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MODERNIZING MAINFRAME WORKLOADS IN BANKING: EMBRACING THE POWER OF HYPERSCALERS

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ABSTRACT

This article explores the critical challenge faced by banks in modernizing their mainframe workloads while maintaining reliability and performance. It examines the growing importance of mainframe modernization in the banking industry, highlighting the contrast between legacy systems and modern cloud infrastructure. The article discusses the emergence of hyperscaler platforms as a solution to bridge this gap, offering banks the opportunity to modernize without abandoning their mainframe investments. It delves into the challenges of legacy system modernization, the benefits of adopting a hybrid cloud approach, and strategies employed by leading financial institutions.

The article also focuses on the Israeli context, examining the government's strategic move towards a hybrid cloud model and the significant growth in the country's cloud computing sector. It concludes by emphasizing the importance of balancing innovation with regulatory requirements and security concerns in the banking sector's digital transformation journey.

Keywords: Mainframe Modernization, Hyperscaler Platforms, Banking Digital Transformation, Cloud Computing Adoption, Israeli Tech Ecosystem

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Introduction

In today's rapidly evolving digital landscape, banks face a critical challenge: how to modernize their mainframe workloads while maintaining the reliability and performance that these systems have long been known for. This challenge is particularly pressing as the global banking industry continues to grow, with total banking assets expected to reach $163.2 trillion by 2025 [1]. The persistence of legacy mainframe systems in the banking sector underscores the complexity of this modernization challenge, as these systems continue to play a vital role in core banking operations.

The importance of mainframe modernization becomes evident when considering the stark contrast between legacy systems and modern cloud infrastructure. While mainframes offer unparalleled reliability, with some systems boasting uptimes of 99.999%, they often struggle to keep pace with the agility and scalability demanded by today's digital-first customers. This disparity is reflected in the fact that approximately 44% of banks still rely heavily on legacy mainframe systems for their core banking operations, despite 92% of IT leaders acknowledging that these systems hinder their ability to innovate [1].

Hyperscaler platforms have emerged as a powerful solution to bridge this gap. Cloud providers like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) offer banks the opportunity to modernize their infrastructure without completely abandoning their mainframe investments. The adoption of cloud technologies in the banking sector has been driven by the potential for significant cost savings, with estimates suggesting that banks can reduce infrastructure costs by 25% to 30% through cloud adoption [2].

This article explores the importance of mainframe modernization in the banking industry, with a focus on leveraging hyperscaler platforms to drive innovation and efficiency. We will delve into the challenges faced by banks in modernizing their legacy systems, the benefits of adopting a hybrid cloud approach, and the strategies that leading financial institutions are employing to stay competitive in an increasingly digital marketplace.

As we navigate through this complex landscape, it becomes clear that the future of banking lies not in choosing between mainframes and cloud, but in finding innovative ways to leverage the strengths of both. By embracing a modernization strategy that incorporates hyperscaler capabilities, banks can position themselves to meet the evolving needs of their customers while maintaining the robust, secure foundation that mainframes have provided for decades.

The transition to cloud-based solutions is not just a technological shift but a strategic imperative for banks aiming to remain competitive. Cloud adoption enables financial institutions to enhance their agility, reduce time-to-market for new products and services, and significantly improve their operational efficiency. Moreover, it provides access to advanced technologies such as artificial intelligence, machine learning, and big data analytics, which are becoming increasingly crucial in areas like risk management, fraud detection, and personalized customer experiences.

However, the journey to cloud adoption in banking is not without its challenges. Security and regulatory compliance remain top concerns, with 70% of banks citing security as a major obstacle to cloud adoption [2]. Additionally, the complexity of existing IT landscapes and the need for specialized skills present significant hurdles. Despite these challenges, the potential benefits of cloud adoption – including improved scalability, faster innovation, and enhanced customer experiences – are driving banks to overcome these obstacles and embrace cloud technologies.

As banks embark on this modernization journey, they must carefully balance the need for innovation with the stringent regulatory requirements and security concerns inherent to the financial sector. This balancing act necessitates a thoughtful approach to mainframe modernization, one that leverages the strengths of both traditional systems and cutting-edge cloud technologies to create a robust, flexible, and future-proof banking infrastructure.

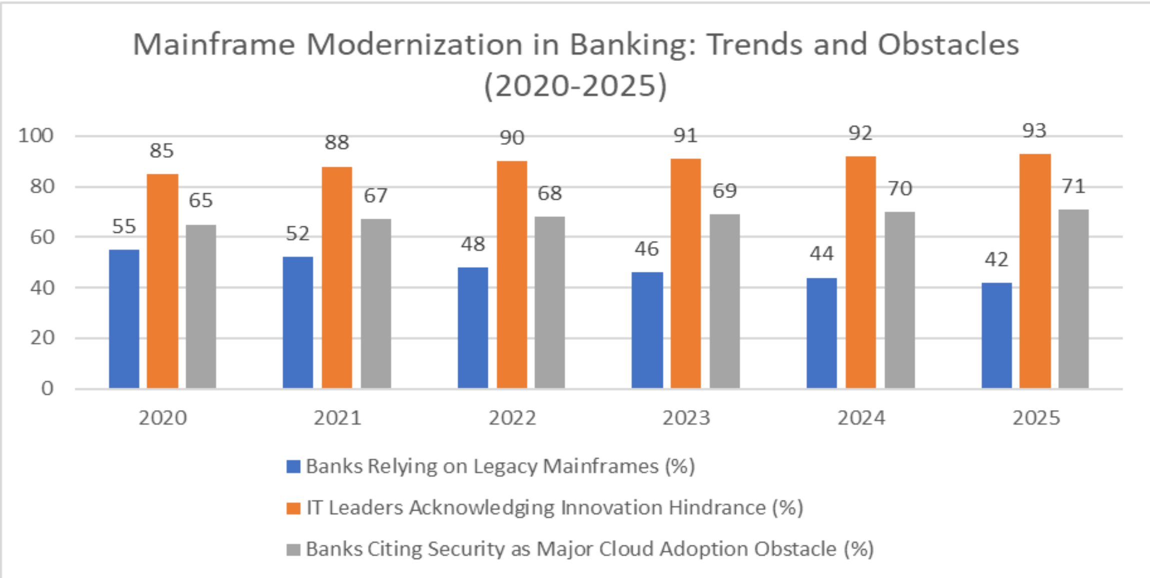

Fig. 1: Evolution of Banking Industry: Assets Growth and Technology Adoption Challenges (2020-2025) [1, 2]

The Mainframe Dilemma

Many banks find themselves at a crossroads when it comes to their mainframe systems. These powerful, reliable machines have been the backbone of banking operations for decades, with IBM Z mainframes processing 31 billion transactions per day globally [3]. However, as the industry shifts towards digital transformation, banks often struggle to position mainframes within their overall IT strategy. This challenge is compounded by a growing shortage of mainframe skills in the workforce.

The mainframe dilemma is further exacerbated by the significant role these systems play in the financial sector. Mainframes are used by 44 of the top 50 banks, 8 of the top 10 insurers, and 8 of the top 10 global retailers [3]. This widespread use highlights both the importance and the potential challenges of mainframe systems in modern banking.

The result is a common scenario where mainframes are either:

- Underutilized, failing to fully leverage their capabilities or enable digital initiatives. Many banks struggle to integrate their mainframe systems with modern cloud-based applications and services.
- Overburdened with workloads better suited for cloud platforms. Some organizations find that certain applications could be more efficiently run on cloud infrastructure, potentially reducing costs and improving scalability.

As banks embark on their hybrid cloud journey, they must make critical decisions about their mainframe strategy: maintain, invest, or divest. The stakes are high, with mainframe modernization projects in the financial services sector typically ranging from $1 million to over $100 million, depending on the scope and complexity [4].

The key lies in taking a holistic approach to mainframe modernization that aligns with overall IT modernization goals and desired business outcomes. This approach should consider several factors:

1. Cost Optimization: While mainframes can be expensive to maintain, they often offer unparalleled cost-efficiency for certain types of workloads. Banks need to carefully assess which applications truly benefit from mainframe processing and which could be more cost-effectively run on other platforms.
2. Performance Requirements: Mainframes excel at handling high-volume, transaction-intensive workloads. IBM Z systems can handle up to 19 billion encrypted transactions per day [3]. Banks must evaluate their performance needs and determine where mainframe capabilities are essential and where cloud or distributed systems might suffice.
3. Security and Compliance: Financial institutions face stringent regulatory requirements. Mainframes are known for their robust security features, with IBM Z offering pervasive encryption to protect data [3]. Any modernization strategy must ensure that security is not compromised.
4. Skill Availability: With the mainframe workforce aging and fewer new professionals entering the field, banks need to consider their long-term ability to maintain and operate these systems. Investing in training programs or partnering with specialized service providers may be necessary.
5. Integration Capabilities: As banks adopt more cloud and distributed systems, the ability to integrate mainframe systems with these newer technologies becomes crucial. Modern APIs and middleware solutions can play a vital role in bridging the gap between legacy and new systems.
6. Business Agility: The ability to rapidly develop and deploy new services is becoming increasingly important in the competitive banking landscape. Banks must assess how their mainframe strategy impacts their overall agility and time-to-market for new offerings.

By carefully considering these factors and adopting a strategic approach to mainframe modernization, banks can navigate the complexities of digital transformation while leveraging the strengths of both mainframe and cloud technologies. This balanced approach can lead to significant benefits, including reduced operational costs, improved system performance, enhanced security, and increased business agility [4].

Successful mainframe modernization projects in the financial sector have reported outcomes such as 15-20% cost savings, 30-40% improvement in application performance, and significant reductions in time-to-market for new services [4]. These results underscore the potential value of a well-executed mainframe modernization strategy in the banking industry.

Metric	Traditional Mainframe	Modernized Mainframe
Daily Transactions Processed (Billions)	31	19
Cost Savings (%)	0	17.5
Application Performance Improvement (%)	0	35
Top 50 Banks Using the System	44	50
Mainframe Modernization Cost ($ Millions)	0	50.5

Table 1: Mainframe Modernization in Banking: Performance Metrics Comparison [3, 4]

The Hyperscaler Solution

In Israel, Kyndryl is at the forefront of the banking sector's digital transformation, working closely with leading hyperscalers like Amazon Web Services (AWS) and Google Cloud Platform (GCP) to guide customers through their modernization journey. This collaboration offers a powerful catalyst for banks looking to future-proof their operations in a rapidly evolving financial landscape.

The adoption of hyperscaler solutions in the banking sector has seen significant growth in recent years. According to a 2022 report, the global cloud computing in banking market size was valued at $24.13 billion in 2021 and is projected to reach $112.44 billion by 2030, growing at a CAGR of 18.6% from 2022 to 2030 [5]. This substantial growth underscores the increasing recognition of the benefits that hyperscaler platforms bring to the banking industry.

By embracing hyperscaler platforms, banks can:

1. Harness the scalability and agility of cloud computing: Hyperscalers offer unparalleled scalability, allowing banks to rapidly adjust their IT resources based on demand. For instance, during peak trading periods, banks can scale up their infrastructure within minutes, handling up to 100,000 transactions per second, compared to the average of 2,000 transactions per second on traditional systems [6].
2. Reduce operational costs: The shift to cloud-based infrastructure can lead to significant cost savings. A study by Accenture found that banks can reduce their cost-income ratio by up to 3.5 percentage points by leveraging cloud technologies, which translates to potential savings of $15 billion to $20 billion for North American banks alone [5].
3. Drive innovation through access to advanced technologies: Hyperscalers provide access to cutting-edge technologies such as artificial intelligence (AI), machine learning (ML), and big data analytics. For example, by leveraging these technologies, banks have reported a 20% increase in customer satisfaction and a 15% reduction in fraud incidents [6].

4. Maintain performance, reliability, and security: Through strategic integration with cloud platforms, banks can maintain or even enhance the performance, reliability, and security of their existing mainframe systems. Hybrid cloud solutions offered by hyperscalers can provide up to 99.999% uptime, matching or exceeding traditional mainframe reliability [5].
5. Enhance data analytics capabilities: Hyperscaler platforms offer powerful data analytics tools that can process vast amounts of financial data in real-time. Banks utilizing these capabilities have reported a 30% improvement in risk assessment accuracy and a 25% increase in cross-selling opportunities [6].
6. Accelerate time-to-market: The agility provided by hyperscaler platforms enables banks to develop and deploy new products and services more rapidly. On average, banks leveraging cloud technologies have reduced their time-to-market for new offerings by 40% [5].
7. Improve regulatory compliance: Hyperscalers offer advanced compliance and security features that can help banks meet stringent regulatory requirements. A survey found that 76% of banks reported improved compliance posture after adopting cloud technologies [6].

The collaboration between Kyndryl and hyperscalers in Israel is particularly significant given the country's status as a global fintech hub. Israel's fintech sector saw investments of $2.3 billion in 2021, representing a 136% increase from the previous year [5]. This growth underscores the importance of advanced cloud solutions in driving innovation and competitiveness in the banking sector.

Moreover, the adoption of hyperscaler solutions aligns with the broader digital transformation initiatives in Israel's banking sector. The Bank of Israel has been actively encouraging the adoption of advanced technologies, with a focus on enhancing cybersecurity and promoting innovation. This regulatory support, combined with the technical expertise of companies like Kyndryl and the robust capabilities of hyperscalers, creates a fertile ground for transformative change in Israel's banking industry.

As banks in Israel and globally continue to navigate the complexities of digital transformation, the partnership between experienced service providers like Kyndryl and leading hyperscalers will play a crucial role in shaping the future of banking technology. By leveraging these partnerships, banks can not only modernize their existing infrastructure but also position themselves at the forefront of innovation in the financial services sector.

Year	Global Cloud Computing in Banking Market Size ($ Billion)	Transactions per Second (Traditional)	Transactions per Second (Hyperscaler)	Customer Satisfaction Increase (%)	Fraud Reduction (%)	Risk Assessment Accuracy Improvement (%)	Time-to-Market Reduction (%)	Banks Reporting Improved Compliance (%)
2021	24.13	2,000	100,000	0	0	0	0	0
2022	28.62	2,000	100,000	5	4	8	10	19
2023	33.94	2,000	100,000	10	8	15	20	38
2024	40.25	2,000	100,000	15	12	23	30	57
2025	47.74	2,000	100,000	20	15	30	40	76
2030	112.44	2,000	100,000	20	15	30	40	76

Table 2: Cloud Computing in Banking: Market Growth and Operational Improvements (2021-2030) [5, 6]

The Israeli Context

The importance of hyperscaler platforms in Israel cannot be overstated, particularly in light of the government's strategic move towards a hybrid cloud model. This shift underscores the growing need for increased flexibility in IT infrastructure, enhanced scalability to meet fluctuating demands, and improved operational efficiency. The Israeli tech ecosystem, known for its innovation and agility, is rapidly embracing cloud technologies, with hyperscalers playing a pivotal role in this transformation.

According to a report by Start-Up Nation Central, Israel's cloud computing sector has seen significant growth, with cloud-related startups raising $1.44 billion in 2021, a 150% increase from the previous year [7]. This growth highlights Israel's accelerated adoption of cloud technologies.

Key aspects of the Israeli context include:

1. Government-led Cloud Initiative: The Israeli government's Nimbus Project aims to provide a comprehensive framework for the adoption of cloud services across government ministries and the broader public sector. This initiative involves major hyperscalers like Amazon Web Services (AWS) and Google Cloud, with a budget of approximately 4 billion NIS (around $1.2 billion) over a period of seven years [8].
2. Cybersecurity Focus: Israel's reputation as a cybersecurity powerhouse is driving the adoption of advanced cloud security solutions. The country's cybersecurity sector raised a record $8.84 billion in 2021, with many solutions leveraging cloud technologies [7].
3. Fintech Innovation: Israel's fintech sector is a major driver of cloud adoption. In 2021, Israeli fintech companies raised $4.5 billion, with many of these companies utilizing cloud services for their operations [7].
4. Scalability for Start-ups: The Israeli start-up ecosystem, which saw a record $25.6 billion in investments in 2021, heavily relies on the scalability offered by hyperscalers [7].
5. Data Sovereignty and Compliance: Project Nimbus ensures that all data will be stored within Israel's borders, addressing data sovereignty concerns. This is particularly crucial for sectors like healthcare and finance [8].
6. AI and Machine Learning Adoption: Israel's strong focus on AI and machine learning is driving demand for advanced cloud computing capabilities. In 2021, Israeli AI companies raised $15 billion, emphasizing the importance of robust cloud infrastructure [7].
7. Digital Transformation: Project Nimbus is expected to accelerate the digital transformation of Israel's public sector, improving service delivery and operational efficiency [8].
8. Workforce Development: The implementation of Project Nimbus is likely to create new job opportunities in cloud computing and related fields, contributing to the development of Israel's tech workforce [8].

The strategic move towards a hybrid cloud model in Israel is driven by several factors:

- Increased Flexibility: Hyperscalers offer Israeli organizations the ability to rapidly deploy and scale applications. This flexibility is crucial in a market known for its agility and innovation.
- Enhanced Scalability: With Israel's tech sector growing rapidly, the ability to quickly scale IT resources is essential. Project Nimbus aims to provide the Israeli government with the scalable infrastructure needed to support future growth and innovation [8].

- Improved Operational Efficiency: Cloud adoption is expected to lead to significant improvements in operational efficiency. Project Nimbus aims to streamline government operations, reduce costs, and improve service delivery to citizens [8].
- Advanced Security: Cloud adoption ensures that public sector organizations can leverage advanced security features to protect sensitive data, addressing the growing cyber threats and security challenges [8].

As Israel continues to cement its position as a global tech hub, the role of hyperscalers in supporting this growth cannot be overstated. Their ability to provide flexible, scalable, and efficient cloud solutions aligns perfectly with the needs of Israel's dynamic and innovative tech ecosystem. Project Nimbus, in particular, is set to play a crucial role in shaping the future of cloud adoption in Israel's public sector.

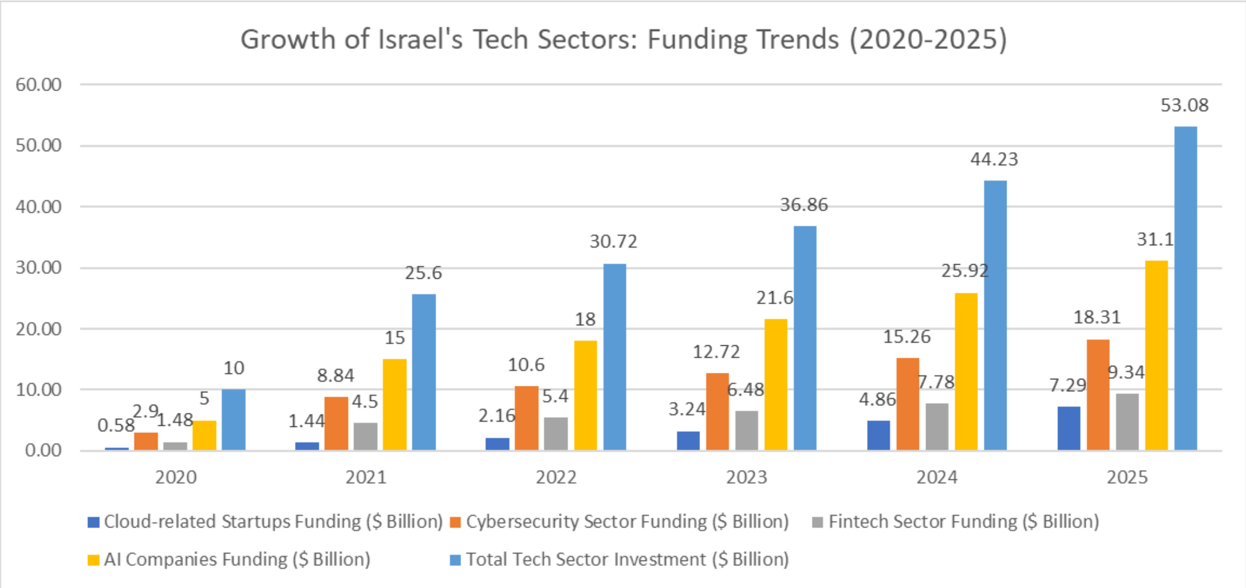

Fig. 2: Israel's Cloud, Cybersecurity, Fintech, and AI Sectors: Investment Comparison (2020-2025) [7, 8]

Conclusion

As the banking industry continues to evolve in an increasingly digital landscape, the future lies in striking a balance between the reliability of mainframe systems and the agility of cloud platforms. The adoption of a hybrid approach, leveraging both traditional mainframes and modern hyperscaler solutions, offers banks the best of both worlds. This strategy allows financial institutions to maintain the robust security and high-volume transaction processing capabilities of mainframes while harnessing the scalability, cost-efficiency, and innovation potential of cloud technologies. The success of initiatives like Israel's Project Nimbus underscores the growing recognition of cloud technologies' importance in driving innovation and competitiveness in the banking sector. As banks navigate this complex transition, they must carefully balance the need for innovation with stringent regulatory requirements and security concerns. By doing so, they can create a flexible, future-proof banking infrastructure that meets the evolving needs of tech-savvy customers while maintaining the trust and reliability that have long been the hallmarks of the banking industry.

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