

Microservices: The Next Frontier of Innovation in Digital Mortgage Lending

Abstract

With the proliferation of digital technologies, fintechs have emerged as a major player in the US mortgage industry. However, in the new post-COVID reality, lenders are seeing falling productivity and increasing cost of operations. This emphasizes the need for lenders to relook at their existing technology stack and determine if they can seamlessly work with technology architectures evolving in the market. Technology needs should be driven by business needs which in turn should be driven by customer expectations. Designing and planning the technology roadmap should not only take into account the existing process operations but evolving customer needs and requirements as well. This white paper discusses the key drivers for lenders to analyze their existing technology solutions, assess their relevance to evolving business needs, and plan for optimal investments in the right areas to evolve into future-proof enterprises. The paper explains how an efficient microservices-based mortgage technology architecture can help banks in overcoming legacy issues and streamlining the lending process.

Taking Stock of the Mortgage Landscape

The mortgage industry works differently across the globe. For instance, in the US, unlike other banking and financial technology solutions, mortgage technology solutions cannot be easily ported across geographies. While mortgage lending in most parts of the world is funded by bank deposits and is a banking activity, in the US, it is funded by mortgage backed securities and is therefore a capital market activity. In addition, aspects like mortgage insurance, consumer disclosure, regulatory compliance, and types of products vary significantly in the US. While most geographies have broker and direct channels, the US has a unique variant in the correspondent channel. Most US lenders are non-bankers while those in other geographies are depository institutions. Moreover, most lenders across the globe service their own loans while in the US, mortgage lenders either sell the servicing rights or opt for substitute servicing. US lenders therefore prefer to have multiple point solutions at every stage of mortgage lending such as origination, fulfilment, closing, and servicing. Consequently, most lenders spend millions on technology. In fact, according to a recent study, over the next five years, the global loan origination software market will expand at a compounded annual growth rate (CAGR) of 14.2%, to reach USD 5,273.2 million by 2025.¹

Most lenders typically use a core system for key functionalities of loan origination and ancillary components for support functions. The traditional lending architecture (see Figure 1) has a complex monolithic core

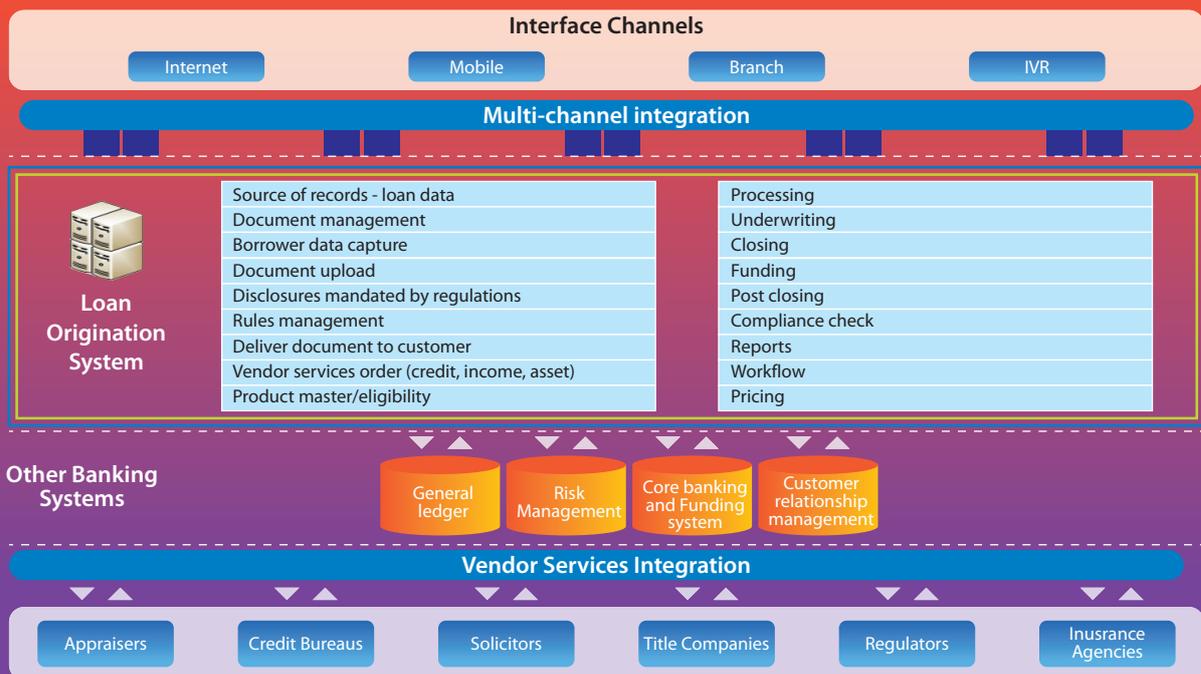


Figure 1: Traditional Lending Architecture

[1] MarketWatch, Industry News: Loan Origination Software Market share will grow at CAGR of 14.2 % says Marketstudyreport, Nov 2020, Accessed January 2021, <https://www.marketwatch.com/press-release/industry-news-loan-origination-software-market-share-will-grow-at-cagr-of-142-says-marketstudyreport-2020-11-23?tesla=y>

system to support channels such as mobile, online, interactive voice response (IVR), and other banking systems and integration gateways for vendor services such as appraisals and titles.

In most financial institutions, the core loan origination system (LOS) is most likely a proprietary third-party or in-house solution with hundreds of screens, menus, tabs, and buttons as well as a user manual running into thousands of pages. This system that performs almost all the key functions is accessible to every stakeholder, sales consultant, processor, underwriter, and closer, as well as users from support and quality control and other functions. Loan application data is either entered or pulled into the LOS from a customer relationship management (CRM) system. Documents are either stored in a separate enterprise content management solution or within the core solution. A traditional one-size-fits-all workflow moves the task from one stage and/or stakeholder to the other, often requiring multiple iterations.

Such a traditional, monolithic LOS solution comes with several challenges including high dependence on the core system and potential single point failure, which is extremely risky. Moreover, most core systems are third-party solutions, which are not open to customization and costly to maintain. In addition, the inability to customize inflexible legacy LOS prevents lenders from quickly implementing regulatory changes besides leading to scalability issues and hampering operational agility.

In our experience, most loan origination systems are not able to keep up with regulatory changes such as TILA RESPA Disclosure (TRID), Uniform Residential Loan Application (URLA), Qualified Mortgage (QM) rules, and Consumer Finance Protection Bureau (CFPB) timelines. Almost all the systems perform poorly in key areas such as status alert and closing collaboration, in turn forcing lenders to switch to alternative options such as creating more ancillary components.

Modernizing Mortgage Lending with Microservices

Microservices facilitate the designing of solution architecture as a group or collection of clearly defined services. By defining and creating uniquely independent services for each business function that can be easily clubbed together based on the need or demand, the entire architecture becomes loosely coupled, giving lenders the maximum flexibility for change.

Each LOS functionality (see Figure 1) can be broken down into services such as underwriting, closing, income, and asset service. They can then be owned by specific teams and deployed independently and on demand. These services should be self-contained so that their dependence on other services is minimal. For instance, income and asset services can be updated,

technologically or functionally, by independent teams, in parallel, thereby enhancing maintainability and testability.

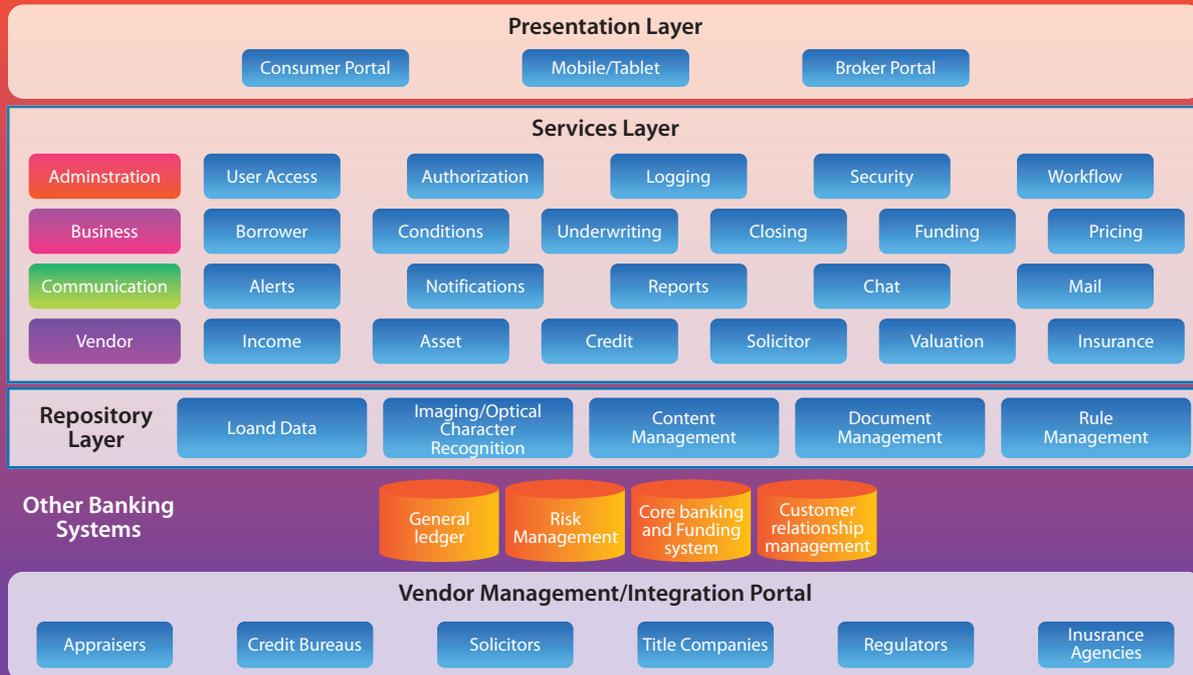


Figure 2. Microservices-based Lending Architecture

Figure 2 illustrates a representative reimagined lending architecture leveraging microservices. The microservices can be connected via application programming interfaces (APIs) through one or more API gateways. This ensures relevant protocol translation which in turn reduces development time and coding errors. This creates a well optimized communication stream for faster data flow, reducing bandwidth requirement and infrastructure cost.

- Benefits of a lending model leveraging microservices include:
- Replaceable components with less impact and dependence on other components
- Higher agility and resilience, enabling faster upgrades with lesser downtime
- Higher efficiency with reduced infrastructure costs and maintenance
- Flexibility for organization-specific customization, enabling quick implementation of regulatory change, higher scalability, and productivity
- Ability to leverage open platforms
- Higher reusability across business lines as certain mortgage services can be used for credit cards, personal, auto loans, or even insurance

However, successful adoption of the microservices model will require careful execution to avoid implementation pitfalls. For example, if the definition and creation of services are not done accurately, the number of microservices can become too large to be managed effectively. Higher cyclic dependencies can go out of control and conflicts can arise if services are not clearly aligned with business functionalities. Similarly, if the API gateways are not appropriately defined or created, latency and communication issues can crop up. Security related aspects also need to be taken into account while defining the architecture. Reimagining the lending architecture requires careful consideration of the possible slipups that could occur during the design phase, in the absence of which, the microservices model can become more complicated than managing legacy monolithic systems.

Chasing the Maximum

Microservices allow lenders to get the maximum bang for their buck in terms of operating expenses, so they can effectively fund their growth and transformation initiatives. The biggest advantage is not just the cost, but the agility and resilience for faster upgrades with lesser downtime. Major banks across the globe have recently started exploring microservices in areas such as open banking and employment and income verifications. The payments industry is also moving toward microservices. The mortgage industry can take a cue from these companies to learn and adopt cross-industry best practices on getting the maximum out of the microservices technology.

About The Author

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Ramani Balakrishnan is a senior business consultant in the Mortgage Practice of TCS' Banking, Financial Services, and Insurance (BFSI) business unit. He has over 30 years of technology and functional experience in the residential mortgage industry. Ramani has led large scale IT transformation programs for several TCS clients across the globe. He has designed, developed, and implemented loan origination and fulfillment systems. Ramani holds an MBA in Finance (Summa Cum Laude) from Rutgers University, New Jersey, USA, and a Master's degree in Physics from Bharathidasan University, Tiruchirapalli, India.

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