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Data Migration between on prim to Cloud using Generative AI to Reduce Costing And Overheads

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***Abstract*—"Cloud data migration" describes the method of transferring digital data to new cloud services or garage structures. Data have to be transferred in a way that guarantees it remains available, secure, and uncompromised. Businesses might also easily adjust to new needs and trends in era by way of transferring their statistics, apps, or workloads to the cloud. Scalability, adaptability, and optimising charges are all made feasible by this. Generative AI can help us evaluate existing applications and provide insights into how they can be optimized for the target cloud environments. In the ever-evolving world of technology, Generative AI (GenAI) has emerged as a transformative force, poised to revolutionize various industries and domains, including cloud migration. As the global landscape of migration continues to shift, GenAI is prepared to play an essential role in streamlining processes, enhancing accuracy, and improving overall migration outcomes. The review present paper investigates the utilisation of generative AI in order to facilitate the transfer of data from on-premises to the cloud. While highlighting the potential of generative AI to automate transfer operations, it tackles obstacles such as economic implications and security concerns. Migration techniques, the benefits of cloud migration, and pertinent literature are examined in this study, which also provides a summary of key findings and recommendations for future research.**

Keywords— Data Migration, Cloud Migration, Generative AI, Artificial Intelligence, Challenges, Applications, Techniques.

I. INTRODUCTION

The data management industry has never been the same due to the fact the appearance of cloud computing. The elastic and scalable resources supplied by the cloud efficient green management, storage, and analysis of great data sets. The transition from traditional on-premises infrastructure to cloud-primarily based answers is growing in importance because of the many advantages, which includes stepped forward accessibility, value-effectiveness, and agility[1].

At the core of cloud computing's growing recognition is its capability to revolutionise information control for firms. Organisations may additionally effects extend their operations with the assist of cloud infrastructure, which in flip improves collaboration, performance, and time-to-marketplace. Finally, cloud services have robust security measures in place to defend sensitive data. Organisations are an increasing number of relying on cloud offerings to live up with the rapid digital international and fulfil the developing want for data storage and processing power. This is a essential strategic step, now not just a technical one[2].

Although there are a few obstacles, moving from on-premises to the cloud has several advantages[3]. Concerns about uptime, security risks, and data integrity are just a few potential issues that can arise when transmitting data. Given the volume, variety, and interdependencies of the facts, records switch would possibly prove to be an intimidating task. In addition, the want to adjust present structures and make sure a data transfer that does not disrupt enterprise operations might bring about sizable overhead and prices all through the transition.

Massive data sets offer a large assignment whilst migrating data from on-premises to cloud website hosting. It may be a time-ingesting and aid-in depth method for lots corporations to transfer big amounts of data that is significantly important from their own servers to the cloud. The want to make sure records integrity, protection, and minimum downtime at some point of migration additionally results in substantial issues.

Data migration additionally has considerable economic implications. Transferring massive datasets to the cloud can be a pricey ordeal that disrupts enterprise operations at times. In order to gain the blessings of cloud computing ultimately, corporations should carefully weigh those costs. The complexity of existing on-premises systems and their integration with cloud environments makes conversion system sensitive and difficult. The result is troubles that no one saw coming.

Data transmission instances might be reduced with using generative AI integration, which can resolve those problems. Generative AI is the subfield of AI algorithms that could automate facts switch processes or generate authentic content material (which includes pics or textual content) in this context. The data transfer process may be significantly simplified and charges can be reduced with the assist of generative AI, among its many other potential applications. The use of generative AI to automate records transfer operations should prove to be pretty beneficial. Generative AI is able to move on-premises information extra efficiently and appropriately to the cloud as it makes use of system gaining knowledge of algorithms to better apprehend the structure of the records. When it involves information dependency mapping, generative AI might be a lifesaver. This is due to the fact it's miles critical for preserving dataset integrity and connections for the duration of transfer. This is probably the answer to the difficulties with the contemporary on-premises to cloud facts transfer fees and barriers. More downtime and data inconsistencies may end result from the use of traditional migration techniques, which regularly depend upon human intervention and are at risk of human mistakes. By optimising aid allocation, automating repetitive responsibilities, and other method, generative AI has the ability to growth migration performance[4][5].

A. Contribution of this paper

The following paper provide the contribution of this work:

- This study explores the complexities of migration techniques by analysing a range of strategies utilised during the transfer of data from on-premises systems to the cloud.

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- This paper examines the challenges and barriers that organisations might confront as they navigate the intricate transition from on-premises to cloud environments.It is essential to identify concerns that are intrinsic to the migration process.
- The study emphasises the benefits that organisations can obtain by migrating from on-premises to cloud computing, including enhanced scalability and operational efficiency.
- The study of generative AI integration is undertaken as a potential remedy for optimising the data migration procedure. The paper examines the categories and applications of generative AI with a particular emphasis on the critical elements that enable efficient data migration.
- In order to put cloud data migration in context, the article provides a thorough literature analysis. It explores the field's many affecting variables, algorithms, and approaches. Table 1 provides a comprehensive overview by comparing and contrasting various prior research.

B. *Structure of the paper*

The remaining paper organized as: Section II provide the overview of migration techniques, next challenges and advantages in one-premises in cloud data migration described in Section III-IV, Then Section V define the generative AI in data migration, while Section VI discuss the literature review for the GAI-cloud data migrations, and last Section VII provide the paper conclusion and future work.

II. Overview Of Migration Technique

Many companies have found that moving their old apps to the cloud has helped them save money by allowing them to use a shared infrastructure and platform. The ability to scale up or down apps on demand in the cloud makes it easy to control costs. The capacity to scale up or down in response to changes in an organization's infrastructure requirements is made possible by cloud migration, which provides unlimited scalability. Cloud services allow businesses to reap the benefits of enhanced mobility by making them accessible from anywhere with an Internet connection, at any time[6]. Furthermore, the ancient system's essential parts will remain undamaged when coupled with modern infrastructure. The primary approaches utilized in industry are briefly described below:

A. *Forklift Migration*

Forklift migration in the cloud refers to the process of migrating on-premises data, programmes, and infrastructure to cloud environments with little disruption. Lifting and transferring existing workloads to cloud platforms like as AWS, Azure, or Google Cloud, often using virtual machines or containers, is part of this strategy. Forklift migration is all about getting resources to the cloud as fast as possible so you can take advantage of its flexibility and scalability. While it allows for a speedy transition, post-migration optimization for cloud-native features is necessary to optimize benefits such as cost savings, agility, and better performance. Forklift migrations need thorough planning and evaluation of cloud-specific capabilities.

This migration approach works well for autonomous, self-contained systems that are highly interconnected. Transferring the application system in its whole to the cloud rather than transferring it progressively is the most efficient option. Once this is done, there is far less chance of inadvertently modifying the source code of an existing programme[7].

B. *Hybrid Migration*

Application migration to the cloud is the primary goal of the hybrid migration strategy. Optimising the moved components individually is one approach to mitigate application relocation risks, such unexpected behaviour. Different parts of a traditional datacenter could alter communications using short wrappers. The complexity of an object may be concealed by using wrappers, which use well-described interfaces. Asynchronous and cloud-aware wrappers might also help preserve communications uninterrupted with the aid of the unpredictability of internet latency.

C. *Phased Migration*

A staggered migration plan lets in customers to step by step transfer their applications to the website hosting platform. This technique of transfer is perfect for corporations that have a high turnover fee because it enables to minimise steeply-priced downtime. Completing a phased migration requires a great amount of time and physical labour. Assuming they adhere to the client’s requirements, they will do the testing in advance with little trouble.

III. Challenge In On-Premises To Cloud Data Migration

Data migration to the cloud is fraught with difficulties, and this section examines each one in detail.

A. *Several Security Concerns*

Data theft, loss, and allotted denial of provider (DDoS) attacks are a number of the maximum commonplace privateness and safety problems that rise up with cloud migrations. Other foremost issues encompass identification and get admission to management (IAM) techniques. A company's data migration to the cloud can include migrating all of its data from on-premises databases and apps, or it might involve migrating only a portion of it, depending upon the service model selected. Data privacy and security are universally important, but they take on added significance in cloud applications due to the dispersed nature of data storage and the lack of physical access given to the user. Although many different cryptographic and non-cryptographic methods have been used to enhance and sustain cloud data protection, security and privacy continue to be two issues that cloud migrations face. As the cloud provider will have access to all users' data stored in the cloud, protecting users' privacy is more important than ensuring data security[8].

B. *Inadequate Preparation*

In a cloud environment, legacy systems may not function as effectively as they should, despite the fact that they are essential for day-to-day operations. Due to a lack of knowledge of cloud-based technology and incompatibility, it may be difficult to merge data that is stored on-premises using cloud storage. There are applications that are no longer being used. The transformation of outdated code into self-

sufficient microservices is one way that automation might facilitate cloud migration.

C. Data Compatibility

Migrations to the cloud could be complicated by interoperability issues caused by technical variations between cloud providers or systems. There is a risk of vendor lock-in due to compatibility issues with cloud services, which makes it difficult to transfer apps or change providers. Developed as a wellknown, ISO/IEC 19941:2017 ensures that cloud companies have a not unusual know-how of interoperability and portability. The mixture of previous hardware and software program with new cloud technology inevitably ends in compatibility troubles, in addition complicating cloud migration. E.g., precise qualities of the cloud, including its elasticity and multi-tenancy, ought to make it tough to port antique software program to function at the cloud.

D. Expense control

Cloud computing is being utilized by numerous agencies all through the globe as part of their technological improvement efforts. It can be challenging, specifically for big businesses, to remodel their present IT infrastructure for the cloud, and there may be nonetheless a extensive threat of fee as opposed to benefit. The ongoing, unpredictable prices of retaining existing software program and systems up and going for walks make groups hesitant to dish out extra money to cloud service providers[9].

E. Downtime and Business Disruption

When migrating structures from one infrastructure to any other, there is a high possibility of downtime and interruption to organization operations. Reduced manufacturing, profits, and disgruntled customers can result from the short disruption to operations. Companies may additionally put together for this downtime by means of the usage of measures which includes staggered migrations or redundant systems, which assist to restrict interruptions. Good planning for staying open in business is very important. It helps make essential work run smoothly without problems. Moving already costs a lot, without having to add the expenses of reducing down time. This can be done using good data transfer methods or backup systems along with other things involved in this process. A good and eco-friendly transfer process needs finding the right balance between avoiding trouble and managing costs.

IV. Advantages Of On-Premises To Cloud Data Migration

The benefits of moving data to the cloud are discussed in this section.

A. Agility and Speed

Switching to cloud from on-site is a big plus in making businesses work quicker and more flexible. Businesses can set up services and apps quickly because cloud computing is very fast at giving them resources. This flexibility helps to quickly change as market situations and company needs shift, which makes it more helpful. The built-in size growth of cloud allows companies to handle resources faster and better at high demand. In today's fast-moving business world, businesses want everything they can. This helps them grow and roll out their item faster which makes it easier for everyone to get more access. It also encourages innovation.

B. Resource Optimization

As a main perk of transferring to the cloud, optimising sources manner making the most of available IT resources at the same time as reducing down on waste. With the use of cloud services, organizations can streamline their control operations, use their computer sources greater successfully, and consolidate their workloads. Enhanced useful resource utilisation, much less call for for excess potential, and reduced working fees are the results of this. Automated scaling systems allow call for-based totally dynamic changes, making certain peak overall performance without a human involvement required. Leveraging those cloud abilities permits companies to create a extra efficient and bendy infrastructure. They can focus on supplying fee as opposed to maintaining complex hardware, which improves ordinary operational efficiency.

C. Innovation and Technological Advancements

Innovation is stimulated with the aid of users' get admission to revolutionary technologies and offerings through cloud migration. Businesses may also take use of cutting-edge innovation without committing to a huge prematurely expenditure way to the dynamic nature of cloud structures. Because of this ever-changing environment, which encourages innovation and the rapid adoption of new ideas, organisations may remain technologically relevant. Organisations may refocus their efforts on incorporating new technology, making continual improvements, and remaining competitive in a dynamic market by outsourcing infrastructure management[10].

D. Environmental Sustainability

The use of cloud computing has environmental advantages, one of which is the reduction of energy use in data centre operations. When it comes to energy efficiency and making the most of available resources, cloud providers often use cutting-edge tools and methods. The ongoing innovation and economics of scale allow providers to potentially run data centres more effectively than individual on-premises installations. By transferring their IT infrastructure management to the cloud, organisations may lessen their environmental footprint, which has economic and environmental benefits[9].

V. Generative AI In Data Migration

Cloud migration involves inherent risks of data loss, security breaches, or service disruptions. Generative AI can help assess and mitigate these risks, presumably by analyzing potential vulnerabilities in the infrastructure or applications. Also, by identifying potential security loopholes and recommending necessary security measures, AI empowers organizations to secure their systems and data during migration. One of the most critical aspects of cloud migration is data transfer without blowing things up. Generative AI can automate and simplify this process by suggesting the most appropriate data migration strategy based on data volume, sensitivity, and network bandwidth. Finally, generative AI can evaluate existing applications and provide insights into how they can be optimized for the target cloud environments. As it analyzes code repositories and application dependencies, it can offer recommendations

for refactoring or rearchitecting applications to improve performance, scalability, and cost-efficiency[11].

The term "generative AI" refers to a subset of AI that can learn from examples and apply those patterns to the creation of new material. An important tool in this domain, generative AI has the ability to automate data migration-related data structure construction and change. Generative AI algorithms may find commonalities in the data and, without human mistake or interference, develop suitable structures in the target system. This technique simplifyes the transmission process while simultaneously increasing its speed and ensuring the data's integrity and quality. Generative AI is a powerful tool for improving the efficiency and reliability of data transfer processes in complex and dynamic situations because it can learn patterns and create new content[5].

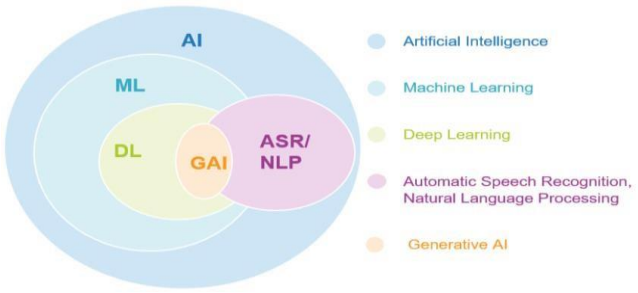

Fig. 1. Relationship Diagram for Generative AI[5]

A. Applications and categories of Generative AI

The many types of generative AI and their practical applications in people's everyday lives are covered in the section that follows.

TABLE I. STANDARD GENERATIVE AI MODELS AND ITS APPLICATIONS

Type	Representative Models	Application Field
Text	Hugging Face Bloom, Meta LLaMA, DeepMind Gopher, Google PaLM2, OpenAI GPT-4	General writing, translation, summarization, marketing, sales, customer support
Code	Google PaLM2, Pygma, Tabnine, stenography, AI2sql, Amazon CodeWhisperer, OpenAI Codex, Ghostwriter	Document Code, Code Generation, Generate Web Apps, Generate SQL Queries, Testing, Code formatting
Image	OpenAI Dall-E2, Google Imagen, Meta Make-A-Scene, Midjourney, Stable Diffusion	SNS, Advertising, Generate Image, Design, Data visualization
Video	MS X-CLIP, RunwayML, Meta Make-A-Video, Synthesia, Rephrase AI, Hour One	Video Summarization, Video Generation, Video Editing
3D	NVIDIA GET3D, DreamFusion, MDM	Generate 3D Models, Generate 3D Scenes
Audio	Harmonai, Google MusicLM, Coqui, WellSaid, Play.ht, resemble AI	Generate Music, Speech Synthesis, Voice Cloning, Sound effect design

Text Generative AI Models: The ChatGPT language model developed by OpenAI is the most popular and efficient one for writing new texts. Text generative AI models that use ChatGPT are explored in this chapter. The most advanced AI language model to date, ChatGPT, was an attempt by a conversational big language model to provide replies that were as "humanlike" as feasible. After becoming live on November 30, 2022, ChatGPT attracted one million users in its first week. By January 20, 2023, over 100 million individuals had used the artificial intelligence. You may access the ChatGPT-3.5 model, which is also known as GPT-3, for free and without any restrictions. In contrast, OpenAI has built ChatGPT-4, a very advanced version of ChatGPT, and it is now offered solely to paying clients[12].

Text-to-image Generative AI Models: A generative model is a kind of artificial intelligence that can take a collection of input parameters and use them to generate new images. The model is based on machine learning techniques, which are comparable to text generative models; however, its databases consist mostly of images rather than text. What this means is that the photos of the model are always Images in the training set are very consistent in both style and content. Whatever the situation may be, the model can't comprehend the input texts without text data as well as image data. Consequently, the models include language model components that transform text input into a latent presentation form. Then, the generative image model turns it into a picture. Among the most advanced generative AI models for text-to-image conversion, VQGAN, CLIP, and steady diffusion remain at the forefront. To increase picture accuracy, text-to-image AI models often utilise VQGAN and CLIP algorithms. A VQGAN creates the image, and CLIP acts as a middleman to assess the caption's suitability[12].

Video Generative AI Models: Using powerful machine learning algorithms, video generative AI models can automatically produce and modify videos. Hour One, RunwayML, MS X-CLIP, ReAI, Synthesia, and Meta Make-A-Video are model examples. Computer vision and deep learning are only two of the many methods used by these models to assess and alter visual material. Some of the upcoming offerings from MS X-CLIP and Meta Make-A-Video include vision-language pre-training, RunwayML offers creative coding, and Synthesia offers deep neural networks. Hour One may use powerful algorithms to automatically compress material for video summaries in terms of artificial intelligence. The use of AI in these new developments demonstrates its potential to transform video creation, editing, and summarization[12].

Audio Generative AI Models: There is a huge variety of tasks that generative AI models for audio, such Google MusicLM, Harmonai, Coqui, WellSaid, Play.ht, and Resemble AI, are exceptional at. Utilising speech synthesis and voice cloning, applications such as Resemble AI and WellSaid are able to generate voices that seem natural and can be completely customised. They may assume that Play.ht would use powerful algorithms to imitate human speech in various settings. The open-source project Coqui may be helpful when it comes to cloning and voice synthesis. New methods of music production that use large-scale language models and are powered by AI are being considered by both Harmonai and Google MusicLM. These models can automate a wide range of audio-related tasks, including cloning, speech synthesis, and music and sound effect composition[5].

B. Essential Components of Generative AI

This section explains the fundamental elements of generative AI and shows how the technology has advanced and end up greater standardised.

Foundation Model: Generative AI models may be classified in step with the kind of output they develop. For

example, some models are capable of producing words, images, and movies. As a result of their ability to gather information from both text and pictures at the same time, multi-modal models are gaining popularity. Multi-modal models are constantly growing in potential and overall performance. In addition to being fundamental models, those multi-modal models are also becoming an essential component of artificial intelligence. Stanford University researchers first supplied the idea of foundation models in a 2007 article titled "Opportunities and Risks of Foundation Models." Foundation models are educated the use of a huge sort of input types, including as textual content, pics, audio, based information, and 3D alerts, among many others. Tasks requiring human creativity and reasoning are the ones these models are designed to carry out. To highlight the significance of a paradigm shift in AI, the phrase "Foundation Model" is utilised to characterise it.

Foundational models display the emerging characteristic. The ability of the model to solve problems without prior explicit coding is what this term refers to. To a certain extent, AI neural networks allow the model to act independently by making decisions or inferring future actions from the accessible data. The concept of emergence is important to this idea. The importance of the developing feature will grow in sync with the quantity of data[13]. Figure 1 below illustrates how generative AI has emerged.

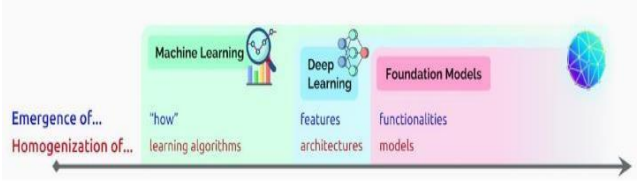

Fig. 2. Growing Emergence and Standardization of Generative AI[5]

LLM (Large Language Model): Online chatbots like ChatGPT often use LLM and other forms of generative artificial intelligence. These algorithms provide outcomes based on text after being trained on linguistic data, like text. The AI community has taken a keen interest in LLMs, like OpenAI's GPT series & Google's BERT. Machine learning and deep learning are the foundational technologies, and training them requires massive datasets and a lot of computing power.

As fundamental models, LLMs underpin NLP and NLG procedures. To deal with the complex and interrelated structure of language, these models are fine-tuned utilising methods such as in-context learning and zero/one/few-shot learning after being pre-trained on massive volumes of data. An effectiveness of LLM is heavily dependent on the calibre of the pre-training data. The need for high-quality data during pre-training is greater for LLMs compared to smaller language models. How many training corpora are used and what pre-training techniques are used greatly affect the model's capabilities?[5].

VI. Literature Review

This section explores the background history of the cloud data migration. The literature review dives into the numerous methodologies, algorithms, and inspiring factors that inspire this discipline's professionals. A comparative analysis of previously published studies is shown in Table 1 below.

The Cloud Readiness Planning Tool (CRPT) is presented in this study[14]. It is a Migration Type Classifier that tackles "idea drift" using a unique active learning technique. The AI Planner is an additional component of the system that formulates strategies using automatically produced domain and issue files. These files include declarative specifications like goal states and data input formats that are easy for users to understand and work with. Several tests were performed on an actual migration job in the real world. The findings indicate that the Migration Type Classifier can successfully adjust to evolving business requirements and achieve a high level of accuracy while minimising the expense of labelling.

This work presents[15], the PLBVM method, an approach to load balancing & virtual machine migration that is specifically designed for large data cloud settings. This method estimates the future demands of all servers. Virtual machine migration is initiated in the event that the predicted future load exceeds an upper limit or falls below a lower constraint, indicating an imbalanced load. In VM migration, the VMs with minimum migration time and sufficient resources are selected. Then the task execution continues in the migrated VMs. By experimental results, it is shown that PLBVM achieves lesser response delay and execution time, among the other approaches.

This study introduces[16], a mechanism that streamlines the transition to the cloud. The Metric-FF AI planning algorithm is integrated into it, allowing for the dynamic assembly of migration plans according to source and destination environment attributes and the available migration tools. The article goes over some of the difficulties with migration planning and AI domain design. Based on the source environment's seven hundred servers and the varied sizes of the migration service requests, this study proves that the system generates plans effectively and scalable.

A hybrid optimisation deep learning strategy for energy-efficient data transfer in a heterogeneous cloud is presented in this study[17]. Physical machines (PM), containers, and VM are a three primary parts of a cloud simulation. A Taylor Lion-based Poor and Rich Optimisation (Taylor Lion-based PRO) is used to carry out the migration programme, while an Actor Critic Neural Network (ACNN) is used to determine the load. Furthermore, reputation, resource capacity, energy consumption, predicted load, migration time, and transmission cost are objective functions that are used. In this scenario, the Taylor series along LOA is combined with PRO to generate Taylor Lion-based PRO. There are three performance parameters used to assess the interoperability performance of data migration: load (0.006), resource capacity (0.364), and energy use (0.281).

In this article[18], they take a look at the current best practices for live virtual machine migration that use artificial intelligence (AI), as well as more traditional approaches that are energy-aware, SLA-aware, and network-aware. This research examines the most important features of traditional and AI-driven live virtual machine migration strategies by conducting a thorough literature analysis. Finally, certain unanswered research questions are brought to light, which call for more investigation from the academic community.

They propose[19], an AI-based image analysis approach and a programmable dual-nested microwell array chip (DNMA chip) as a high-throughput device to address this issue. Our DNA microarray technology allows for long-term

growth, label-free labelling, and single-cell capture. Using AI to help with data processing, they can look at how single tumour cells move and multiply in regular culture or treatment in a way that doesn't damage the cells.

They provide [20], a novel approach to successfully use the credentials saved by the web browser on other devices, as an alternative to the forensic technique that relies on local credentials. They looked into credential decryption techniques after discovering that most browsers encrypt and save credentials. The migration proceeded as planned, which included transferring the decrypted credentials to the investigator's device for further encryption or transferring merely the unencrypted credentials. They have confirmed that migration is feasible in all browsers (with the exception of three that do not save data, like Tor), after conducting credentials migration trials on a total of twenty-eight browsers. They confirmed that 20 popular online service types may be accessed and data collected using transferred credentials. Our proposed method is simple, yet it enables efficient and effective collecting of cloud data for digital forensic investigations.

Using a multi-vocal literature study[10], this research lays out the advantages and downsides of moving data to the cloud. To assess performance, determine security needs, choose a cloud provider, estimate costs, and implement any required organisational changes, five distinct cloud migration models and methodologies are recommended. By outlining the steps for transferring data to the cloud, this paper's results may help decision-makers make the move in a safe and productive way.

This article presents[21], a metamodel for migrating from older systems to the cloud. Building an included framework to facilitate cloud migration is the purpose of this article. For the reason of creating domain-precise languages and reusing knowledge, the study uses a Model Driven Software Engineering (MDSE) method, which is common within the fields of software program engineering and statistics systems. A survey of the contemporary literature on cloud migration was helpful within the improvement of the framework. The method consisted of identifying, coordinating, and repeatedly refining already essential issues in cloud migration literature. Making a general method for transferring to the cloud is the goal.

TABLE II. COMPARISON TABLE OF PREVIOUS LITERATURE WORK

Reference	Methods	Data	Application	Research Gaps
Cloud Readiness Planning Tool (CRPT): An AI-Based Framework to Automate Migration Planning	Migration Type Classifier (active learning strategy, concept drift), AI Planner	Real-world migration task experiments	Automated migration planning	Low labelling cost, high accuracy, and adaptability to changing business demands
Prediction based Load Balancing and VM Migration in Big Data Cloud Environment	PLBVM algorithm (estimating future loads, VM migration)	Experimental results	Big Data cloud environments: load balancing and virtual machine migration	Achieving lesser response delay and execution time
Cloud migration using automated planning	Metric-FF AI planning algorithm	Source and target environment properties, migration tooling	Automated cloud migration planning	Effective and scalable solution for generating plans
Energy Efficient Data Migration Concerning Interoperability Using Optimized Deep Learning in Container-Based Heterogeneous Cloud Computing	Hybrid optimized deep learning (Taylor Lion-based PRO)	Simulation with PMs, containers, VMs	Efficient data transfer across diverse cloud environments	Interoperability assessment with energy consumption, load, and resource capacity metrics
Live virtual machine migration: A survey, research challenges, and future directions	Survey and literature review	-	Synopsis of traditional and AI-based virtual machine migration plans	Identifying open research challenges in the field
AI-aided high-throughput profiling of single-cell migration and proliferation on addressable dual-nested microwell arrays	Addressable dual-nested microwell array chip, AI-based image analysis algorithm	High-throughput single-cell migration analysis	Quantitative analysis of tumor cell migration and proliferation	Non-destructive analysis with high-throughput capabilities
A study on cloud data access through browser credential migration in Windows environment	Credential decryption methods, browser credential migration experiments	Experiments on 28 browsers	Accessing cloud data via migrating browser credentials	Efficient acquisition of cloud data for digital forensic analysis
Key Opportunities and Challenges of Data Migration in Cloud: Results from a Multivocal Literature Review	Multivocal literature review	-	Determining the benefits and drawbacks of moving data to the cloud	Providing a roadmap for decision-makers in cloud data migration
Cloud Migration Metamodel: A framework for legacy to cloud migration	Model Driven Software Engineering (MDSE) approach	Developed through the review of existing literature	Legacy to cloud migration support framework	establishing a general reference procedure for cloud migration

VII. CONCLUSION AND FUTURE

In conclusion, the reviewed literature and related implementations display that generative AI integration has superb ability for improving on-premises to cloud facts migration. The transition from on-premises to cloud computing is an imperative undertaking for businesses aiming to enhance accessibility, efficiency, and adaptability. Although this transition presents a multitude of advantages, it also entails substantial expenditures, concerns regarding data security and integrity, and security vulnerabilities. Incorporating Generative AI into these challenges is suggested by this research as a paradigm-shifting approach. Through the automated process of schema mapping, code generation, data quality checks, as well as security measures, Generative AI significantly improves migration process' capacity for efficiency. Minimising problems, the real-time monitoring and communication systems contribute to

proactive issue resolution. Synergy among generative AI abilties with cloud migration's benefits, such agility and aid optimisation, highlights its importance in improving performance.

Enhancing generative AI algorithms for migration conditions, examining higher safety features, analyzing adaption to various settings, and assessing scalability should be the point of interest of future studies. Updating AI-primarily based frameworks like the cloud readiness planning tool is important for retaining up with evolving commercial company's needs. Furthermore, there is a need for extra studies into the environmental sustainability results of generative AI throughout migrations. The future of easy and effective statistics migration from on-premises to cloud could be significantly inspired with the aid of generative AI.

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