit margin of over USD $1 billion for past few years. But the IT department of the bank has struggled to streamline its IT processes and expand the business. The bank found it difficult to manage the complex web of legacy silos, disparate systems, redundant functionality, excess capacity and inconsistent service levels, and thus it operated in an environment noncompliant with service-oriented architecture (SOA).

Currently, the bank operates with a business structure under which its products are manufactured or developed internally. The bank typically incurred huge costs for IT support and maintenance. Added to this, services were hardly reused. Without a regulatory mandate to comply with, and lacking any formal architectural governance, the bank developed new services without validating whether a similar service had already been built. This, in turn, increased the turnaround time for implementing business requirements, which, in turn, increased the organization’s costs. As a result, there was very little flexibility to adapt to changing consumer requirements, regulations and marketplace demands. Thus, a major product rollout typically took an inordinate amount of time to fully implement across all lines of business and geographies, and quality was compromised as well.

In order to survive in the competitive financial market, the bank needed to offer its customers differentiated products/services with shorter time to market. At the same time, the bank wanted to enhance its risk management and comply with the requirements of new directives and regulatory demands, such as Basel III. It had become difficult for the bank to live up to these expectations without a common enterprise architecture (EA) framework, which required an enterprise-wide digital transformation program.

The key business objectives for this program included:

- Deliver a consistent customer experience across channels.
- Create a service-based infrastructure to support faster product and service rollouts and thereby enhance operational agility.
- Reduce IT costs to support disparate processes.
- Introduce best practices in an enterprise-wide fashion.
- Facilitate compliance efforts with policies and regulations.

The firm’s Enterprise Architecture Review Board decided to use this opportunity to standardize its information architecture by creating a service-based infrastructure governed by a common canonical model. The primary benefits expected from this digital transformation initiative included:

- Reduced time to market for new products/services as well as any updates in the existing application portfolio.
- A common blueprint for the overall framework for regulatory compliance as well as reengineering, broadening and standardizing core business processes or implementing new business process architectures.
- Best practices and guidelines required to support critical business issues and ensure that IT projects are linked with business requirements.
- A means to help the bank identify, describe and structure all of the business functions, data and processes in an objective manner.
that can be understood by both IT and business users.

- A streamlined, efficient organization where services are built once and reused many times across multiple lines of business.

The architecture board reviewed several industry models and finally decided on IBM Information Framework.

**Selection of the Architecture Standard**

IBM IFW provides a set of data, process and service-based models focused on helping banks, brokerage houses and others in the financial services industry to accelerate the planning and requirements analysis of business process transformation and to ensure that IT projects are linked with business requirements.

Our client’s other alternative was to build its own enterprise framework for the architecture standardization program. Building an enterprise canonical information and service model from scratch is a long-term endeavor and it requires significant costs, effort and a skilled workforce. Apart from this, it would divert the bank from its primary objective (digital transformation) and not engage in framework building. In this “buy or build” situation when there is a ready-made cost-effective solution available in the market, the architectural board opted to “buy.”

IFW gained preference over any other alternatives for this standardization program based on the following criteria:

- Alignment with principles from other leading frameworks such as Zachman and BIAN.

- Granular level business services, backed by technical artifacts (i.e., wsdls, xsds), which reduces functional design time and effort.

- Ability to be customized and extended to cover the specific requirements of the organization.

- Provision of a canonical model for information entities, and service models based on these entities.

It is important to note that industry models do not provide an out-of-the-box solution to address all of the organization’s key issues. IFW provides generic abstraction of the problem domain. The models provide the blueprints and standards upon which specific processes and supporting services and data structures can be constructed. Thus, with an industry standard core foundation, IFW adoption can help to rapidly revamp the core information and service model and build more specific coarse-grained services and processes.
THE TRANSFORMATION JOURNEY

Architecture standardization is by far one of the critical changes in the IT landscape of an organization. It cuts across all departments and business units and impacts the entire organization’s IT workforce, including enterprise architects, solution architects, infrastructure architects, software developers, testers and project managers.

At the outset of this digital transformation journey, enterprise architects laid out the foundation principles, frameworks and guidelines needed to proceed for this program. They took the initiative to create the business case and evangelized IT stakeholders and business on this change. The IT workforce of the organization was structured accordingly. Several teams were dismantled while several other new teams were formed. The finalized organization structure is illustrated in Figure 1.

Once decisions, approvals and roadmaps were in place, existing business entities were mapped to the corresponding entities in the IFW canonical model. IFW-compliant services were identified to address the needs of respective business functionalities. Moreover, attributes for respective IFW entities were also identified and mapped from the business attributes. Solution architects, along with business analysts, carried out these activities.

Figure 2, next page, details the relevant mapping between business and IFW entities included in this program.

Organization Structure

![Organization Structure Diagram]

Figure 1
For exposed vendor services that are not possible to transform, IFW-compliant facade services were defined. The implementation team, along with their respective application architects, performed the technology assessment and feasibility study to incorporate IFW in the organization’s existing IT landscape. They built the respective IFW domain objects and the relevant IFW-compliant services.

Key elements of the technology stack used in this program included:

- Integration platform for hosting IFW-compliant services - IBM Integration Bus v10.

  > Importantly, IFW provides a technology-agnostic model, and does not impose any prejudice over the technology stack used; the same canonicals can be referred to for developing the services in other technology stacks as well.

- For service repository, service versioning and service lifecycle management – IBM WebSphere Service Registry and Repository (WSRR).

- For service design – IBM Rational Software Architect.

- For asynchronous messaging – IBM WebSphere MQ v8.0.

- For team collaboration, assignment of work items and defects, and repository and versioning for development artifacts like code base, unit test case, etc. – IBM Jazz Platform.
Benefits Achieved

Large-scale digital transformation initiatives like this will span multiple years, and their potential benefits are fully realized over long periods of time. As more applications are onboarded to exploit IFW’s information model, the benefits of standardization become exponentially more evident. But with careful planning, even short-term benefits can make the journey rewarding. Several immediate benefits include:

- **Optimized reuse across business processes and supporting IT services:**
  
  » Two upcoming projects were able to reuse nearly 70% of the services, 30% as is and 40% identified for updates. Only 30% of the rest of the services needed were identified to be developed afresh. Once this model matures, the percentage of new creation of services is expected to decline and the percentage of reuse will increase.

- **Reduction of project risk:**
  
  » Structured and well-defined models of IFW helped to capture the business requirements and align them to business processes and services.
  
  » IFW provided a blueprint for enterprise services to ensure scalability. As the services are mapped to business functionalities and defined based on the IFW model, they can be scaled up to address any new business requirements.
With the existing templates and artifacts and common nomenclature, the functional design process now takes hours rather than days.

» Functional design and business requirement mapping can now be defined in a cheaper, faster, easier and more complete manner. With the existing templates and artifacts and common nomenclature, the functional design process now takes hours rather than days.

» IFW provided a common object model to map all the business entities and attributes.

• Quick start based on pre-built models:

  » Ready-made service interfaces and processes with relevant attributes helped to reduce design and development time.

  » Increased consistency of specifications, designs and delivery of business solutions.

  » The final model became the single source for information and reporting. At a glance, the business can now identify which business services and processes are already available rather than going through project by project and investing a lot of time and effort to get this information.

  » Provided an enterprise-wide canonical model:

    ○ Provided a common data format and nomenclature for service parameters and attributes across business, IT, vendors and global customers. The major benefit of this is the common landscape for services exposed by IT and the internal and vendor applications consuming the services. This eased the process of integrating the services and will eventually reduce both time and money on service integration.

» Optimized incremental development:

  ○ Provided an enterprise-wide single source of information for deciding to reuse an existing service or to build a new one.

KEY TAKEAWAYS

Several challenges emerged during this transformation journey. Here are the actions taken to resolve these challenges and the lessons learned in the process:

• Challenge: Adoption of a complex framework such as IFW initially faced pushback from existing application owners.

  » Remedy: We overcame this by enforcing the policies and governance from top management such as the CIO or “build the bank” initiative leaders and EA team.

• Challenge: Aligning the entire organization to this new framework was difficult. The most critical issue faced during this implementation was managing a common nomenclature for the business entities for all the services. This led to recursive issues, including the deployment of common service components worked on by multiple projects. In turn, this raised the problem of overriding one change with the other.
» **Remedy**: To mitigate this, we identified proper deployment strategies for the services. Guidelines were defined to identify which services can be grouped under one deployment unit and also identify the respective deployment server to minimize this risk.

- **Challenge**: As IFW enforces extensive reuse of the existing services, merging of code bases by the development team became a major roadblock. We observed that often the changes of one developed component were overwritten by the newly added changes of the same component, thus impacting the existing business functionalities. This led to an increase in production issues.

» **Remedy**: To mitigate this, additional resources were on-boarded in the project who acted as build managers. Their primary role was to baseline the service components post production go-live and then identify the changes of these service components and merge them with the services under development.

- **Challenge**: For projects under one release cycle, syncing service components became another major problem as the projects used the same IFW entity of the same service in the same timeline.

» **Remedy**: The initial mitigation plan we formulated was to introduce another layer of merging and regression testing, post UAT, for all these projects. This approach was not sustainable - we believed it might break given the growing number of parallel projects. It was finally decided to avoid scheduling parallel projects - which tend to work on the same service components. These projects should follow a sequential delivery mode, and proper baselining of the projects must be carried out from its predecessors.

- **Challenge**: In its present form, IFW is more aligned for SOAP-based services. While WSDLs can be readily generated from the IFW model, defining swagger for REST services requires additional effort to create the same manually or by other external tools. This process not only increases the development time and effort of the service but is also prone to human errors. Added to this, REST services demand simplified interfaces and IFW provides complex layered and wrapped objects.

» **Remedy**: The organization already had its own canonical model for REST-based services, which it consulted in these situations. Also, the organization has already standardized this model in line with IFW.

- **Challenge**: Additional changes were required for non-IFW-compliant existing applications and services.

» **Remedy**: We planned phase-wise onboarding of these existing applications for adopting the framework.

- **Challenge**: Many legacy applications couldn't migrate to the new framework due to technical challenges.

» **Remedy**: Wrapper IFW compliant services were identified and built.
LOOKING FORWARD

We strongly recommend IT organizations consider the following points when exploring an information architecture standardization using IBM IFW (or a similar framework):

• Strong executive commitment and sponsorship is essential for such strategic endeavors. A clear roadmap must be established at the onset, with proper articulation of short-, medium-, and long-term benefits.

• Digital transformation calls for a collaborative and well-coordinated team across the enterprise.

• Induce IFW principles into the core value chain of the organization. Proper training and evangelization of the benefits of IFW must be brought to the wider organization.

• To avoid cost overruns, nonstandard cost heads must be rationalized and accounted for at the beginning. Such items include additional efforts solely for the architecture standardization program, setting up robust governance, etc.

• You must identify service repository, service versioning, service lifecycle management, and necessary tools and platforms at the beginning of the transformation program.

• Plan and formulate infrastructure setups, team formations, project planning, project merging and deployment strategies at the beginning of the digital transformation program.

REFERENCES


ACKNOWLEDGMENTS

The author would like to credit Das Sibendu, a Principal Architect in Cognizant’s Global Technology Office (GTO), and Nilotpal Ghosh, a GTO Architect, for their guidance in writing this white paper.

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