

# Cloud-Powered Modernization of Applications:

*The TechM Approach*



PoV



## Abstract

Cloud technology is no longer 'emerging'. It is established. It has become de-facto go-to platform as it provides resilience, agility, and innovation among many other things. Most of the organizations are still saddled with large legacy systems and technology. There is a burning desire to modernize these legacy platforms to cloud, along with latest technology stack. This has become imperative initiative to achieve sustained digital transformation and competitive business advantage.

But path for modernization is far from simple. It is important to understand the challenges, define measurable objectives, define strategy, and develop roadmap. Tech Mahindra has developed a comprehensive 'playbook' to undertake any application modernization project. While each situation is unique, the playbook acts as starting point and a guide for the entire modernization journey. The Playbook is developed based on Tech Mahindra's real-life experiences of helping clients with modernization journeys. In a way, it is the essence of the collective learning and memory of the organization, abstracted for a more generic purpose.

This whitepaper explains the important elements of the playbook in a methodical manner, along with several practical real-life examples. The whitepaper also shares the insights (learnings and best practices). Lastly, the whitepaper shares a summary view of various intellectual property and platforms that Tech Mahindra has developed using the practitioner's experience. Applying the 'playbook' to a client's problem, with desired contextualization, will improve the odds of success for the application modernization journey.

## Key Takeaways

The key areas covered in this whitepaper are as follows:

1. Introduction
2. Application Modernization Playbook - 360° Perspective
3. Playbook Explained
  - A. Modernization Playbook: Drivers, Solution Guiderails and Tangible Outcomes:
  - B. Modernization Playbook: Risks and Challenges:
  - C. Modernization Playbook: Solution Realization Approach for Application Modernization
  - D. Modernization Playbook: Key Solution Tracks for Application Modernization
4. Modernization Playbook: Insights (Experiential Learnings and Best Practices For Application Modernization Initiative)
5. Tech Mahindra - Partner for Application Modernization

## Introduction

Cloud provides a disruptive opportunity for today's businesses to take the advantage of resilience, elasticity, extensibility, innovation, and a lot more.

However, merely moving workloads to cloud platforms will not realize the promise that cloud holds. It is important to modernize the complex legacy applications into latest technology stack to unlock the real value of cloud. The technological modernization provides an opportunity to relook into business processes and customer experience. This opportunity also must be seized.

Modernization is not easy. It is estimated that almost 80% of the modernization initiatives fail to achieve the stated objectives. Still, it is a 'must have' program for most of the CIOs and business leaders. Hence it is important to understand the challenges, define considered objectives and goals and choose a well-calibrated approach to improve odds of success. While it is not possible to have any straight-jacketed method for modernization programs due to the unique context of each organization; common themes need to be understood and learnt.

Over the last decade, Tech Mahindra has helped several clients in their application modernization journeys. This paper crystalizes the collective institutional memory and experiential learnings into a 'playbook' for any modernization project. The playbook examines the common expectations and challenges and lays certain guiding principles. These principles act as inputs to choose right plans and implementation approach. The Playbook also briefly covers a 3600 view of various tracks such as reverse engineering, co-existence, cloud landing zone creation, data migration and so on. The intellectual property (through enabling solutions and platforms) of Tech Mahindra helps in achieving modernization with greater speed with reduced risks.

In short, the playbook can be a starting point for organizations to set the appropriate foundation for application modernization. If contextualized appropriately through the planning and execution, organizations can greatly enhance their odds of successful modernization.



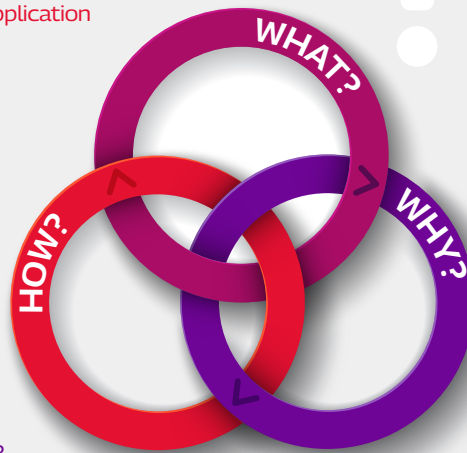
# Application Modernization Playbook – A 360° Perspective

Before starting a modernization journey, decision makers often ask below questions to themselves. Simply put, these are fundamental 'why', 'what' and 'how' questions to induce critical thinking and decision making within the organization. The 'playbook' tries to provide answers to these questions. This section discusses such questions and the basic answers. The questions and answers provide a framework which can be applied within the given problem context. The framework is grouped under the three buckets of why, what, and how.



- How should I plan and execute modernization initiative in terms of approach?
- How should I identify and define various work-streams or tracks in an application modernization program

- Why should I do modernization?
- What should be my key drivers for the initiative?
- Why should I modernize and move to cloud?
- What are the key considerations that I should investigate to decide modernization tenets?



- What should be tangible outcomes and objective measures of success?
- What are the key risks and challenges I should be aware of?
- What should be broad solution guiderails I should choose before embarking on a modernization journey?
- What is the best engagement model for me to modernize my landscape? What are the key considerations to decide this?

Figure 1: A Simple Framework that Gives an Overall Perspective of App Modernization Playbook

## Playbook Explained

### Modernization Playbook: Drivers, Solution Guiderails and Tangible Outcomes

Modernization initiative must positively impact the business. Technology modernization without any discernible impact to business is a pyrrhic initiative. Usually, business wants to unlock new sources of value using modern technology as an enabler. The figure below shares the common drivers. Business and technology teams need to jointly work to carve out clear objectives that should be fed into planning and implementation of modernization program. For example:

**Modernization creates new business possibilities and unlocks value:** A large US based AMC wanted to modernize its mainframe platforms to introduce real-time transaction processing instead of end-of-day batch jobs. This allowed them to introduce new services to their customers during the trading window, which was not possible without modernization.



Defining measurable and tangible outcomes is another side of business drivers. These outcomes serve as a guiding 'North Star' throughout the program. Many of them can be measured even during the journey, instead of waiting until end.

**It helps to define solution guiderails clearly:** While modernizing their commercial banking legacy platform, a global bank used 'quarterly release' as the most important guiderail because they wanted to 'fail fast' to learn and realize incremental business value faster during the journey.

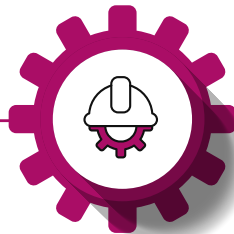
Based on the challenges and objectives, TechM playbook envisages founding principles (or guiderails) for any modernization program. While, the applicability may vary based on the context, these guiderails can be applied during solution designing phase. The business and technology architecture teams can jointly examine the guiderails to come up with their own version.

**Business value should be articulated to get sponsorship:** A large clearing and settlement house decided to modernize from a technology perspective; but ran into heavy questioning from business because of unclear business drivers. The program had to be stopped because of lack of business sponsorship.



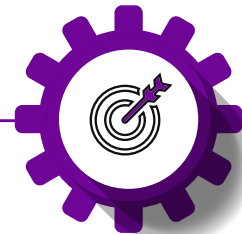
### Objectives

- Business agility and faster TAT
- Ecosystem collaboration for innovation
- Future proof design catering for disruptive changes
- Superlative customer experience
- Elastic, resilient, interoperable IT platforms
- Automation first culture



### Solution Principles

- Progressive modernization, with frequent value realization
- Agile/DevSecOps for acceleration
- Predictable and risk-managed
- Framework-driven, structured decision making
- Real time, metrics-based governance
- Talent culture - learning, skilling and self-organized



### Business Outcomes

- Revenue through new sources (e.g, \$10M pa)
- TCO reduction over 3 years (e.g, 30%)
- Net Promoter Score Improvement (e.g, 20%)
- Faster release frequency (e.g., 5x number of yearly releases)
- Engineering productivity improvement (e.g, 40% over 3 years)

## Modernization Playbook: Risks and Challenges

Before envisaging the modernization plans, it is important to appreciate the risks and challenges that are likely to be faced. The experience suggests common strands of risks. The playbook provides a risk-repository as a starting point. The extent of challenge will vary based on the context of the organization.

It needs to be noted that risk assessment is a continuous process. So, the risk-repository needs to be refreshed and calibrated during the implementation.

### Nature of Risks varies depending on the context:

A bank from Nordics region was modernizing an aging monolithic, large Java/J2EE application. They were confident about SME availability and documentation. So 'Understanding of current state' was not identified as major risk.

But another global bank, with mainframe platform for its commercial banking business, identified this as the biggest risk. The bank had lost its aging workforce and documentation was too old. Besides, years of patchwork had made code extremely complex. The bank had to allot longer duration and use reverse engineering tools to capture the current state in more detail.

### Key Challenges to be Jointly Addressed During the Transformation Journey

Understanding the challenges is critical step before managing them throughout the transformation journey

#### Culture Change: Striving for engineering excellence

- Transformation of people, ways-of-working, organization structures skilling/learning environment.
- Buy-in from line/portfolio management teams for modernization
- Collaboration between distributed teams, especially in hybrid work model

#### Disruption to ongoing projects:

- Compromise to business requirements to enrich current legacy platform
- Slowdown to modernization initiatives due to backlog of 'here and now' business requirements

#### Strategic decisions and direction for future-ready technology:

- Technology/architecture feasibility to solve current and future business problems - POVs, POCs, expert validations
- Rapid technology obsolescence
- Timely strategic decisions on enterprise architecture. E.g, choice of cloud, choice of UX technology, other key technology components

#### In-depth understanding of current state

- knowledge the current landscape, limitations, advantages, problems, technical debt
- Availability of SMEs, tribal knowledge, documentation

#### Coexistence

- Managing parallel existence of old and new platforms without business impact (data, interfaces).
- Complexity of cut-over, parallel run and decommissioning (switching-on features from new platform and switching off features from old platform)

#### Executive Sponsorship and measure of success

- Poorly defined/measured outcomes and inadequate articulation of business value articulation may lead to erosion of executive sponsorship

## Modernization Playbook: Solution Realization Approach for Application Modernization

Once the preparatory ground is created as mentioned above, the team (usually led by business/domain and technology architects) to define the solution realization approach. Organizations also engage global system integrators to aid this activity. Planning and decision making is complex and sometimes iterative in nature. But it is good to lock down the key decisions such as choice of technology, financial model for value realization etc.

Modernization usually involves breaking the monolith into micro-services-based, cloud-ready architecture. Identifying right 'seams' where the monoliths can be broken down into discrete and relatively decoupled business capabilities is extremely important.

Implementation roadmap is a dynamic document that needs alterations based on successes during implementation. Hence, while a 'baselined' version is created during the Planning phase, priorities may change later during implementation. It is often a good idea to prioritize the capabilities that are relatively independent, easier to modernize and provide immediate business value. Early success boosts confidence and learnings can be applied to more complex transformations.

It may be noted that TechM's playbook recommends using TechM developed IP/solution-enablers to improve odds of success. However, organizations may choose to use their own toolset.

**Breaking monolith along its 'seams':** a large policy management platform was broken into business capabilities at its natural cleavages such as underwriting, premiums, payments, actuarial calculation engine, claims management. The monolith data model was also broken into 'policy' and 'customer' models which can be physically designed and deployed separately.

Progressive Modernization, with frequent tangible value delivery model, built on foundation of culture of engineering excellence

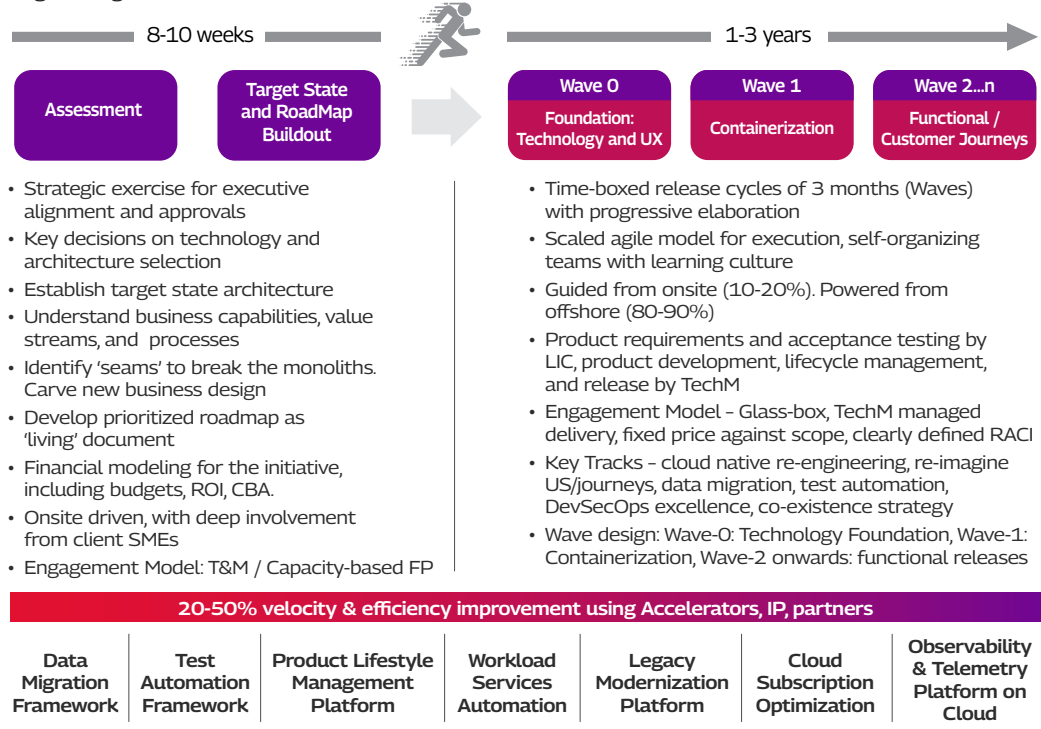


Figure 2: Plan on a Page for App Modernization Program

## Modernization Playbook: Key Solution Tracks for Application Modernization

Modernization program requires not just complex approach; but also synchronized efforts across various unique but interrelated tracks. The program team should be structured with these tracks in mind, with clearly defined accountability, deliverables, and dependency management. The tracks also serve as input to identify the skill demands and training requirements. Usage of right tools (without causing tool-fatigue) is also important to improve efficiencies. Servant-leader roles such release train engineer (RTE) or program manager become very crucial for coaching, governance, and management across the tracks.



### Re-imagining Customer Journeys

- Redefining interactions and digital touch-points
- Remap business processes and functions
- Experience design for user interface (front end)



### Testing and Test Automation

- Functional equivalence testing
- Test automation across testing phases - unit, integration, system, regression
- Test Data Management
- Non-functional Testing



### Cloud ready Design and Development

- Microservices and APIs at the core of functional design
- Future-ready choice of technology stack (data streaming, workflow, rules engine, data storage.)
- Containerized, resilient, elastic deployment architecture



### Co-existence Strategy

- Intelligent router for routing transactions between legacy and modern platforms
- Bi-directional data synchronization on real time basis
- Cut-over and deployment plans to progressively switch from legacy to modern platform



### Reverse Engineering for legacy platform knowledge management

- Involvement of legacy platform SMEs
- Tool-enabled reverse engineering from code
- Appropriate use of existing artifacts, documents



### Agile & DevSecOps led Automation

- SAFe, Scaled agile framework for entire initiative
- CI/CD/CT tooling for fast, efficient development
- Observability and telemetry



### Data Migration and Management

- Development of target data models (logical/physical)
- Data migration - one time, incremental
- Data synchronization during co-existence period



### Cloud Design and Platformization

- Landing zone provisioning - account set up, policy configuration for security
- Infrastructure as code (network, storage, compute)
- Container management, virtualization

Figure 3: Solution Tracks for App Modernization Program



# Modernization Playbook Insights : Experiential Learnings And Best Practices For Application

As covered above, the Playbook explains the reference framework to answer 'Why', 'What' and 'How' of Application Modernization. Beyond the framework, some of the practical insights from practitioner's perspective also serve as guiding light for the organizations undertaking modernization. The figure below covers these insights. While some of them seem obvious, it is interesting to note that they also at times run counter to the commonly understood guidelines.

For example, having a matured set of tools is important for engineering excellence. But it is important to avoid overuse, often termed as 'tool fatigue'. Overuse of tools create excess burden of integration and tool-skilling, which may undercut the gains of tools substantially. Also, over-reliance may lead to additional risks.

**Over-reliance on tools is risky:** A large Australian bank used reverse-engineering tool to extract business functionality and rules from the archaic code. But the bank under-invested in human/SME bandwidth for this job believing that tool will be sufficient. In reality, while tool was successful in providing a 'bottom-up' view of the legacy system; the 'top-down' view was missed out.

While end-state cloud-ready architecture is well-understood, transitional architecture is much more complex and contextual. As modernization programs run for several years, it is important to invest sufficiently in defining robust transitional architecture along with co-existence, cutover, and decommissioning processes. A common mistake occurs when organization lose focus on decommissioning legacy, resulting into perpetual existence of multiple platforms for similar business capabilities.

**Decommissioning legacy is as important as creating modern assets:** A large bank introduced a state-of-the-art third-party payments platform for real-time processing with a roadmap to migrate other payment schemes from legacy platforms. The bank deployed the new payments platform for real-time payments; but didn't follow through to migrate and decommission legacy. As of now, the bank maintains both - old and new platforms leading to increased complexity and cost.

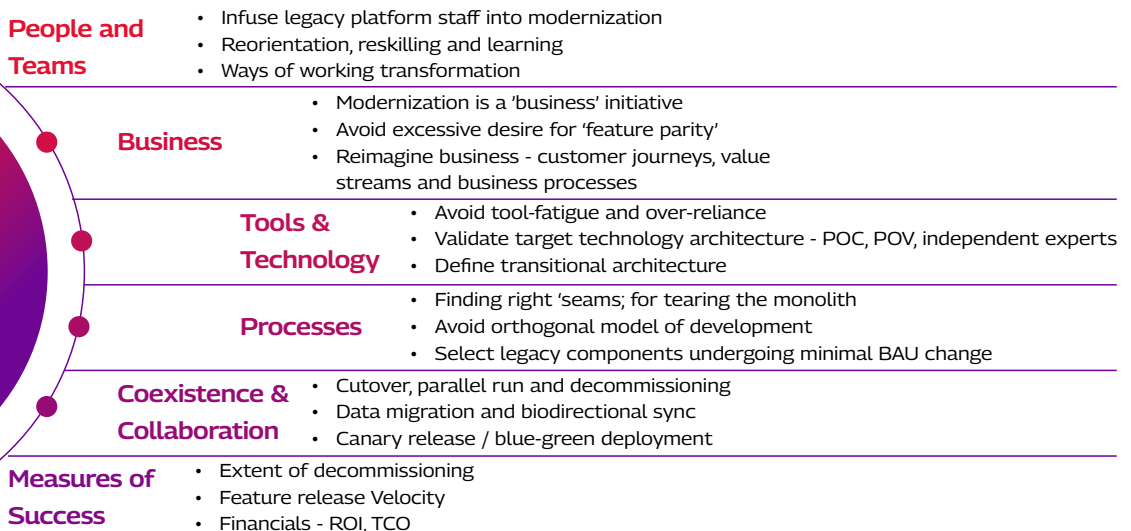


Figure 4: Key Insights for App Modernization Program



# Tech Mahindra - A Gold Partner for Application Modernization

Over the last 12 years, Tech Mahindra has helped 100+ clients in their end-to-end cloud-led modernization journeys. Investments into people - skilling and scaling - is an obvious focus area for a system integrator. But going beyond that, Tech Mahindra has taken Software + People + Services approach.

'Modernization Playbook' that is explained in this paper sits at the heart of the planning and execution model. The service is a reference point for the organizations to start their modernization journey with TechM.

TechM can provide advisory, consulting and implementation services across a range of engagement models that are tailored for specific needs of the clients.

Beyond the playbook, TechM has invested heavily into development of platforms

Tech Mahindra has created a US patented framework for data modernization. It can help in data governance, management, quality control and migration.

that can accelerate modernization, with greater quality and success. The usage of these platforms provides up to 30% improvements across key parameters such as cost efficiency/productivity, velocity/TAT, and quality. The platforms are flexible, can be integrated easily with other modern tools and easy to learn and use.

The platforms offer number of capabilities that are briefly mentioned in the figure below.

Overall, Tech Mahindra's 'software + people + services' model can improve the odds of success for clients undertaking modernization initiatives.

With the years of experience, TechM has created integrated product lifecycle management platform. This platform is actively used by 50+ clients: can be used as backbone for end to end software delivery lifecycle. It can not only provide a clear view of the programs to senior management on real time basis; but also acts can collaboration lever for all the teams working on various transformation programs.



**20-40%**  
Efficiency Improvement



**20-50%**  
Velocity Improvement



**10-30%**  
Quality Improvement

#	Capability Area	Tech Mahindra owned Platform/IP details
1	Legacy Modernization Reverse Engineering	Tech Mahindra's code analyzer platform will automate legacy code analysis and help us identifying the technical debts, service decomposition and business rules. It will also identify dead code, repeat code.
2	Application Modernization Architecture and Design	Application Modernization toolkit for microservices, serverless accelerated journey leveraging factory model. This is coupled with assessment & guidance framework /best practices for modernization on each Hyperscalar platform services.
3	Integrated Product Lifecycle Management	Tech Mahindra's proprietary Agile DevSecOps automated and fully integrated platform that is built with 100+ plugins to align with customer DevOps platforms.
4	Cloud Workload Management and Services	Tech Mahindra's platform provides operational patterns that ties together an application, related shared services and a configurable landing zone, resulting in elimination of bottlenecks, reduced risk, improved governance, consistency and improved developer productivity.
5	Cloud Subscription Optimization	Tech Mahindra's platform an extensible and highly controlled self-service Hyperscalar control plane solution, customized for each enterprise, to enable it to automate deployment of pre-configured, governed and secure cloud services while providing a visibility on cost and security.
6	Observability and Telemetry Automation	Tech Mahindra's proprietary observability and telemetry platform to provide a single pane of glass view for App/Infra Metrics, SRE Metrics, DevOps metrics and intelligent incident resolution leveraging AIOps tools along with cloud metrics.
7	Cloud cost optimization	Tech Mahindra's cloud cost optimization framework to enable FinOps best practices and create a cost management strategy.
8	Data Management and Data Landscape Modernization	Proven data management platform for data migration, data quality management and for implementing as a revenue and margin assurance framework. With over thirty successful implementations across the globe and with as high as 600% ROI delivered.
9	End-to-end Test Automation	Tech Mahindra's test automation framework based on open-source tools and proprietary tools .Dedicated user interface for design and execution of scripts for web, mobile, API. Supports multiple technologies web, mobile, Java, Siebel, SAP, web services integrations with Jenkins, Bamboo, Azure, MF ALM, JIRA.

Figure 5: Tech Mahindra Accelerators for App Modernization

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Gopal Parasnis heads digital transformation for the BFSI vertical at Tech Mahindra. Gopal has around 25 years of experience in the IT industry and has been part of several large-scale digital transformation initiatives across the banking and financial services clients. He has led and advised on several mainframe modernization journeys. He has deep understanding of the latest industry and technology trends in this space.

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