

BUILDING VERSUS BUYING IN CLOUD TRANSFORMATION: PROJECT MANAGEMENT AND SECURITY CONSIDERATIONS**Dr. Sureshkumar Somanathan**

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ABSTRACT

Cloud services have significantly expanded and are now essential to corporate operations, while cloud service providers have diversified their products to meet global demand for cloud computing services. To secure future growth and strategic competitiveness, firms consistently pursue strategies to improve their productivity, scalability, flexibility, and efficiency, which are notable advantages of cloud computing. This ambition drives them to modify their business operations through the utilization of cloud services. If concerns regarding cloud migration security are not addressed, enterprises may collapse as a result. The primary objective of this study is to do a comparative analysis of building versus buying in cloud transition, focusing specifically on project management and security concerns. This study utilizes a qualitative research methodology, with data gathered through secondary data gathering methods. This study analyses 25 papers released from 2018 to 2023. This study reveals a substantial need for research on the security issues and vulnerabilities linked to cloud migration, which could impede the efficacy of corporate transformation. This research examines how project management methodologies (Waterfall, Agile, and Hybrid) can aid in the analysis of critical factors such as security, cost, and functionality in cloud transition methods. This illustrates the significance of the "6R" migration strategies—Rehost, Refactor/ Rearchitect, Replatform, Repurchase, Retain, and Retire—in the evaluation of whether to construct or procure a structure. Consequently, to mitigate the adverse effects of cloud migration on the business, it is imperative to identify solutions that enhance the efficiency of the migration process. This will guarantee that the organization's transformation and transition to a future strategy and competitive advantage are executed with optimal benefits and efficiency.

Keywords: Cloud Transformation; Project Management; Security; Cloud Adoption Models; Project Management.

INTRODUCTION

Cloud transformation has emerged as a crucial foundation for contemporary enterprises aiming to succeed in a swiftly changing digital environment. Transitioning to cloud-based technologies enables firms to attain scalability, enhance efficiency, foster innovation, and optimize operations to successfully meet market needs [1]. The transition from conventional on-premises systems to cloud settings has numerous advantages, such as decreased operational expenses, effortless worldwide accessibility, and increased agility [1, 2]. Nevertheless, these chances entail the obligation to make strategic judgments that match with organizational objectives, particularly regarding the choice between developing custom cloud solutions tailored to unique requirements or utilizing existing market platforms. This decision is not merely technical; it carries significant ramifications for cost management, security, functionality, and long-term operational sustainability, rendering cloud transformation a complicated but essential approach for enterprises across all sectors [3].

**Figure 1: Understanding Cloud Transformation**

The build-versus-buy conundrum is central to cloud transformation decisions, offering enterprises two unique options. Developing a bespoke solution enables organizations to create a platform meticulously designed to meet their distinct requirements, ensuring compatibility with current procedures and particular industry specifications [4]. This solution necessitates considerable investment in development, specialized personnel, and continuous maintenance, which can be resource-demanding and time-consuming [5, 6]. This review article seeks to deliver an exhaustive examination of the determinants affecting build-vs-buy decisions in cloud transition and to underscore the significance of project management approaches in directing these pivotal choices.

Cloud Transformation: An Overview

Cloud transformation denotes the strategic migration of an organization's digital assets, systems, and applications from conventional on-premises infrastructures to cloud-based platforms. This transition is crucial for businesses to maintain competitiveness in a swiftly changing technological environment by utilizing the scalability, flexibility, and cost-effectiveness provided by cloud computing. Cloud transformation is crucial for optimizing operations, minimizing IT costs, improving data accessibility, and promoting innovation through sophisticated technologies like big data analytics, artificial intelligence, and Internet of Things (IoT) interfaces [4, 7].

**Figure 2: Benefits of Cloud Transformation¹**

¹ <https://successive.cloud/industry-trends-in-cloud-migration-and-adoption-strategies/>

Primary motivators for embracing cloud solutions encompass the increasing necessity for agility in application deployment, the requirement for improved cooperation among a globally dispersed workforce, and the impetus to diminish capital expenditures while maximizing operational efficiency. Organizations are rapidly embracing cloud technologies to guarantee business continuity, as cloud platforms offer resilient disaster recovery solutions and enhanced availability. Notwithstanding its benefits, the cloud transformation process presents problems. Numerous firms contend with issues related to data security, regulatory compliance, and vendor lock-in, which can impede the seamless implementation of cloud solutions [8]. Furthermore, the intricacy of merging cloud technology with legacy systems and the deficiency of qualified individuals can pose obstacles to successful adoption. These problems highlight the necessity for a systematic and well managed strategy to cloud transformation, enabling enterprises to capitalize on its advantages while minimizing possible hazards.

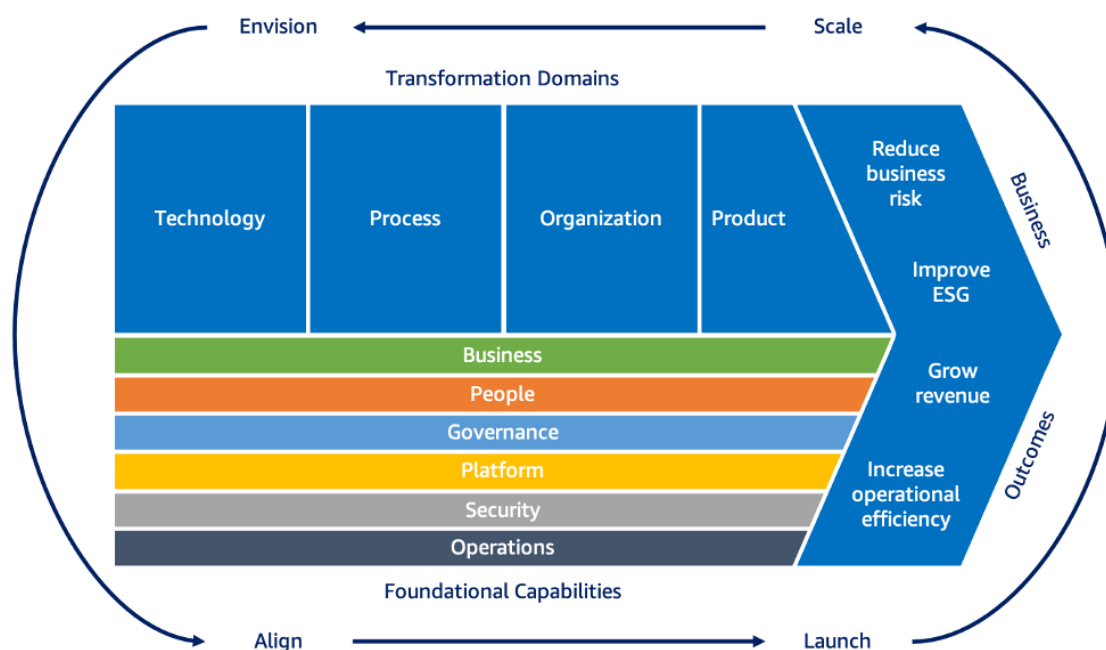


Figure 3: Cloud Transformation – An overview²

Decision Making in Cloud Transformation

Organizations must carefully consider many criteria before choosing to construct custom cloud solutions or buy ready-made platforms to successfully change their clouds. Business needs, resource availability, and long-term strategic goals often influence this choice. Custom solutions allow cloud systems to be tailored to specific operational needs, integrating workflows and addressing specialist functions. However, this method requires significant time, technical, and financial investment. Developing, maintaining, and scaling a solution can be resource intensive. However, buying ready-made platforms like SaaS, PaaS, or IaaS allows speedy deployment, ease of use, and predictable pricing structures. These off-the-shelf solutions appeal to enterprises with limited technical skills or those who want to eliminate development risks [9]. They may not be customized enough for individual sectors or business processes, limiting adaptability and scalability.

This decision is heavily influenced by cost. Both alternatives require organizations to examine the total cost of ownership (TCO), including initial investment, operational costs, and hidden costs like vendor lock-in or growing

² <https://docs.aws.amazon.com/whitepapers/latest/overview-aws-cloud-adoption-framework/your-cloud-transformation-journey.html>

over time. Building or buying affects data management, storage, and protection, therefore security is important. Custom-built solutions provide for higher security protocol control and regulatory compliance, making them suited for healthcare and financial businesses with strict data privacy standards. However, pre-built platforms frequently have robust, standardized security features controlled by the supplier, which can help smaller firms handle security [10]. Additionally, functionality influences decision-making. Pre-built solutions may not suit the needs of enterprises with specific operational demands, making custom solutions more enticing.

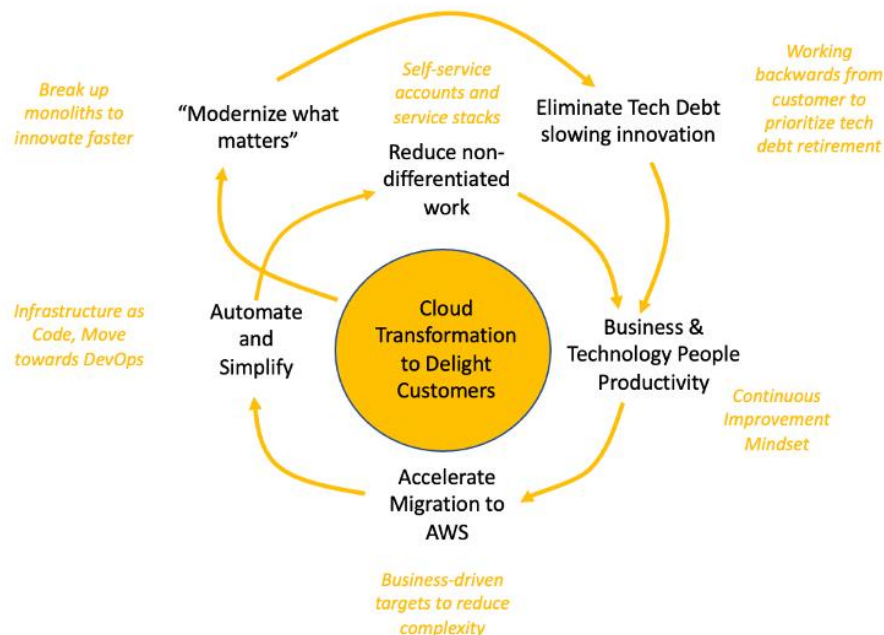


Figure 4: Decision making in Cloud Transformation ³

Cloud transformation decisions must align with company goals for long-term success. Organizations must verify that building or buying meets strategic goals like efficiency, innovation, or customer experience. For instance, a company looking to quickly enter new markets may prefer pre-built platforms, whereas one focused on innovation and differentiation may prefer custom solutions. In a fast-changing industry, aligning cloud strategy with business goals helps firms stay agile. Cloud transformation should allow businesses to effortlessly react to new opportunities and challenges, evolving their cloud environment. Cloud transformation decision-making is complicated and involves a deep understanding of an organization's priorities, limits, and goals [11]. Organizations can choose the optimal path to digital maturity by carefully considering cost, security, and functionality and matching their cloud plans with business goals. Agile, Waterfall, and Hybrid project management methods can help make this selection and ensure a smooth cloud migration. This strategic alignment boosts operational efficiency and positions companies to capitalize on cloud technology for growth and innovation.

Migration Approaches for Cloud Transformation

The "6R" paradigm offers a systematic method for enterprises to manage cloud migration efforts, facilitating alignment with business objectives and operational needs. Each method inside the framework presents distinct advantages and obstacles, necessitating selection based on the organization's existing infrastructure, resources, and future objectives.

³ <https://aws.amazon.com/blogs/architecture/making-effective-decisions-for-your-v1-aws-design/>



Figure 5: Types of Migration Strategies⁴

- **Rehosting**, often termed "Lift and Shift," is transferring programs from on-premises infrastructure to the cloud with little alterations. This method is direct, economical, and facilitates rapid implementation. It is suitable for enterprises aiming to swiftly transition workloads to the cloud without interrupting current operations. Nonetheless, it fails to utilize cloud-native features, constraining opportunities for performance or cost optimization.
- **Refactoring**, necessitates minor adjustments to the application to enhance its performance in a cloud environment. This strategy harmonizes the advantages of modernization with the efficacy of minimum alteration.
- **Rearchitecting** entails substantial modifications to the application's fundamental architecture to render it cloud-native. This method facilitates sophisticated cloud functionalities, including micro services architecture, containerization, and serverless computing, allowing enterprises to attain significant scalability, resilience, and performance. Nonetheless, it requires considerable time, technical proficiency, and financial resources, rendering it more appropriate for long-term strategic objectives.
- **Replat forming**, moving an application or a workload to a different platform and may be termed as "Lift-tinker-and-shift". Organizations can expand scalability, improve performance, or reduce costs by utilizing managed services or cloud-native features, all while preserving the fundamental architecture.
- **Repurchasing**, entails replacing of current on-premises applications and implementing third-party solutions, such as Software-as-a-Service (SaaS), to meet business requirements. In simpler terms, move to a different cloud-based product as drop-and-shop. This strategy enables firms to achieve diminished operational overhead, swift deployment, and consistent cost frameworks.

⁴ <https://aws.amazon.com/blogs/enterprise-strategy/6-strategies-for-migrating-applications-to-the-cloud/>

- **Retire**, entails decommissioning of the application. This could be due to various reason like no business value in running the application or needs to eliminate the application due to maintenance/running cost.
- **Retain** emphasizes the preservation of specific applications in their existing condition, in simple term “Do-Nothing”. This method minimizes complexity and expenses yet necessitates meticulous assessment to prevent interference with essential activities [12, 13].

Comparative Analysis of Migration Strategies for Building vs. Buying

This comparison demonstrates that building is appropriate for firms that emphasize customization and control, whereas buying is optimal for swift implementation and cost-effectiveness. The decision is contingent upon the organization's objectives, resources, and technical proficiency.

Table 1: Comparative Analysis of Migration Strategies [12, 13]

Migration Approach	Building (Custom Solutions)	Buying (Ready-Made Solutions)
Rehost	Ensures compatibility with existing systems but lacks cloud-native benefits.	Quick migration to pre-built platforms but with limited customization.
Refactor	Allows partial optimization for unique needs while retaining control.	Incorporates some cloud-native features, often pre-configured.
Rearchitect	Offers full control and scalability with tailored cloud-native capabilities.	Rarely applicable as buying limits architectural flexibility.
Repurchase	Not applicable, as the existing application will be replaced to a new cloud-based product	Not applicable as buying replaces rebuilding efforts.
Replatform	Optimize the application by considering the cost, application efficiency in cloud environment.	Ready-made solution might not work, as this requires some level of customization to the existing application.
Retain	Not applicable, as no changes are done to the existing application	Not applicable, no purchase is necessary
Retire	Not applicable, as the existing application will be decommissioned	Not applicable, no purchase is necessary

Project Management Approaches in Cloud Transformation

Effective project management is essential for directing cloud transformation initiatives, as it guarantees the alignment of business objectives with technological execution while overseeing risks, resources, and schedules. Project management approaches are essential in cloud decision-making, influencing the approach, enabling effective transitions, and optimizing value from cloud solutions [27].

The Waterfall Methodology is ideal for cloud transition projects that possess explicit, well-defined requirements and foreseeable results. This conventional, sequential methodology enables organizations to methodically plan, create, execute, and evaluate cloud solutions in separate phases, guaranteeing comprehensive documentation and responsibility at every level [14].

The Agile Methodology prioritizes flexibility and iterative development, rendering it suitable for cloud transformation projects that necessitate ongoing input, swift modifications, and frequent updates. Agile methodology allows teams to operate in brief cycles or sprints, facilitating the resolution of unexpected difficulties, integration of new requirements, and adaptation to changing business priorities during the transformation process. This methodology is particularly advantageous for firms experiencing digital transformation, where creativity and response to customer or market demands are essential [15].

The Hybrid PM Methodology integrates the systematic, reliable characteristics of Waterfall with the flexibility of Agile, providing a balanced strategy suitable for intricate cloud projects. The Hybrid approach capitalizes on the

advantages of both techniques, facilitating teams to systematically plan and implement significant aspects of cloud migration, while concurrently permitting adaptability for minor, iterative modifications during the project's advancement. The versatility of the Hybrid technique renders it optimal for enterprises undergoing multi-phased cloud conversions that encompass both predictable legacy systems integration and dynamic, dynamically evolving cloud solutions [14, 15, 16]. The selection of project management approach depends on the organization's particular requirements, the intricacy of the cloud transformation, and the capacity to manage change efficiently during the migration process.

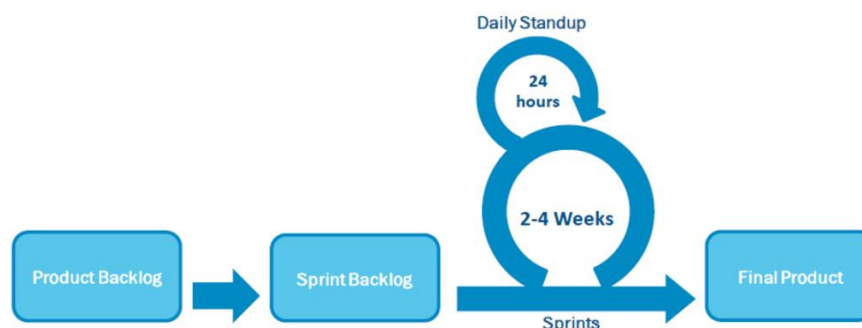


Figure 6: Collaborative Agile – Waterfall Hybrid Model⁵

Security Considerations in Build-Vs-Buy Decisions

Security is a critical factor in the cloud transition process, as enterprises must safeguard the integrity, confidentiality, and availability of their data while addressing possible risks. In the realm of build-versus-buy considerations, security concerns can differ markedly between bespoke and off-the-shelf solutions. Custom-built solutions provide enhanced control over security architecture and can be customized to address unique organizational requirements; but they necessitate extensive knowledge for development and maintenance of safe systems, presenting hazards such as misconfiguration, vulnerabilities, and insufficient continuous support [17]. Conversely, pre-configured cloud solutions typically have inherent security capabilities, such as encryption, authentication, and vulnerability scanning; nonetheless, companies must depend on the vendor's security procedures and face constraints in adapting them to meet their security needs. Risk evaluation is essential for identifying the appropriate course of action, since companies must analyse the probability and consequences of security breaches to ensure that the selected solution aligns with their security objectives [18]. Furthermore, US-based firms must consider compliance with regulatory frameworks such as HIPAA, GDPR (for data processing in Europe), and other industry-specific rules. Custom-built solutions may necessitate greater effort to achieve compliance and implement appropriate governance, whereas off-the-shelf solutions frequently have certifications and compliance frameworks that facilitate adherence to legal and regulatory mandates. Nonetheless, irrespective of the methodology, continuous monitoring is essential to mitigate emerging threats, ensure compliance, and efficiently manage security risks throughout the cloud solution's lifecycle [19, 20, 26].

Cost and Functionality Trade-Offs

In assessing build versus buy decisions, the Total Cost of Ownership (TCO) is a critical consideration. Tailored cloud solutions frequently incur elevated initial development expenses owing to the requirement for specialized resources, extended development time, and continuous maintenance. They provide enterprises enhanced flexibility, enabling exact customization of the system to meet specific business requirements. As the solution develops and matures, the cost of ownership may diminish over time [21, 22]. Conversely, pre-packaged solutions like SaaS or third-party cloud platforms generally incur fewer initial expenses, as suppliers oversee infrastructure, updates, and support. Organizations may encounter persistent membership fees and restricted customization possibilities, perhaps leading to elevated long-term expenses if the solution requires frequent upgrades or

⁵ <https://synoptek.com/insights/it-blogs/agile-waterfall-hybrid-wine-cheese-software-development/>

modifications. Custom-built solutions can be tailored to fulfil specific functional requirements and provide scalability choices that correspond with anticipated organizational growth. Pre-packaged solutions provide rapid deployment and scalability but may restrict the integration of distinct business processes or the expansion of capabilities without incurring extra expenses [23, 24]. Case studies⁶ indicate that organizations with distinct industry requirements frequently select custom-built solutions for enhanced functionality, whereas others emphasize cost-effectiveness and expedited deployment by choosing pre-packaged solutions, carefully considering the trade-offs between initial and recurring expenses [25, 26].

CONCLUSION AND FUTURE RECOMMENDATIONS

This analysis emphasizes the essential factors firms must evaluate when choosing between developing custom cloud solutions or purchasing off-the-shelf alternatives. The results emphasize the necessity of assessing issues including security, affordability, usefulness, and scalability, since each method has unique benefits and obstacles. Project management strategies, such as Waterfall, Agile, and Hybrid approaches, are essential for the successful execution of cloud conversions, offering organized frameworks to manage complexity, adapt to change, and align technical decisions with business objectives. The research underscores the importance of migration methods, namely the "6R" framework, in directing enterprises during the cloud adoption process. Anticipating future developments, trends such as the growing implementation of hybrid cloud environments, AI-enhanced cloud management solutions, and automation are projected to redefine the cloud transformation landscape. Furthermore, investigating sophisticated decision-support models and extensive case studies would yield significant insights for firms seeking to adeptly manoeuvre through this intricate landscape.

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⁶ <https://www.ibm.com/case-studies/carhartt-turbonomic>

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