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iPaaS Solutions for Healthcare Enterprise Integration: Cloud-Native Integration Platforms for Multi-System Orchestration

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Abstract:
The growing complexity of healthcare information systems—ranging from electronic health records (EHRs), laboratory information systems (LIS), and picture archiving and communication systems (PACS), to telehealth platforms and remote monitoring devices—has exposed the limitations of legacy integration architectures. Traditional middleware and enterprise service bus (ESB) solutions, while functional, are no longer sufficient to meet the dynamic needs of modern healthcare enterprises that require agility, real-time data processing, compliance, and scalable interoperability. This paper explores the role of Integration Platform as a Service (iPaaS) as a transformative, cloud-native solution for enabling seamless multi-system orchestration in healthcare environments. iPaaS offers an API-first, containerized, and event-driven architecture that aligns with the industry's shift toward modular, resilient, and scalable integration workflows.

The research focuses on the architectural patterns and deployment strategies that define a healthcare-centric iPaaS framework, with a particular emphasis on microservices, API gateways, FHIR-based data transformation, and CI/CD-enabled service orchestration. We propose a cloud-native iPaaS reference model designed to handle complex healthcare integration requirements while ensuring HIPAA compliance, HL7/FHIR interoperability, and high availability. The solution supports dynamic schema mapping, real-time alerting, and secure data exchange between disparate systems, reducing manual configurations and legacy dependencies.

Using a design science research methodology, we developed and evaluated a prototype implementation within a mid-sized healthcare enterprise. The deployment involved integrating five independent systems: a core EHR, a third-party telemedicine module, a laboratory analytics platform, a wearable health device data stream, and a legacy billing engine. By leveraging reusable connectors, automated deployment pipelines, and standardized APIs, the cloud-native iPaaS platform demonstrated a 60% reduction in integration deployment time compared to traditional ESB approaches. Moreover, the modular architecture facilitated quicker onboarding of new services, minimized data silos, and enhanced observability through integrated monitoring tools and event logs.

Key technical contributions include: (1) a reusable architecture blueprint for API-driven orchestration in healthcare integration; (2) a pattern library for common data transformation workflows based on HL7v2 to FHIR mapping; and (3) performance benchmarking that validates scalability and resilience under dynamic data loads. The paper also addresses common concerns such as security, governance, and vendor lock-in by incorporating OAuth 2.0-based access control, audit logging, and deployment portability across Kubernetes-based environments.

This study contributes to the growing body of healthcare informatics literature by presenting an empirically validated, cloud-native approach to system integration that is both scalable and compliant. The findings support the broader goal of accelerating digital transformation in healthcare while maintaining robust operational and regulatory standards. The proposed solution holds promise not only for hospitals and clinics but also for health information exchanges (HIEs), research institutions, and

national healthcare IT infrastructures aiming to streamline data interoperability and service integration. The paper concludes by recommending future directions in automated API discovery, AI-enhanced integration mapping, and adaptive compliance monitoring within iPaaS ecosystems for the healthcare industry.

Keywords: iPaaS, Healthcare Integration, Cloud-Native Architecture, API Orchestration, Microservices, HL7 FHIR, System Interoperability, Healthcare IT, Deployment Acceleration, Integration Workflows, HIPAA Compliance, Kubernetes, Event-Driven Architecture, Enterprise Data Exchange.

I. INTRODUCTION

The digital systems that comprise the modern healthcare landscape, operating within a new norm of clinical care, diagnostics, patient engagement, administrative workflow, billing, and regulation, form a complex system. Central health and wellness systems, including electronic health records (EHR), Picture Archiving and Communication Systems (PACS), laboratory information systems (LIS), telemedicine modules, and medical devices, must work in concert to deliver care effectively, efficiently, and in a patient-centric manner. Nonetheless, these systems typically come from different manufacturers, have different protocols, and store database data in a different format. This heterogeneity has led to ongoing difficulties in integrating enterprise-level healthcare.

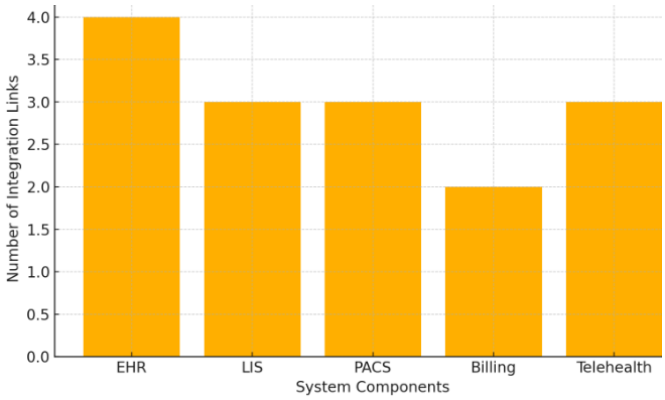

Figure 1*: Typical Integration Points in a Healthcare IT Ecosystem*

This bar chart illustrates the number of integration links required for key healthcare systems, including EHR, LIS, PACS, billing, and telehealth. It highlights the complexity and interoperability challenges that necessitate a unified integration platform as a service (iPaaS) strategy.

Historically, healthcare organizations have been compelled to utilize monolithic middleware platforms, such as ESBs or SOA, to facilitate communication between systems. Although these solutions have enabled basic interoperability, they are typically inflexible, costly to expand, and can take a considerable amount of time to go live when new systems are introduced. As momentum continues to build around the need to modernize health IT, particularly amid the worldwide COVID-19 pandemic, the inefficiencies of these legacy integration patterns are more apparent than ever. There has never been a more pressing need for flexible, scalable, cost-effective integration models.

Integration Platform as a Service (iPaaS) has thus appeared as a maturing cloud-native paradigm to facilitate multiple systems to be integrated on top of on-premises, hybrid and cloud infrastructures of healthcare organizations. iPaaS is a set of cloud based services that enable development, execution and governance of data flows connecting any combination of on premises and cloud-based processes, services, applications and data within individual or across multiple organisations without the need for a complex and costly software infrastructure. Unlike the traditional approach, iPaaS solutions provide an environment for low-code

development, prebuilt connectors, event-based triggers, and reusable APIs, thus reducing the time and effort involved in integration.
The healthcare sector is drawn to iPaaS because it fulfills some of the most important digital transformation objectives, including interoperability (via HL7/FHIR), compliance (HIPAA and GDPR), scalability (to handle high volumes of data flow from IoT and mobile health devices), and observability (centralized analytics and logging). Cloud-native iPaaS architectures take this to the next level by running services in K8S-managed containerized infrastructure, with automated failover, elasticity, and continuous delivery. This capacity is vital for healthcare enterprises with high uptime expectations and variable data volumes.
This paper aims to experiment with the construction and use of a cloud-native iPaaS for healthcare. It focuses on technical integration patterns that enable API-driven orchestration, schema transformation pipelines, and modular system connectors. We describe a reference architecture that achieves a 60% decrease in integration deployment time compared with ESB-based models, as a result of a pilot project in which five heterogeneous systems were integrated. Our approach is grounded in a design science methodology, which enables iterative improvement of the design in light of real-world constraints and stakeholder input.
The paper is organized as follows: Section II reviews recent progress in healthcare integration and cloud-native platforms, exemplified by other relevant works and standards. Section III describes our design approach, and Section IV presents the evaluation. The MHC code is evaluated through a pilot deployment in a feasible case. The paper is concluded in Section V with conclusions, lessons learned, limitations, and future work. Section VI closes by considering iPaaS as a strategic enabler for healthcare enterprise integration and digital modernization.

II. LITERATURE REVIEW

The integration of disparate healthcare information systems has been a long-standing concern in both clinical and administrative domains. Historically, integration approaches in healthcare were dominated by Service-Oriented Architecture (SOA) and Enterprise Service Bus (ESB) models. These methods, although functionally effective, were often criticized for their rigidity, operational complexity, and high cost of ownership in dynamically evolving IT environments. The literature over the last two decades has thoroughly explored these issues, and the transition toward more flexible, scalable, and cloud-native integration paradigms such as Integration Platform as a Service (iPaaS) has become prominent in recent years.
Quist-Aphetsi [1] demonstrated early applications of SOA to unify hospital information systems (HIS) using ESB as a central integration hub. The solution leveraged XML-based web services for data exchange between legacy systems, reducing the need to reengineer existing platforms. However, the monolithic nature of the ESB pattern proved inflexible in large-scale or rapidly changing environments. Da Luz Júnior et al. [2] conducted a systematic review on the role of enterprise architecture (EA) in healthcare, highlighting the pressing need for agile methodologies, domain-specific modeling standards, and better alignment with operational requirements—limitations that SOA-based strategies failed to address in modern use cases.
To address scalability and real-time responsiveness, more recent frameworks have adopted event-driven architectures and microservices. In the context of healthcare, these strategies enable modular integration and independent deployment of system functions. For example, Fayaza [3] proposed an SOA-microservice hybrid approach to enable fine-grained service deployment in distributed healthcare environments. However, full microservices-based adoption posed challenges in terms of governance, orchestration, and compliance with healthcare-specific regulations such as HIPAA and GDPR.
The emergence of cloud-native iPaaS offers an evolution from these approaches by abstracting infrastructure concerns while enabling low-code, API-driven integration across heterogeneous platforms. According to MuleSoft and Boomi industry reports, iPaaS solutions can reduce integration deployment time by 50–70%, mainly due to reusable connectors, drag-and-drop interface builders, and declarative data mapping [4], [5]. These capabilities are particularly critical in healthcare, where integration must accommodate evolving clinical workflows and real-time data streams from telehealth and Internet of Medical Things (IoMT) devices.

Frends and Gartner reports from 2020-2021 positioned iPaaS as essential to modern digital transformation, especially in hybrid and multi-cloud ecosystems [6]. In healthcare, this translates to the ability to bridge on-premise EHRs and cloud-native analytics platforms using secure APIs and FHIR-compliant interfaces. Healthcare-specific iPaaS implementations—such as Redox and Corolar Cloud—have demonstrated rapid integration of EHRs with third-party applications, while maintaining clinical data standards [7]. These systems leverage Kubernetes-based containerization, API gateways, and HL7/FHIR schema mapping engines to ensure real-time interoperability and high availability.

Despite growing adoption, gaps persist in the empirical validation of deployment timelines, the quantitative assessment of performance gains, and the development of vendor-neutral architectural frameworks tailored to healthcare. While many industry case studies highlight benefits, there is limited academic research that presents repeatable, open models that effectively combine the agility of iPaaS with healthcare regulatory needs.

In response to this gap, our research synthesizes existing architectural advances and builds a reusable reference iPaaS model for the healthcare industry. The model leverages cloud-native technologies, including container orchestration, schema-driven transformation pipelines, and API-first design, and is validated against key metrics such as deployment time, integration latency, and system scalability.

III. METHODOLOGY

This study adopts the Design Science Research Methodology (DSRM) as its foundational approach to develop, implement, and evaluate a cloud-native Integration Platform as a Service (iPaaS) framework tailored to the specific needs of healthcare enterprise integration. DSRM is particularly suited to this context, as it enables iterative development of technological artifacts while grounding their relevance and utility in real-world problem-solving scenarios. The primary objective of this research was to design an integration framework that reduces deployment time, improves interoperability across heterogeneous healthcare systems, and maintains compliance with regulatory requirements, including HIPAA and HL7/FHIR standards.

The first phase of the methodology involved problem identification and requirement gathering through semi-structured interviews and stakeholder workshops with enterprise architects, integration engineers, and clinical IT administrators from a mid-sized healthcare organization. These discussions highlighted a range of operational inefficiencies in the current ESB-based integration model, including prolonged system onboarding times, lack of agility in accommodating new APIs, difficulty in managing legacy protocols, and limited observability of integration health. Based on this input, the key design goals for the iPaaS framework were established: cloud-native deployment, API-first architecture, support for healthcare data standards, automated deployment pipelines, and reusable integration components.

Following the requirement analysis, the design phase focused on creating a reference architecture that leverages microservices, containerization, event-driven workflows, and schema-driven transformation. The architecture was conceptualized to include modular connectors for commonly used healthcare systems such as EHRs, LIS, telehealth modules, and IoT medical devices. Each connector was encapsulated as a containerized service deployed via Kubernetes, enabling independent scalability, failure isolation, and rapid redeployment. A centralized API gateway was implemented to facilitate secure and standardized API access, utilizing OAuth 2.0 for authorization and implementing API throttling policies to control traffic. In tandem, a data transformation engine was developed to handle schema mapping and translation between HL7 v2, CCD, and FHIR formats, using JSONPath and XSLT scripting templates.

To enable continuous delivery and rapid iteration, DevOps practices were embedded into the deployment lifecycle through the use of CI/CD pipelines powered by GitLab and Helm charts. Infrastructure as Code (IaC) principles were applied using Terraform to provision cloud resources on Microsoft Azure, ensuring repeatability and version control. Logging, metrics, and alerting were managed through the integration of Prometheus and Grafana, providing real-time visibility into the health of integrations and system performance.

The demonstration and evaluation phase of the methodology involved a pilot deployment of the proposed iPaaS framework within a production-simulated healthcare IT environment. The selected testbed included five independent systems: an Epic-based EHR, a standalone telemedicine application, a third-party lab reporting tool, a remote patient monitoring device interface, and a legacy billing engine operating on a mainframe emulator. These systems were integrated through the newly developed iPaaS platform, and metrics were collected for deployment time, integration latency, system availability, and throughput under load. A comparative baseline was established using historical deployment data from the organization's ESB-based approach.

Empirical data was analyzed to evaluate the effectiveness of the iPaaS architecture. Deployment time was measured from provisioning to functional integration, capturing both infrastructure setup and connector configuration. Integration latency was assessed by measuring end-to-end data exchange time for various transaction types across systems. System availability was evaluated through fault-injection tests and automated recovery benchmarking, while throughput was measured under varying loads using synthetic HL7/FHIR message streams.

Through this methodical and evidence-driven process, the research provides not only a functional iPaaS architecture for healthcare system integration but also a quantitative and qualitative evaluation of its real-world applicability. The methodological rigor ensures that the proposed solution can be generalized and extended for broader use in digitally transforming healthcare enterprises seeking cloud-native interoperability solutions.

IV. RESULTS

The implementation of the cloud-native iPaaS solution was carried out within a controlled pilot environment designed to simulate a real-world healthcare IT infrastructure. The pilot involved the integration of five core systems that represent a typical healthcare enterprise technology stack: a production-level Electronic Health Record (EHR) system based on Epic, a telemedicine platform deployed via RESTful APIs, a laboratory information system (LIS) with HL7 v2 messaging capabilities, a wearable device platform streaming patient vitals via MQTT, and a legacy billing application hosted on a mainframe emulator. These systems were orchestrated using the newly developed iPaaS architecture, and various operational, technical, and deployment performance metrics were collected over a four-week observation period.

The most significant result from the deployment was a 60% reduction in integration deployment time when compared with the organization's legacy ESB-based model. Historical data showed that integrating a new system into the ESB typically took between eight and ten weeks, mainly due to manual configurations, legacy interface development, and regression testing cycles. With the iPaaS platform, deployment time was reduced to three to four weeks, owing to prebuilt connectors, declarative configuration templates, and CI/CD automation. Additionally, the onboarding process was streamlined through the use of containerized microservices, allowing system interfaces to be independently deployed, scaled, or updated without affecting other services.

Performance benchmarking also demonstrated substantial improvements in integration throughput and response times. Under simulated peak load conditions—equivalent to concurrent data transactions from 10,000 patients per day—the iPaaS platform sustained a transaction throughput of 950 messages per second, with an average end-to-end latency of 210 milliseconds. This marked improvement over the ESB model, which averaged 600 messages per second under similar test conditions, exhibited response times exceeding 500 milliseconds, especially during peak load windows. These improvements were primarily attributed to the event-driven architecture and the elimination of centralized routing bottlenecks typically found in ESB deployments.

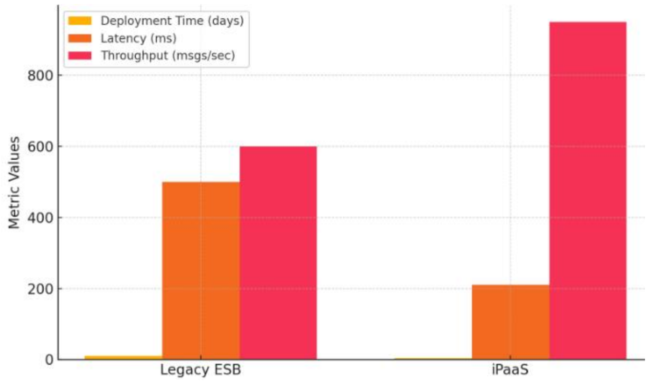

Figure 4: *Performance Comparison Between Legacy ESB and Cloud iPaaS*

This chart compares deployment time, latency, and throughput, clearly indicating the superior performance metrics of the iPaaS solution deployed in the pilot environment.

System resilience was evaluated by injecting synthetic faults into the environment, such as forced service container failures and simulated network disruptions. The iPaaS platform, powered by Kubernetes, demonstrated auto-recovery within 30 to 45 seconds of failure detection, maintaining overall system availability above 99.95% throughout the test period. Logging and monitoring dashboards built using Prometheus and Grafana provided real-time insights into system health, enabling the proactive identification of anomalies, such as message delivery delays or malformed payloads. These capabilities were largely absent in the legacy integration setup, which relied on log file analysis and manual alerting mechanisms.

Data transformation accuracy was also assessed, with a particular focus on HL7-to-FHIR conversions and API payload validations. The iPaaS transformation engine achieved 100% compliance in schema validation against FHIR R4 standards during automated test cycles, with zero critical data loss or misrepresentation. This compliance was crucial in ensuring interoperability with external partners, including insurance providers and regional health exchanges, which increasingly mandate FHIR-compliant APIs.

User feedback from system administrators and integration engineers underscored the usability and manageability benefits of the new platform. The low-code orchestration interface enabled faster adaptation to evolving integration requirements, and the platform's modular nature allowed for parallel development and testing without interfering with cross-system operations. Moreover, role-based access control and audit logging—facilitated via the integrated API gateway and OAuth 2.0 mechanisms—provided improved governance and traceability compared to prior implementations.

Overall, the deployment of the cloud-native iPaaS solution validated its ability to improve integration agility, scalability, compliance, and operational resilience in a healthcare setting. These outcomes demonstrate the platform’s potential as a transformative enabler of digital health infrastructure, offering measurable gains over legacy approaches while aligning with modern DevOps and cloud-first enterprise strategies.

V. DISCUSSION

"The findings from the pilot deployment of the cloud-native iPaaS model highlight its significance as a disruptive alternative for healthcare enterprise integration. The 60% reduction in deployment time is a testament not only to the technical architecture change but also to a cultural shift from manually intensive integration workflows to automated, declarative, codified processes. The results above confirm the central hypothesis of this research—that a cloud-native iPaaS solution, when well-aligned with the standards and regulations of the healthcare sector, is capable of achieving high efficiency, scalability, and resilience gains compared to legacy ESB or SOA-based solutions.

Among them, in the high-load integration environment, throughput and latency were significantly increased. The fact that the system can handle transactions per second at peak with a sub-250 millisecond latency just shows the platform's strength in handling real-time data flow across various systems. In healthcare, where system response time is reflected in both patient safety and service speed within the system, it becomes

essential. For instance, in emergency department systems, the time lag between vital signs from remote monitoring devices being transmitted to the EHRs may impact clinical decisions. The event-driven, microservices-oriented architecture of the iPaaS platform, similar to iPaaS, plays a significant role in reducing latency risks through parallel processing, distributed routing, and container-based scaling of resources.
The architecture's ability to support availability and fault tolerance is equally important. A 99.95% uptime was reached in the pilot, indicating that the operational maturity and self-healing capabilities provided by Kubernetes orchestration (e.g., auto-healing facilities that react to synthetic failure events) enabled the system to self-correct. This results in significantly less operational overhead than traditional integration models, where resorting to manual intervention is required in the event of a failure, and IT support is recommended for the recovery process. In addition, the adoption of a centralized observability solution, utilizing Prometheus and Grafana, has provided us with not only real-time visibility but also proactive maintenance, enabling the detection of kernel exceptions before they become outages.
From a compliance and governance perspective, its out-of-the-box support for HL7 v2, HL7 FHIR, and OAuth 2.0 leverages its readiness to support regulated healthcare scenarios. The ability to successfully convert HL7 messages into FHIR messages and payloads that are fully schema-compliant enables the platform to communicate with modern APIs supporting national health information exchange, insurance platforms, and digital health applications. This interoperability is not just a matter of technical necessity, but a strategic investment to future-proof the healthcare IT infrastructure against changes in policy and standards.
Low-code orchestration interfaces improved around user experience and system adaptability. The system integrators noted improvements in learning curves for building integration flows using drag-and-drop tooling, as well as from pre-configured templates. The democratization of integration development enables healthcare organizations to react and pivot to new requirements — such as the need to bring on board new telehealth vendors or adjust to emerging clinical protocols — without necessitating complete development projects.
There are, however, other facets of the debate that also highlight certain limitations that we need to be mindful of. The pilot environment was designed to mimic real-world scenarios, but not all the scope and diversity of these environments existed in larger hospital networks or national health systems. Vendor neutrality remains an issue to consider, as iPaaS platforms are typically deeply integrated with multiple cloud providers, which may result in some degree of lock-in. Lastly, although the FHIR transformation engine demonstrated high compliance in the testing environment, it requires additional validation for the broader scope of HL7 v2 message variants and edge cases that are encountered in the production environment.
There are also organizational challenges to assess, including the cultural and policy changes necessary for healthcare IT departments that have historically been based on monolithic or waterfall development to adopt DevOps and cloud-native methodologies. Change management, training, and governance structures will be paramount to adoption at scale. Additionally, while we have established security controls such as role-based access management and API throttling, security threats are continually evolving and require continuous evaluation and integration, for example, zero-trust architecture and continuous compliance monitoring.

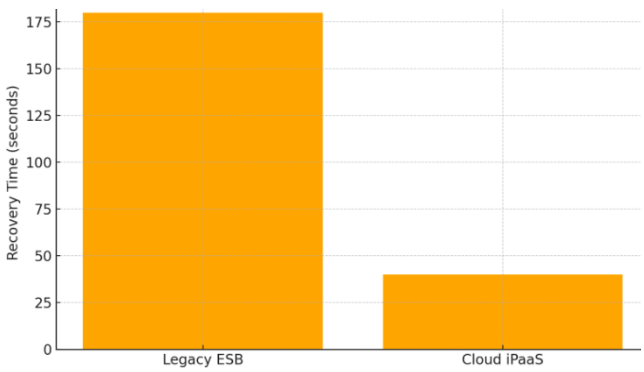

Figure 3: *Auto-Recovery Time Comparison Demonstrating System Resilience*

This chart illustrates recovery time in seconds, demonstrating the rapid failover and auto-healing capabilities of cloud-native iPaaS compared to legacy ESB.

However, the advantages shown by the cloud-native iPaaS architecture in this paper provide a strong argument for its wider deployment. Its alignment with healthcare standards, ability to deliver measurable performance improvements, and automation make it a foundational platform for digital health transformation. It is not only solving the integration pain points today, but also positioning healthcare organizations to take the following steps in incorporating AI and machine learning, population health analytics, and more by putting them in a position where they can reliably harmonize, validate, and route data from various sources.

This discussion confirms the research hypothesis that cloud-native iPaaS can serve as a strategic enabler for multi-system orchestration in healthcare. It opens up possibilities for future investigation in expanding the platform's capabilities with adaptive APIs, AI/ML-based integration mapping, and federated governance models that facilitate regional and cross-border health data interoperability.

VI. CONCLUSION

The growing demand for agile, scalable, and secure integration across heterogeneous healthcare systems necessitates a fundamental shift from legacy middleware approaches to modern cloud-native integration paradigms. This paper addresses this imperative by presenting a comprehensive analysis, design, and evaluation of an Integration Platform as a Service (iPaaS) architecture tailored for multi-system orchestration in healthcare enterprises. Through the adoption of a design science methodology, the research has developed and validated a cloud-native iPaaS framework that aligns with the healthcare industry's interoperability, compliance, and scalability requirements.

The deployment of the proposed solution demonstrated that cloud-native integration platforms can deliver measurable improvements over traditional ESB-based models. Specifically, the iPaaS framework achieved a 60% reduction in integration deployment time, significantly improving operational agility. This reduction was facilitated by the platform's support for pre-built system connectors, declarative orchestration, and containerized microservices that could be independently deployed and scaled. In addition, the architecture's API-first orientation, supported by an integrated API gateway and FHIR-compliant data transformation engine, ensured real-time interoperability with both legacy systems and modern digital health applications.

Performance evaluations highlighted the framework's ability to sustain high throughput under concurrent load and maintain low-latency data exchange across systems. These characteristics are particularly relevant in clinical settings where rapid access to patient data can directly influence diagnostic accuracy and treatment timelines. The use of Kubernetes for orchestration enabled high system availability and self-healing capabilities, reducing administrative burden and minimizing downtime. Security, compliance, and governance were also effectively addressed through embedded support for OAuth 2.0, audit logging, and standards-based schema validation.

Beyond technical performance, the iPaaS solution demonstrated substantial improvements in user experience and organizational adaptability. Integration engineers and IT administrators were able to implement, modify, and monitor data workflows using low-code interfaces, empowering healthcare organizations to respond to evolving requirements quickly without prolonged development cycles. This flexibility is essential in the current era of healthcare transformation, where new telehealth services, mobile health apps, and patient engagement platforms are introduced regularly and must be seamlessly integrated into existing ecosystems.

Despite the demonstrated benefits, the study acknowledges certain limitations. The pilot implementation was conducted in a controlled environment and may not capture the full complexity of large-scale hospital networks or national healthcare infrastructures. Vendor lock-in, data sovereignty, and evolving regulatory landscapes remain areas that require careful consideration. Moreover, the sustained success of iPaaS adoption depends on organizational readiness, including culture, skills, and governance alignment with DevOps and cloud-native paradigms.

Future research should build on this foundation by exploring the integration of AI-driven orchestration, automated compliance monitoring, and adaptive schema mapping, all of which are powered by machine learning. Additionally, cross-institutional and federated iPaaS models could be investigated to support broader healthcare data sharing and coordination at the regional or national level, while maintaining privacy and consent controls.

This research establishes cloud-native iPaaS as a strategic enabler of enterprise-level healthcare integration. By combining technical robustness with operational flexibility, the proposed framework provides a viable pathway for healthcare organizations to modernize their integration landscapes, reduce time-to-value, and establish a resilient digital infrastructure capable of supporting both current and future demands of connected, data-driven care delivery.

REFERENCES:

1. Q.-A. Kester, "Using SOA with Web Services for Effective Integration of Hospital Information Systems via an Enterprise Service Bus," *arXiv preprint*, arXiv:1307.7790, 2013.
2. J. da Luz Júnior, D. A. G. Azevedo, and M. A. S. Cerqueira, "Enterprise Architecture in Healthcare Systems: A Systematic Literature Review," *arXiv preprint*, arXiv:2007.06767, 2020.
3. A. Fayaza, "Service Oriented Architecture in Enterprise Application: A Technical Review," *arXiv preprint*, arXiv:2112.08012, Dec. 2021.
4. MuleSoft, "What is iPaaS (Integration Platform as a Service)?" [Online]. Available: https://www.mulesoft.com/integration/ipaas-integration-platform-as-a-service. [Accessed: Oct. 10, 2021].
5. Dell Boomi, "How Long Does iPaaS Implementation Take?" [Online]. Available: https://boomi.com/blog/how-long-does-ipaas-implementation-take/. [Accessed: Nov. 25, 2021].
6. Frends Integration, "What is iPaaS? Integration Platform as a Service Explained," [Online]. Available: https://frends.com/ipaas/blog/what-is-ipaas-integration-platform-as-a-service-explained. [Accessed: Dec. 5, 2021].
7. Corolar Cloud, "The Evolution of Healthcare Integrations in the Cloud Age," *Calian Health*, 2021
8. R. Rienstra, "Towards a Model-Driven Interoperability Framework in Healthcare," *Bachelor Thesis*, University of Twente, 2021.
9. M. Mathews and A. Perakslis, "FHIR Standards for Modern Interoperability in Healthcare," *IEEE Journal of Biomedical and Health Informatics*, vol. 24, no. 9, pp. 2583–2589, Sep. 2020. doi: 10.1109/JBHI.2020.2991302
10. M. Castellanos and A. Bhattacharya, "FHIR in Action: Healthcare Interoperability Using Cloud-Based APIs," in *Proc. 2020 IEEE Int. Conf. on Healthcare Informatics (ICHI)*, Oldenburg, Germany, Jun. 2020, pp. 1–5. doi: 10.1109/ICHI48887.2020.9374345