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REVIEW ARTICLE

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Automating Deployment and Customization Pipelines in Healthcare Applications

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ABSTRACT

The healthcare industry has encountered several issues due to updated regulatory requirements and excessive workflow. Therefore, utilization of the traditional salesforce environment is not highly suitable as the manual process generates issues and complexities related to errors. Now, the deployment of GitOps practices in the Salesforce environment can be a highly effective approach to ensuring the automation of healthcare facilities and the reliability of services. Even the integration of infrastructure-as-code principles is of great importance in improving accuracy in healthcare services and reducing risk factors of data breaches in compliance with regulatory frameworks.

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GitOps Practices, Infrastructure-as-Code and Continuous Integration (CI), CI/CD

Introduction

Automation deployment and customization pipelines have become an integral part of the ever-changing healthcare industry. Customization of medical software has a large importance in providing optimal treatment by closely monitoring and evaluating patients' conditions. In general, the healthcare industry is one of the heavily regulated industries therefore it requires maintaining a high level of data accuracy and ensuring privacy of patients [1]. Particularly, the deployment of manual steps toward managing patients' sensitive information in salesforce can ultimately result in additional expenses, human error, and delays in the process of streamlining healthcare operations. It has been reported that there is a growing number of users utilizing the digital health market in the UAE, it has been forecasted to reach in total of 0.9 million users (+26.63%) by the financial year 2029.

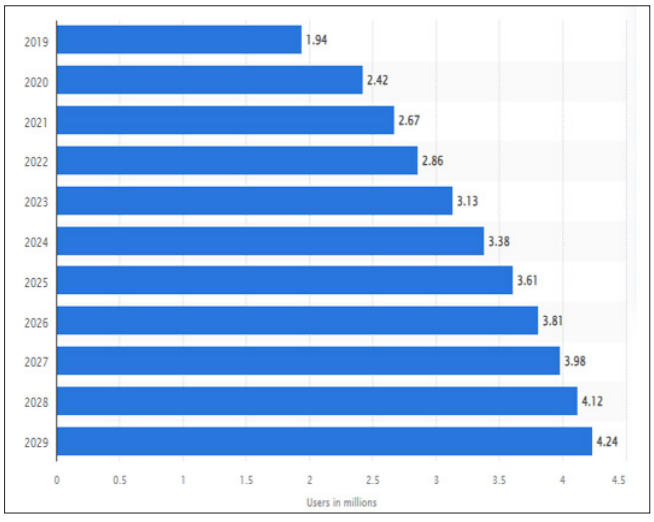

Figure 1: Number of Digital Health users in the UAE from 2019 to 2029 [2].

Therefore, it has been highly crucial for frequent updates of software for the purpose of enhancing reliance on digital healthcare services and ensuring the facilitation of remote care.

Background

With increasing workflows and demand for healthcare services it has become challenging for the healthcare industry to maintain data privacy of patients and develop effective relationships with potential customers. In the possession of ensuring the facilitation of robust healthcare services integration of Salesforce in its streamlined business operations has become one of the effective approaches to managing complexities in the workflow of healthcare services, scheduling of appointments, and developing effective relationships with patients in alignment with regulatory standards Ștefan. Therefore, in the software development process, GitOps has been deployed as a framework for managing healthcare infrastructure and applications [3]. Therefore, in compliance with the healthcare industry regulations implementation of the GitOps framework can be the best practice for leveraging infrastructure-as-code and continuous integration (CI) in the streamlined business operations of the healthcare industry.

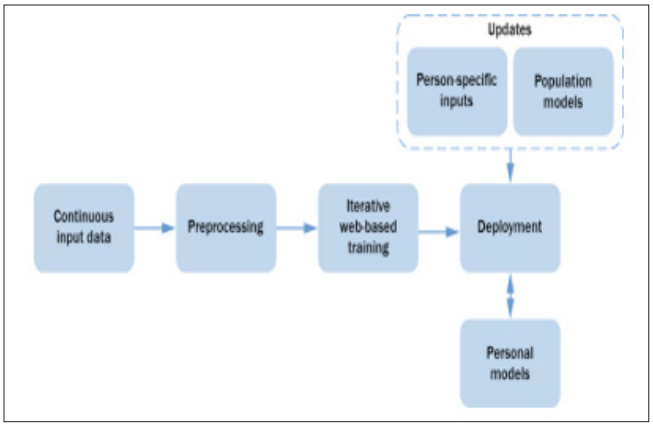

Figure 2: Deployment Pipeline for Personalized Models [3].

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Problem Statement

Generally, it is highly challenging to work on updates of the salesforce application by the healthcare industry as it is highly time-consuming and the chances of making errors are comparatively higher. Mostly deployment of outdated frameworks of salesforce applications does not suit the evolving business functioning of the healthcare industry [4]. Even manual configuration processes in salesforce applications sometimes make it challenging to maintain the data integrity and security of patients. Even, the risk of data breach significantly increases if healthcare regulations are not properly adhered to and it ultimately leads to increased bad consequences for healthcare operations.

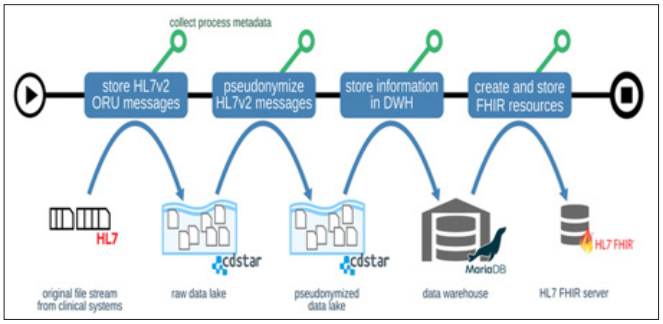

Figure 3: Data Flow between Different Storage Systems in the Healthcare Industry [5].

Proposed Solution

The problems that have been identified need a highly robust proposed solution like utilization of GitOps framework for ensuring automation process in salesforce towards improving healthcare applications.

Utilization of GitOps

In the process of configuring metadata and sensitive data of healthcare Git repository can be utilized as the version controlling system. It should also be ensured that all Git history is traceable and can be fully controlled for compliance purposes [3].

Adopting continuous integration/ Continuous development (CI/CD) tools

In the deployment process, it should also be considered that the automation process for testing and validating stages can be a highly effective approach.

Methodology

Implementation of GitOps practices in the healthcare process through salesforce would involve diverse methodological stages as follows:

Setting up Git

Configuration of salesforce needs to be managed with the establishment of a Git repository. This implementation can be helpful in facilitating changes in configuration.

Ensuing Automated Pipelines through Leveraging CI/CD

In this stage, automated testing can be supported through the configuration of CI/CD. Even, in the process of integrating the CI/CD pipeline, it would be highly required in managing different stages such as validation of code, and prioritizing testing for deployment in the process [6].

Facilitation of Automated Testing

In this process involvement of the static code analysis should be an integral part of automated testing as that would help in deploying regulatory standards in the validation process.

Optimization of Reliability

In order to safeguard all highly sensitive data it should be prioritized on improving the performance of the Git pipeline so the scalability can be improved and deployment time can be reduced [3]. It should also be checked on maintaining ongoing security to prevent the scope of data leakages.

Continuous Monitoring

It would also be highly important to adjust the pipeline to enhance reliability and accelerate the speed of process functioning. Additionally, receiving feedback from stakeholders can also be a highly holistic approach to improving the process of the deployment pipeline.

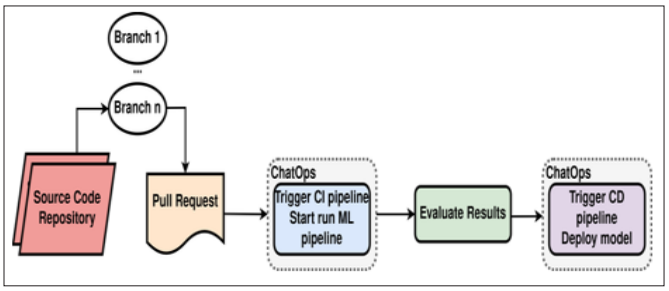

Figure 4: GitOps for ML Workflow [6].

Results and Discussion

With increasing demand for highly advanced healthcare facilities, the federal government of the UAE has implemented a strategic plan for achieving a world-class healthcare system. Considering the increasing pressure of healthcare workflow, it has been highly important to adapt highly advanced technologies in the healthcare system [7]. This current research has emphasized the effectiveness of GitOps practices in securing an improved healthcare development pipeline in alignment with healthcare industry standards. It would be highly required to adhere to IaC principles for the deployment of salesforce configuration [8]. In this way, the overall risk factors associated with inconsistencies in healthcare business operations can be reduced by implementing standardized configurations.

Conclusion

A potential transformation can be expected through salesforce deployment with adaptation to the GitOps framework. With the increasing pressure of workflow in healthcare services it is highly time-consuming when manual configuration is taken into consideration. However, in this process, it would be highly required to align with the regulatory framework of the healthcare industry for the deployment of GitOps-based solutions.

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