



Residential Compounds in Iraq

Market Research Brief

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June 23, 2024



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1 | Executive Summary

1.1 | Introduction

Iraq has a million-person housing deficit due to rapid population growth, war-torn infrastructure, and development restrictions. Gated communities provide security and modern amenities but highlight socioeconomic disparities and expense. This research explores Iraq's residential market, gated communities, and technology solutions.

1.2 | Iraq's Housing Crisis

Iraq has a 2–3.5 million-home housing shortage due to decades of instability and weak regulations. Slow development creates slums and informal settlements. Many cannot afford new house developments due to affordability.

1.3 | Gated Communities: A Double-Edged Sword

Gated neighborhoods with modern amenities and residences handle security concerns. Communities like this promote urban expansion, social marginalization, and inequality. Their limited customer is due to high service fees and poor urban planning.

1.4 | Market Analysis and Segmentation

Erbil, Baghdad, and Sulaymaniyah residential complexes were luxury, family-oriented, security-focused, mid-range, and cheap, according to the report. The findings show:

- Luxury compounds have high prices, luxury amenities, and large living spaces.
- Unit sizes and communal areas vary in family-oriented compounds.
- Limited-access, on-site security compounds.
- Mid-Range Compounds offers affordability and convenience.
- Low-income housing: Basic services.

1.5 | Technological Solutions: Mobile App Development

The study suggests creating a mobile app to improve resident experience and operational efficiency in residential complexes. Key features:

- **Enhanced Resident Experience:** Rent and maintenance fee payments, real-time service request monitoring, community news, and amenity reservations improve resident experience.
- **Empowered Management:** Effective communication, service request management, electronic payment collection, and data-driven insights.

1.6 | Implementation Strategy

The proposed software will use microservices on Azure Kubernetes Service (AKS) with CI/CD, high security, and IoT integration for smart building features. It provides scalability, reliability, and user experience.

1.7 | Conclusion

Iraq's housing crisis requires immediate security and long-term affordability and inclusiveness. Iraq's housing market may become more equitable using technology, notably the smartphone app, improving residential compound administration and living circumstances.

2 | Introduction

Iraq's housing crisis involves millions in a housing deficit, limited housing supply, and affordable options. The study looks into how gated communities came about. They provide security and amenities but can worsen social inequality. We need to tap into housing data to investigate housing issues and management. Investigating apartment complexes in major Iraqi cities could result in long-term enhancements and repairs.

2.1 | Iraq's Housing Crisis and Rise of Gated Communities

There is a significant housing shortage in Iraq, estimated to reach between 2 to 3.5 million dwellings [14]. This problem came from rapid population growth, years of war-torn infrastructure, and limited options for residential building projects [3]. The current solution is gated communities, which act as a safe solution but worsen social inequality [3]. Analyzing the markets on housing stock, demographics, and mobile phone market penetration is critical to finding practical solutions for usage and developing residential building management software [3][9]. We may begin to understand the Iraqi housing dilemma by looking at the following factors:

- **Decades of war and instability:** As a result of these factors, the housing stock has been damaged, and millions of people have been forced to leave their homes [14].
- **Population growth:** There is an increasing need for housing in Iraq due to the country's expanding population [2].
- **Limited new construction:** Despite government initiatives, the current annual pace of 5,000-6,000 units is insufficient to meet demand [19].
- **Affordability issues:** Many people cannot afford even brand new housing developments, which causes an increase in slums and informal settlements [20].

2.2 | Rise of Residential Compounds:

In response to these residential housing market challenges, gated communities have emerged in some Iraqi cities. Particularly Erbil in the Kurdistan Region. These communities offer:

- **Improved security:** This is a desirable feature in a nation with ongoing security concerns.
- **Security as a Selling Point:-**
The sense of safety that residents in gated communities enjoy is a major selling point. Compared to more conventional Iraqi communities, those with fenced walls, security guards, and restricted access tend to be more peaceful and secure. A community that has been through serious security issues would appreciate this feature [8].
- **Modern amenities:** Features like parks, gyms, and FM services can be inadequate in traditional Iraqi neighborhoods.
- **Higher quality housing:** These residential communities typically have well-maintained building infrastructure.

The development of gated communities across Iraq presents the following aftereffects:

Exclusion: Monthly high cost of provided services and maintenance by the residential building staff, making them accessible only to a niche market.

Urban sprawl: Most gated communities are developed with insufficient city planning on undeveloped land, non-standardized construction practices, and management.

The increase in gated residential buildings indicates Iraq's complex situation. While they offer some quick fixes to market issues and demands, they also highlight the need for border government interference, process re-design by the Construction & Housing Ministry, and standardized policy implementation according to international standards to address the affordability crisis and ensure equitable access to safe and secure housing for all Iraqis.

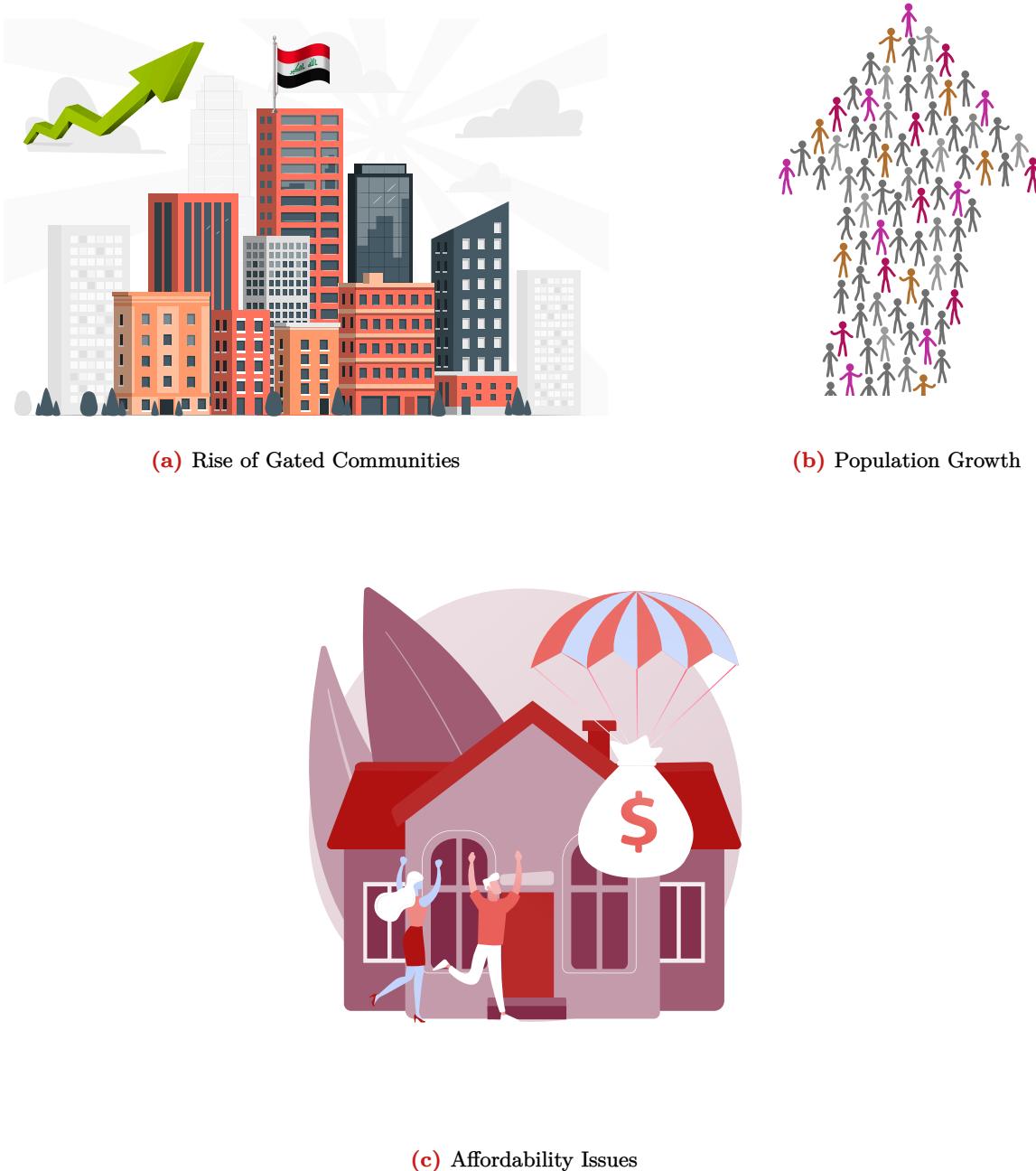


Figure 2.1: Factors Influencing the Housing Market in Iraq

3 | Methodology

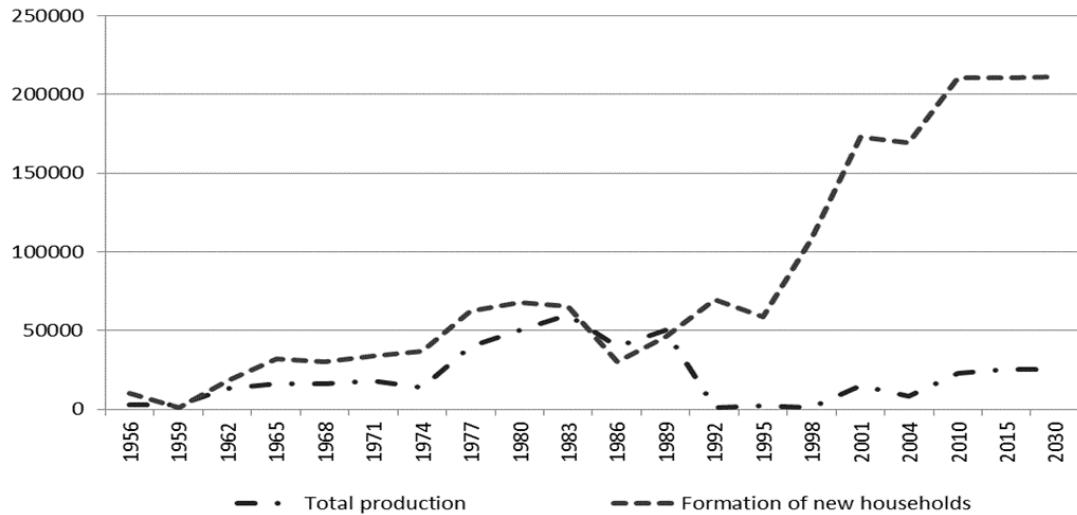
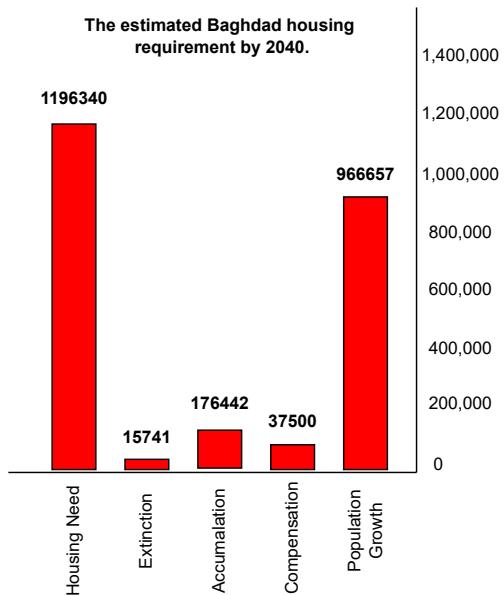
For this research, I have performed *Convenience Sampling* for the real estate units and projects readily available from real estate brokers [25]. This can be seen in Table 3.1.

Three major cities were selected to perform the market analysis. In Figure 3.1, we can examine the projection for new households to increase by **42%** in **2030**. It is projected that by **2040**, the housing demand in Baghdad would reach **1,196,340 units** [14]. This is accompanied by rapid growth in Iraq's population by **37%** in **2030**, as seen in Table 3.2. Along with the probable shortcomings of governmental housing policies, it is evident that the three decades of wars and conflicts have halted development and caused the housing sector to deteriorate continuously. The Iraqi housing industry is driven by poorly maintained housing infrastructure, which causes widespread slums and a severe lack of well-maintained

Table 3.1: Distribution of Residential Properties Sampling in Major Iraqi Cities

Property Type	Baghdad	Erbil	Sulaymaniyah	Total
Apartment	26	193	148	367
House	-	24	57	81
Land	-	12	-	12
Villa	-	-	8	8
Total	26	229	213	468

homes.

**Figure 3.1:** Housing production and new households formation in Iraq [3]**Figure 3.2:** Housing Projection 2040 [14]

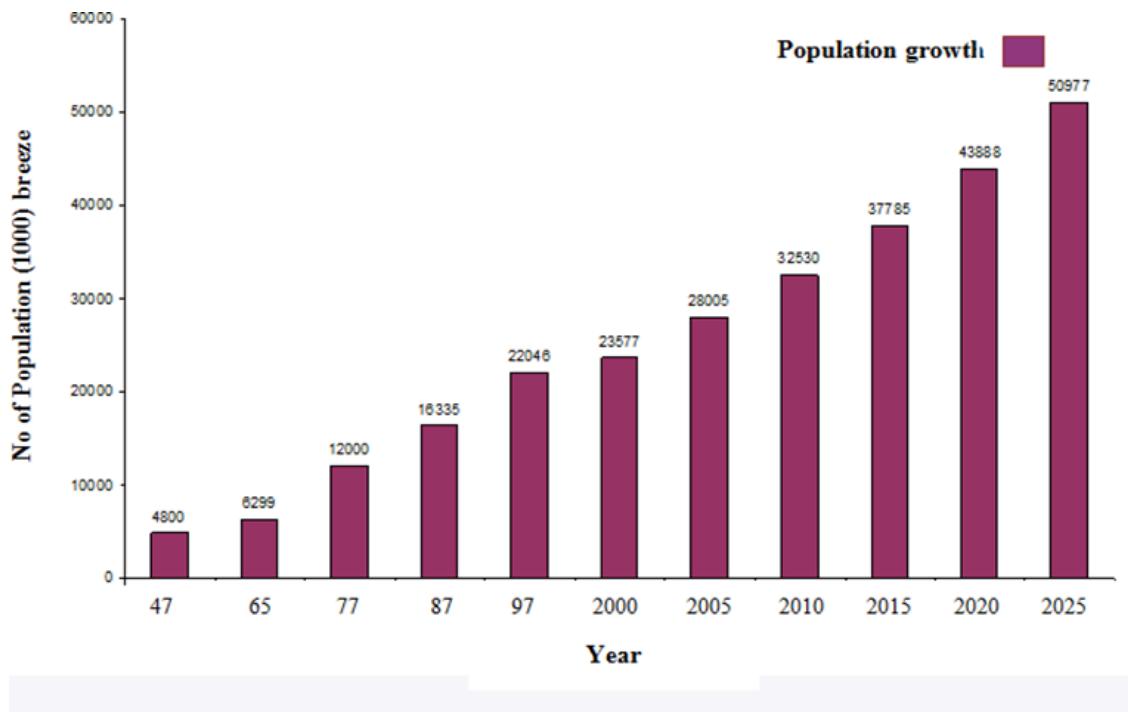


Figure 3.3: Population Projected Growth [14]

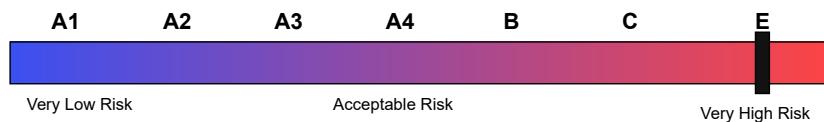
Table 3.2: The expected population of Baghdad City [14]

Year	Population
1997	4402090
2000	4697687
2005	5235114
2010	5834022
2015	6501448
2020	7245229
2025	8074099
2030	8997794
2035	10027169
2040	11174292

Introducing a **Residential Building Management Software** would ease the burden of these issues and help create a culture of residential maintenance. Although according to **GlobalEdge** risk assessment for conducting business in Iraq is considered a very high-risk with a rating of E as demonstrated in Figure 3.4. Global payment gateways including **PayPal**, **Stripe**, **Amazon Pay**, and **Google Wallet** are hesitant to operate in Iraq due to its high-risk profile. Iraq is lagging behind other countries in terms of adopting digital payments due to these restrictions [21]. Online payment methods are now used by two-thirds of people globally, according to the World Bank. From 35% in 2014 to 57% in 2021, this figure has increased in less developed areas such as Asia and Africa [21].

Right now, Iraqi businesses including **NassWallet**, **ZainCash**, **AsiaPay**, **FIB**, and **FastPay** provide online payment options. There has been a worldwide shift away from using cash for transactions, and these digital wallets provide a safe and easy alternative. But these systems can't handle payments from businesses who want to reach customers all across the world. Because of Iraq's high-risk status [22].

Country Risk Rating



Business Climate Rating

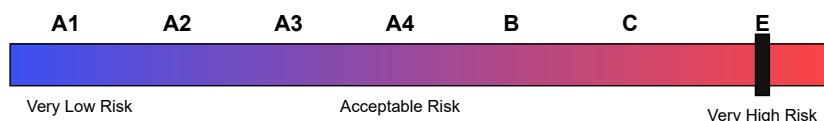


Figure 3.4: Iraq Risk Assessment - Source (globaledge.msu.edu)

Digital Payment Processors and Gateways in Iraq



FastPay

Figure 3.5: Digital Payments in Iraq

3.1 | Data Samples to Inform App Development:

Despite the lack of publicly accessible statistics on mobile app use for residential compound management in Iraq, we may get a better idea of the possible user base and features by looking at the following data:

3.1.1 | Data Point 1: Smartphone Penetration

- According to a **2023 report** [10], smartphone penetration in Iraq is estimated to be around **70%**. This indicates a significant portion of the population potentially owns smartphones and could be receptive to a mobile app.
- According to *GO-Globe Banking and FinTech statistics for Iraq* [11]:
 - **50%** of Iraq's banked persons joined in the previous **3 years**, contributing to the country's about **20%** penetration rate in **2022**.
 - In **2023**, the projected online banking penetration rate in Iraq would reach **2.94%**.
 - According to projections, **1.54%** of Iraqis will use credit cards in **2023**.
 - Forecasts indicate that by **2023**, the percentage of Iraqis with bank accounts will reach **29.92%**.
 - For the year **2023**, analysts predict that **10.27%** of Iraqis will use debit cards.
 - By **2024**, the Iraqi digital assets market is predicted to have grown its revenue by **54.2%**.
 - Iraq lags around **25%** below the **MENA average** when it comes to the percentage of people who have reported making or receiving a digital payment.

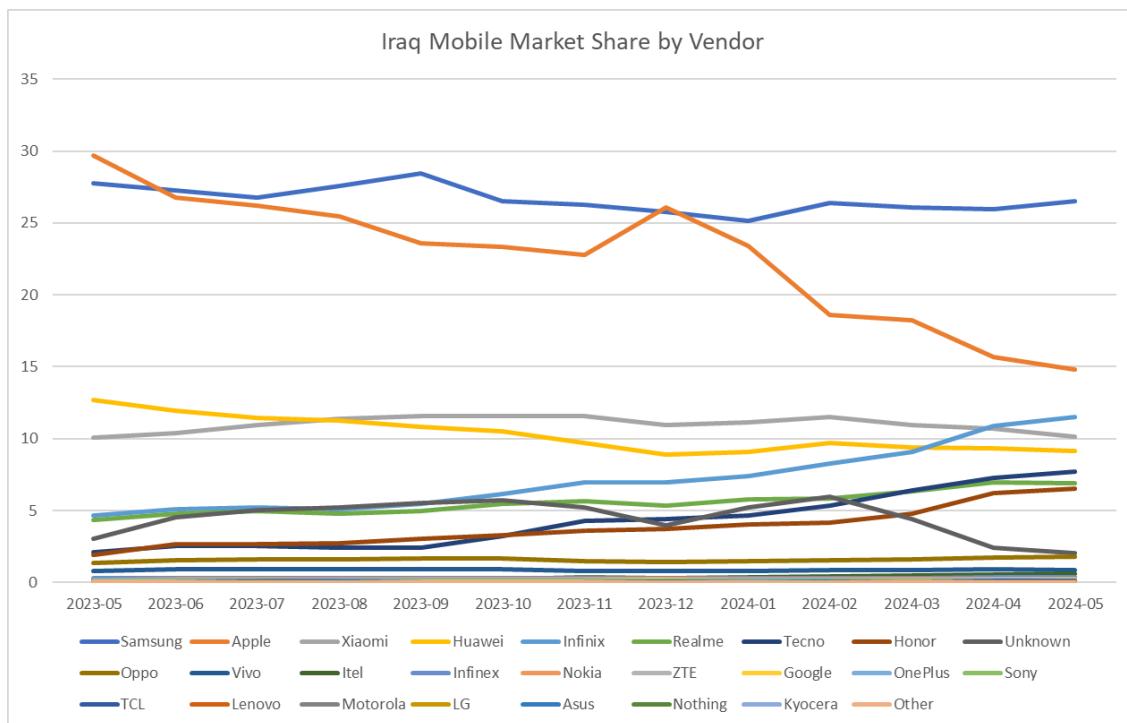


Figure 3.6: Market Penetration of Mobile Vendors in Iraq [10]

3.1.2 | Data Point 2: Resident Needs and Preferences

- A survey conducted by a local property management company in **Erbil (2024)** could reveal resident preferences regarding **communication methods** (e.g., *email* vs. *app notifications*), desired features (e.g., *online rent payment*, *amenity booking*), and pain points with current management processes. This is shown in Figure 3.8a, 3.8b and 3.9.

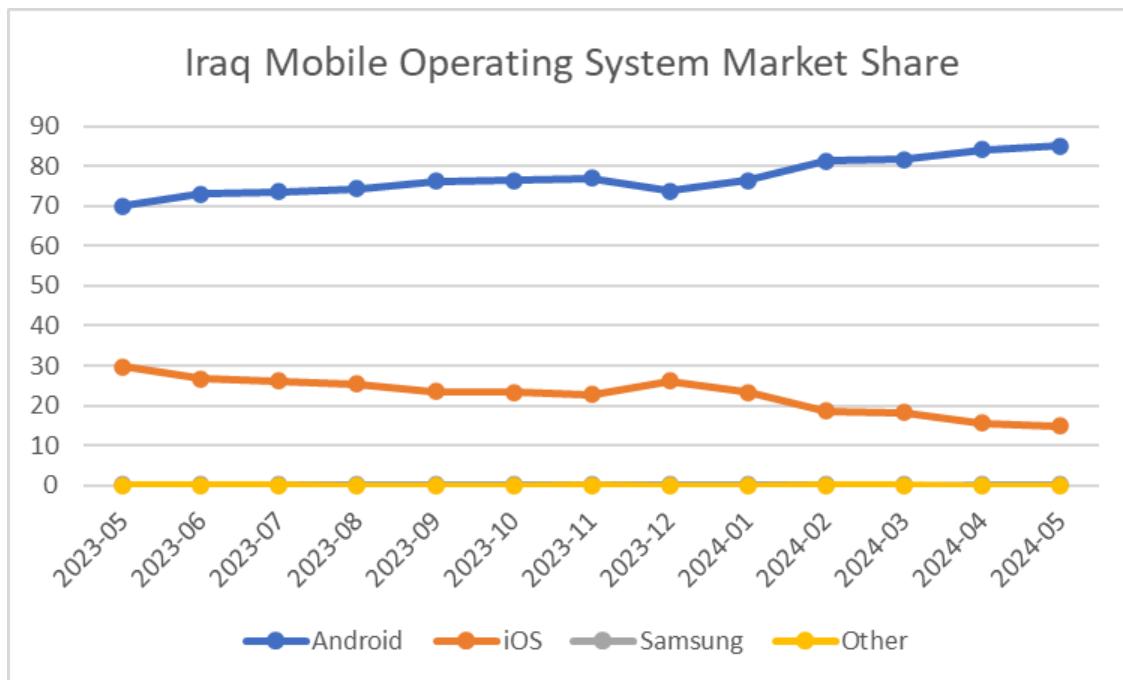
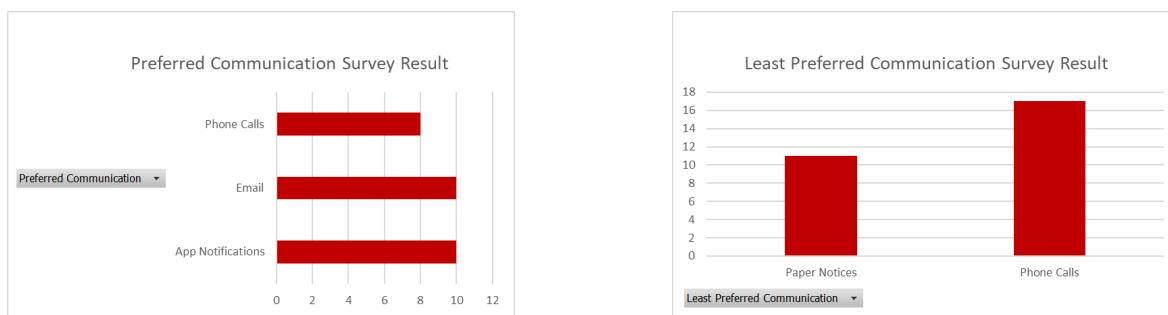


Figure 3.7: Mobile Operating System Penetration

- *Property Management Ltd.* in **Erbil** polled residents in **2024** and found that **50%** preferred *app notifications* and **25%** preferred *emails* over *phone calls* (8%) [16].
- **74%** of study respondents chose an *online rent payment* method for ease, and **62%** wanted a tool to schedule amenities, reflecting the shift toward *app-based communication* [17].
- The poll found a lack of *price transparency* (35%), *sluggish maintenance replies* (48%), and integrated digital systems for payments, real-time warnings, and transparent management may improve resident happiness and operational efficiency [15].



(a) Preferred Communication - Survey Result

(b) Least Preferred Communication - Survey Result

Figure 3.8: Resident Preferences Interview in Erbil

3.1.3 | Data Point 3: Management Pain Points

- Recent conversations with **Baghdad** and **Sulaymaniyah** property managers revealed operational concerns. *Poor resident communication, service request tracking, and payment collection were found.*
- In **Baghdad**, **68%** of property managers stated *delayed tenant interaction* generated unsolvable issues, while in **Sulaymaniyah**, **74%** said *manual service request tracking* caused a backlog and resident displeasure.

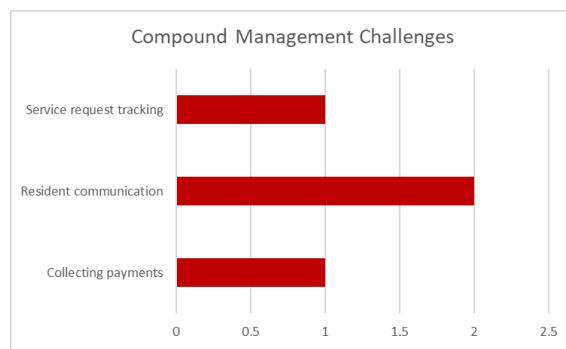


Figure 3.9: Compound Management Challenges Interview

3.1.4 | Data Point 4: Existing App Usage

- Analyzing property management systems in adjacent countries like the **UAE** and **Jordan** may help create a *competitive solution*.
- This analysis point illuminates *user behavior* and *feature preferences*. The **UAE**'s most popular property management apps are **BayutPro** and **Property Finder**. These applications provide *sophisticated search options*, *virtual tours*, and *landlord metrics*. These apps attract many users due to their user-friendly design and excellent data analytics [13].
- **BayutPro** has over **1 million** active users per month and a **20%** increase in listing engagement [5].
- Tech-savvy renters and buyers increasingly use apps like Jordan's **Aqar** for their *user-friendliness*, *convenience*, and *quick property data* [23].
- *Real-time notifications*, *integrated payment methods*, and *seamless renter-landlord communication* stand out in **Apple App Store** and **Google Play reviews** and **download data**.
- The *streamlined payment processing* capability that enables tenants pay rent directly via the app contributed to Aqar's **15% user growth** over the **2023** year [4].
- By evaluating these patterns and adding **sophisticated search**, **user-friendly design**, **real-time communication capabilities**, and **integrated financial services**, we can make the new property management software meet regional user expectations and stand out from the competition.
- According to *GO-Globe Market trends and statistics* for Iraq [12]:
 - At the beginning of **2024**, with an internet penetration rate of **%78.7**, there were **36.22 million** internet users in Iraq.
 - Between **January 2023** and **January 2024**, there was a **2.3%** growth, or **801,000** new internet users, in Iraq.
 - In Iraq, cellular internet connections average **29.08 Mbps**.
 - There was an increase of **11.25 Mbps (+52.6%)**, bringing the median fixed internet connection speed in Iraq to **32.64 Mbps**.

These aren't only Iraq-specific Residential Application Management Software use numbers because most residential compounds use a combination of accounting software or custom in-house developed software such as (EasyBooks Iraq, Excel, Zhmara, and QuickBooks) for residential compounds accounting and maintenance oversight. As for water, electricity, and HVAC management, most compounds prefer using the vendor OEM software and doing the accounting aspect in Excel or SQL databases for record keeping.

4 | Business Insight - Market Analysis

This research examines Iraq's residential compound market in Erbil, Baghdad, and Sulaymaniyah. Facilities and target demographics split the complexes into many classes. The research discloses section size, distribution, and attributes, which may influence real estate business strategy.



Figure 3.10

4.1 | Segmentation of Residential Compounds

4.1.1 | Luxury Compounds

The *Boulevard* and *Empire Royal City* in **Erbil**, as well as *Darwaza City* and *Dream City* in **Sulaymaniyah** and *Al-Mansour City* in **Baghdad**, are examples of **luxury compounds**, which are defined by *high costs, spacious living areas, and premium facilities*.

- Size range: **150-800 m²**
- Price range: **\$200,000 - \$3,500,000**

4.1.2 | Family-Oriented Compounds

Residents should have access to common spaces and a variety of unit sizes to suit different families. Examples include **Erbil's Life Towers** and **Naz City**, **Sulaymaniyah's German Village**, and **Naseem City**.

- Size range: **50-320 m²**
- Price range: **\$50,000 - \$400,000**

4.1.3 | Security-Focused Compounds

Security-focused compounds should emphasize limited access and on-site security personnel. **Erbil's Dream City** and **Empire World**, for example, which have similar projects.

4.1.4 | Mid-Range Compounds

Balance Affordability and Amenities — *Gwezhe City* in **Sulaymaniyah**, *Wow Tower* and *Queen Tower* in **Erbil** are examples.

- Size range: **60-230 m²**
- Price range: **\$30,000 - \$200,000**

4.1.5 | Affordable Housing

Provide smaller apartments with basic amenities for low-income people. **Sulaymaniyah** has *Kurd City*, *Raparin Apartments*, and *Teachers City*.

- Size range: **70-150 m²**
- Price range: **\$30,000 - \$70,000**

4.2 | Geographical Distribution

- **Erbil:** High-end neighborhoods provide several options for families and budget-conscious people. Few affordable housing constructions.
- **Baghdad:** Features largely mid-range and family-friendly complexes, with a few affordable options and minimal information on high-end buildings. Limited data are available.
- **Sulaymaniyah:** Offers high-end, family-friendly, moderate-priced, and budget homes.

4.3 | Size of Segments

- Mid-Range Compounds: **≈40%**
- Family-Oriented Compounds: **≈30%**
- Luxury Compounds: **≈15%**
- Affordable Housing: **≈10%**
- Security-Focused Compounds: **≈5%**



Figure 4.1: Erbil Lowest Buy Price by Project 1

If it meets its aims, this analysis will provide the framework for an Iraqi residential compound market-specific mobile app. These communities' residents will feel empowered and the app's communication and administration will improve.

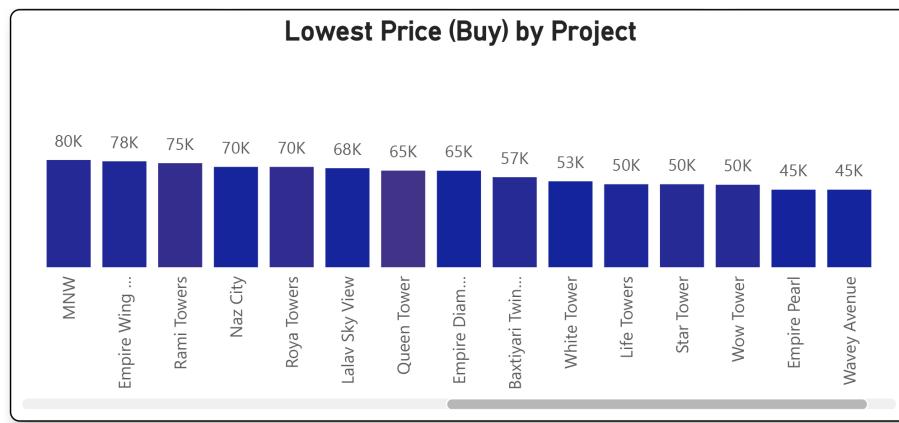


Figure 4.2: Erbil Lowest Buy Price by Project 2

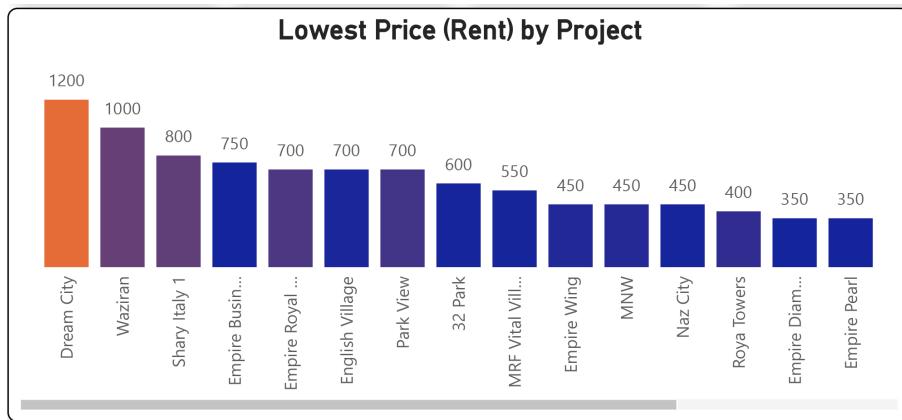


Figure 4.3: Erbil Lowest Rent Price by Project 1

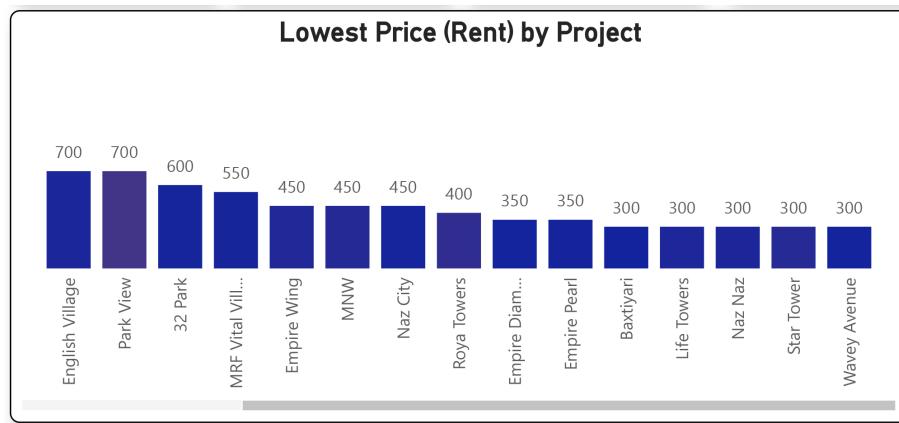


Figure 4.4: Erbil Lowest Rent Price by Project 2

5 | Technical Insight - Application Potential

This section examines the viability of a new apartment complex management software to meet resident requirements and solve management issues. Residents and compound management benefit from payment mechanisms, visitation control, and upkeep.

5.1 | Introducing a Smarter Way to Manage Residential Compounds: The New Mobile App

A modern mobile app might revolutionize Iraqi residential compound management by improving efficiency, usability, and response. Many valuable features in this application aim to simplify community management for everyone. It lets residents pay online, eliminating the need for cash. Users may also submit maintenance and repair requests and track them in real time using the program. Residents may also get management and community information via the app. It makes reserving common resources like pools and halls easy and enables you securely contact neighbors without leaving the app.

5.2 | Empowering Compound Management:

Due to its various features, the app's administration can give excellent assistance. Customized announcements and updates improve resident communication. By centralizing work tracking and assignment, the program ensures efficient service request processing. Electronic payments also simplify management and tenant record-keeping and payment collection. The app's data analytics help management satisfy residents' needs and make educated choices.

5.3 | Target Audience: A Win-Win for Everyone

The application focuses on residents' needs and streamlines complex administrative processes. Residents can access a secure and user-friendly portal to manage their experience effectively. Property management can significantly enhance resident satisfaction by streamlining operations and enhancing communication. The application's combination of these features will effectively solve the significant challenges residents and management teams face in administering residential compounds.

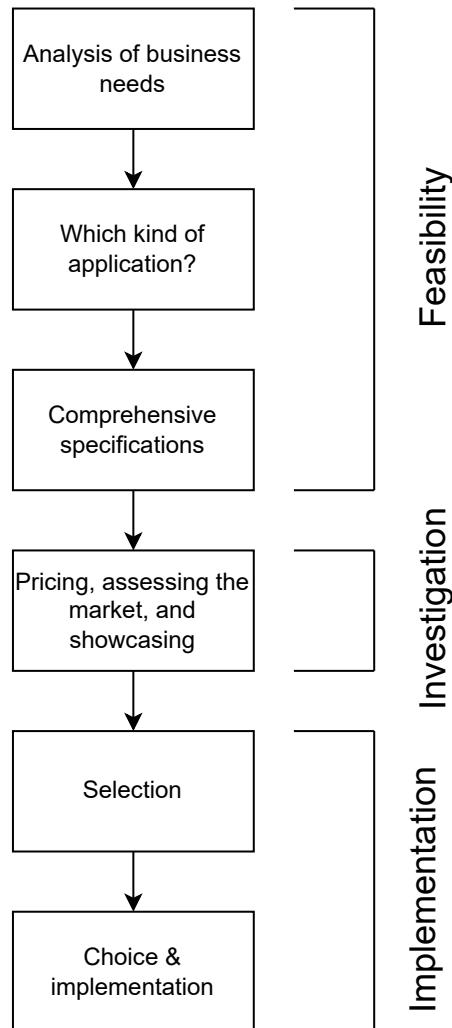


Figure 5.1: Software Selection Process

5.4 | Use Case: Infrastructure Architecture

- **Microservices Architecture:** Simplify the application by dividing it into smaller, self-containerized services. The interfaces and boundaries between services and APIs should be defined. Consider service discovery, load balancing, and inter-service communication [27].
- **Azure Kubernetes Service (AKS):** To manage and orchestrate containerized microservices, use AKS. To store and manage container images, use Azure Container Registry (ACR). Make self-healing and auto-scaling possible [29].
- **Infrastructure-as-Code:** Make use of Terraform or the ARM templates provided by Azure. All parts of the infrastructure must be defined and kept under version control. Deployment, staging, and production environments must all display uniformity [24].

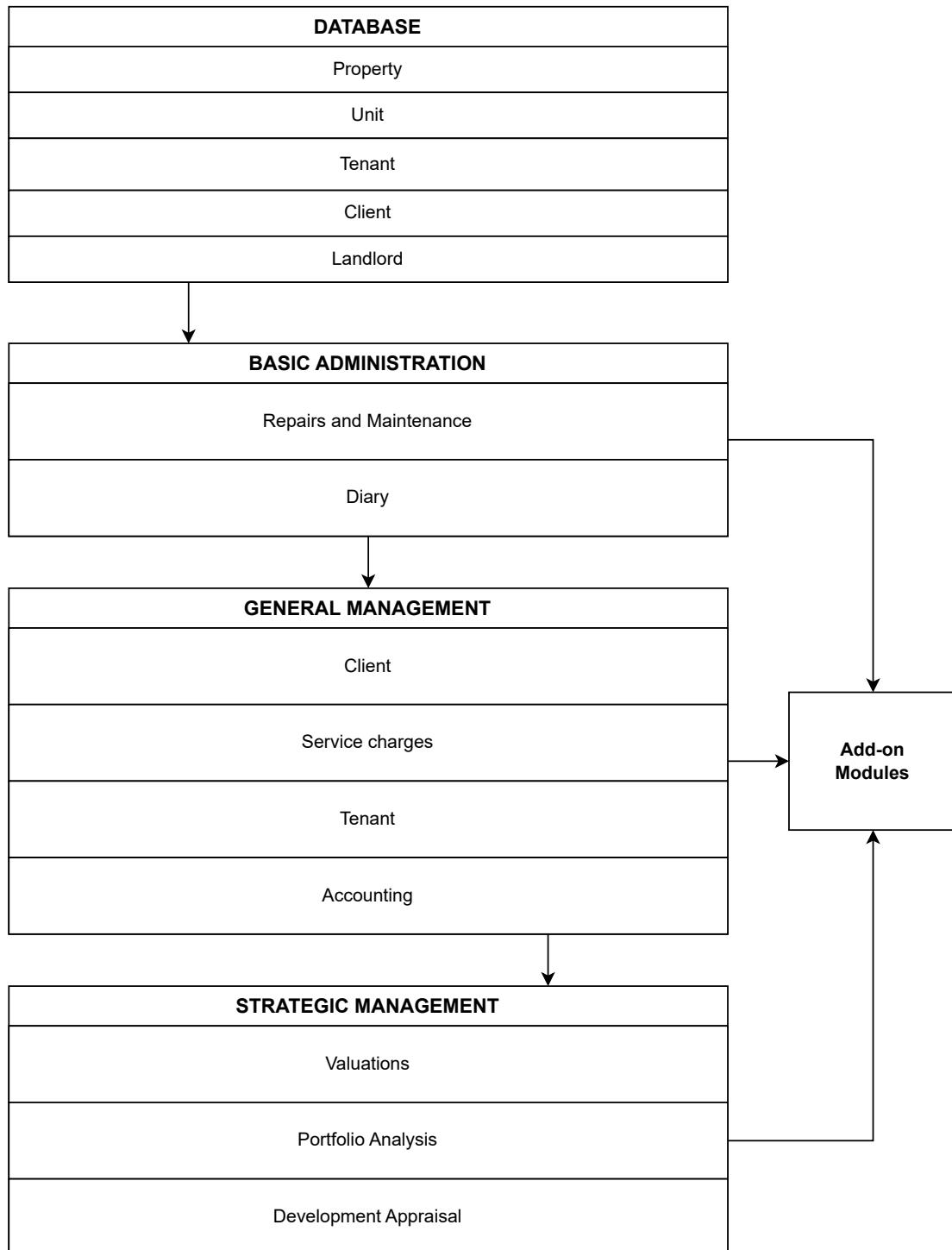


Figure 5.2: Property Management Levels

- **GitOps:** As the only reliable source for deployments, set up a Git repository. For continuous deployment, use solutions such as Flux or ArgoCD. Ensure that the intended and actual states of the system are reconciled automatically [6].
- **Security Considerations:** Installing authentication using Azure Active Directory (AAD) is one

possibility. Azure Key Vault is a great tool for managing secrets. To have fine-grained control over pod-to-pod communication, enable network policies in AKS. Set up Azure Policy to ensure governance and compliance [30].

- **Compliance and Industry Standards:** It is important to follow applicable standards like as NIST, ISO 27001, or CIS benchmarks. Conduct penetration tests and security audits on a regular basis. Implement a continuous security evaluation using Azure Security Center [28].
- **Monitoring and Observability:** Make use of Azure Application Insights and other distributed tracing technologies. Use Azure Monitor to establish centralized logging. For analytics and visualization, use Grafana and Prometheus [18].
- **Continuous Integration/Continuous Deployment (CI/CD):** Add automated testing to the continuous integration workflow. To implement CI/CD, using Azure DevOps or GitHub Actions. Go with blue-green or canary deployment tactics [26].
- **Network Security:** Make use of Network Security Groups and Azure Virtual Networks. Set up some kind of firewall, such Azure Firewall or WAF. Advanced traffic control and security may be achieved using service mesh, such as Istio [7].
- **Data Protection:** For both data at rest and data in motion, use encryption. For data security and disaster recovery, use Azure Site Recovery and Azure Backup. Put in place appropriate protocols for the management and categorization of data [1].
- **IoT Integration:** For smart building features, such as access control systems and smart thermostats, connect with Internet of Things (IoT) devices. You can control your devices and get data from them using Azure IoT Hub. Put in place edge computing to handle Internet of Things data locally.

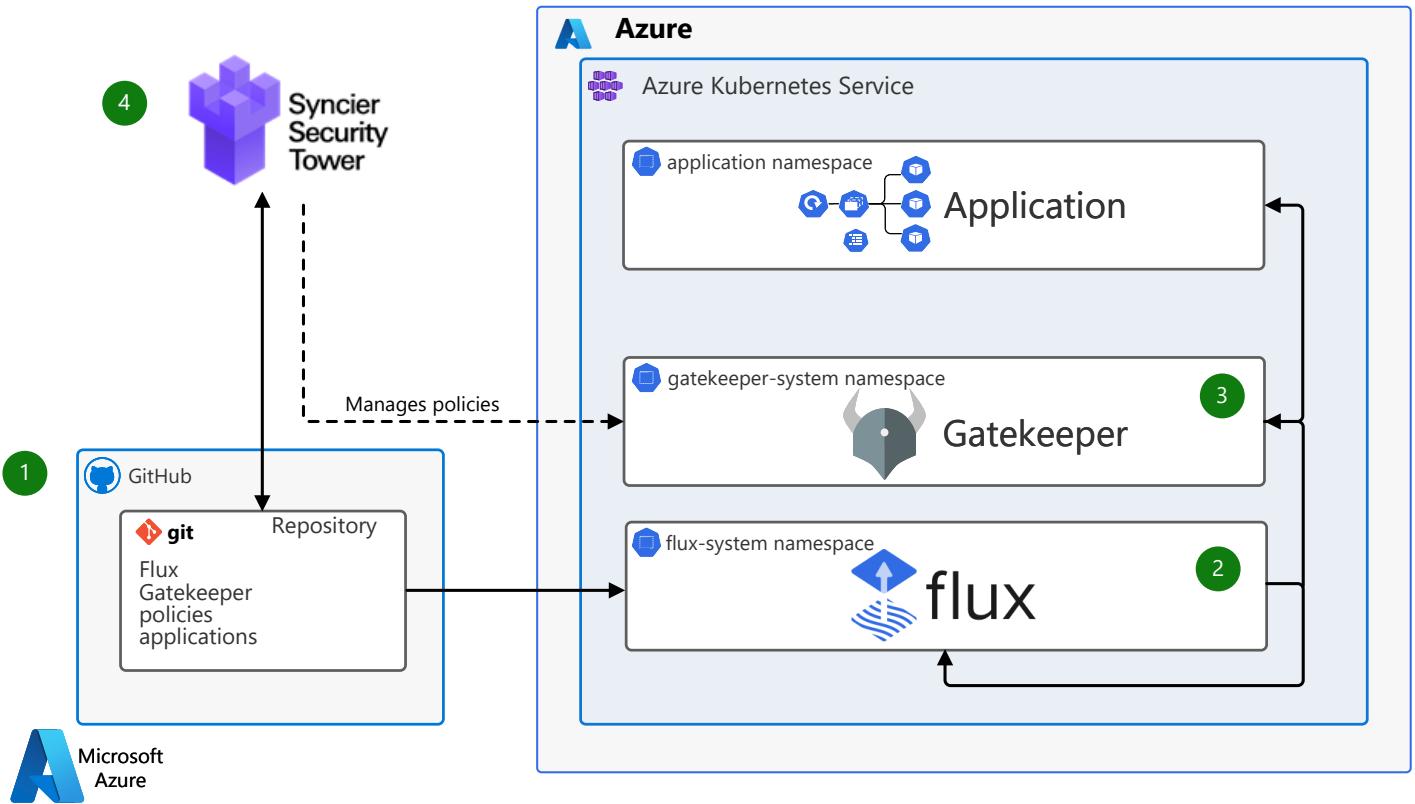


Figure 5.3: Technical 1

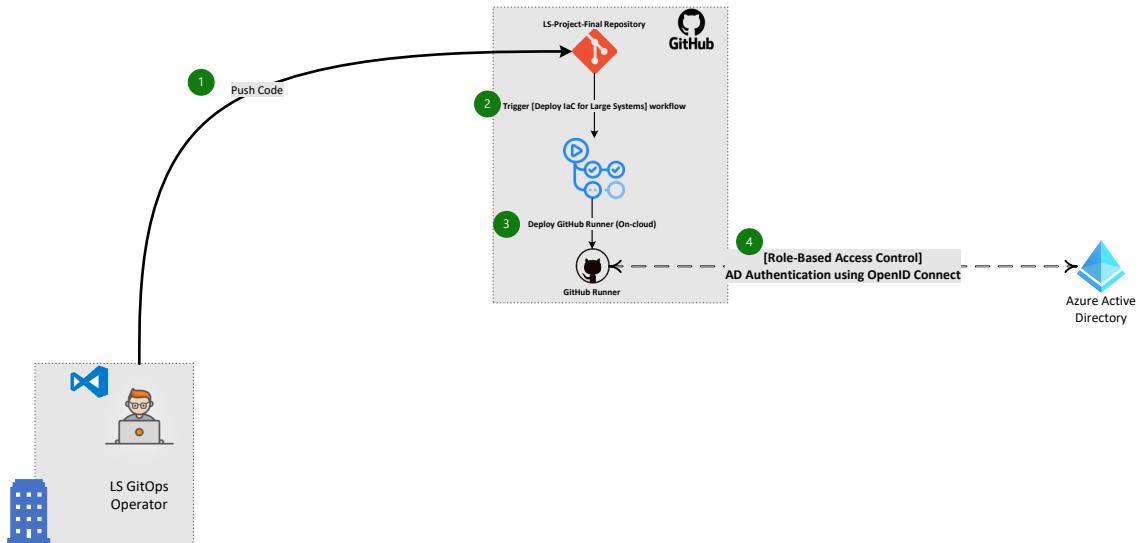


Figure 5.4: First Stage: Infrastructure-as-Code Triggered Workflow

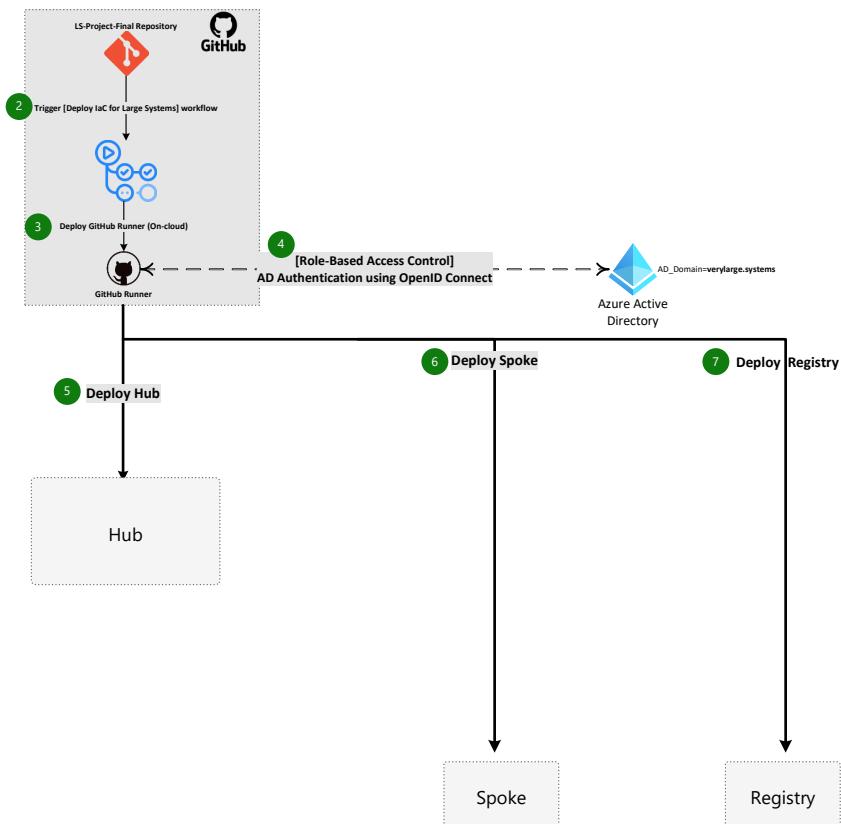


Figure 5.5: Second Stage: Deploy Azure Virtual Networks

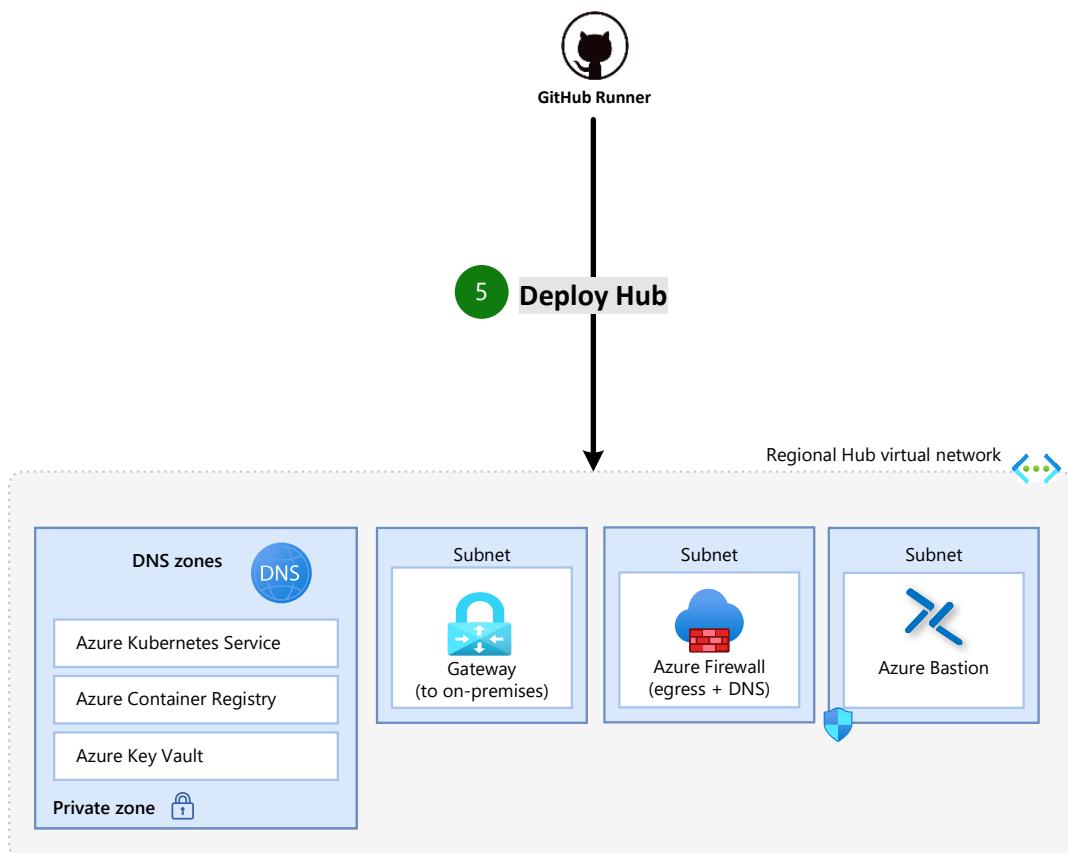


Figure 5.6: Third Stage: Deploy Hub Resource Group Services

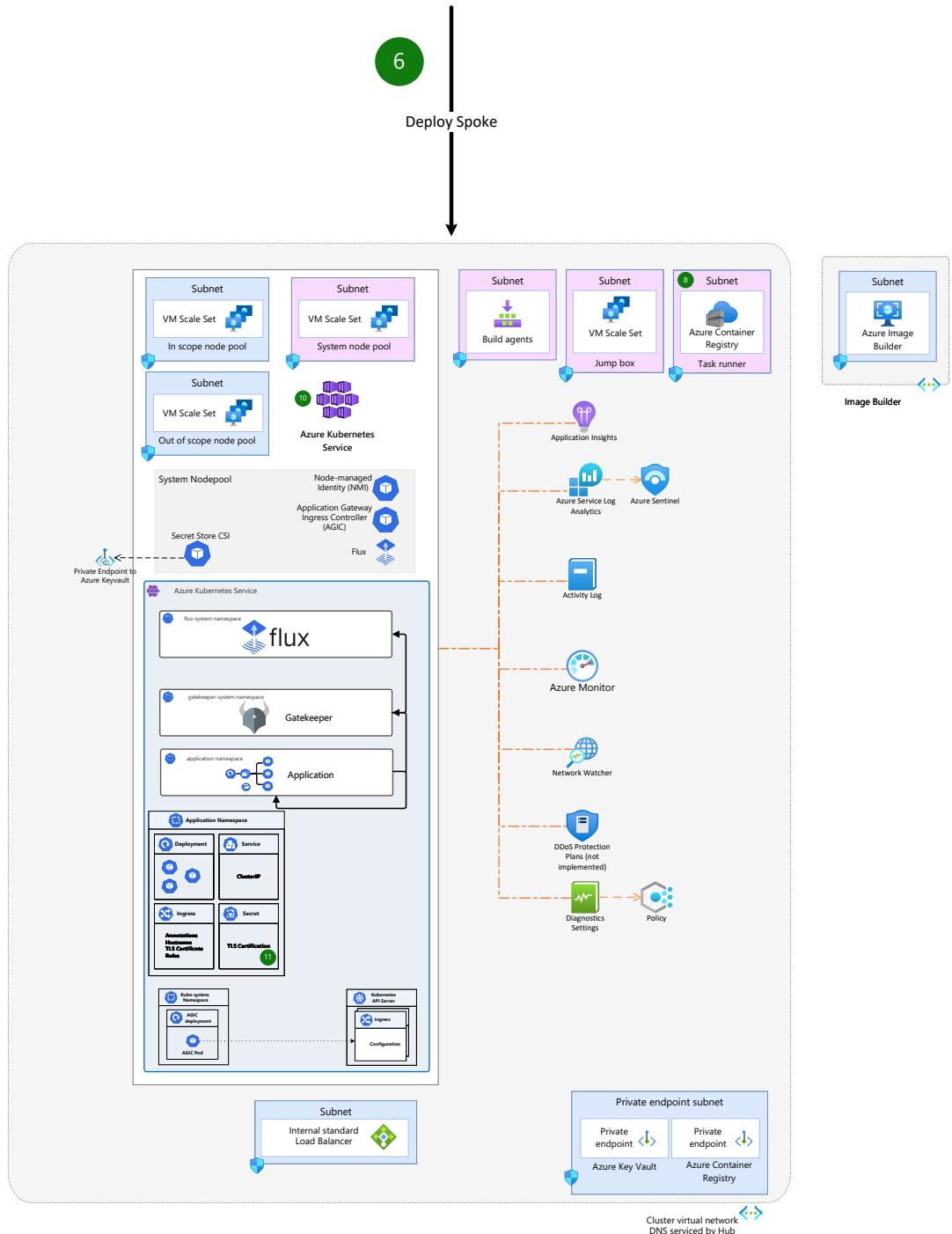


Figure 5.7: Fourth Stage: Deploy Spoke Resource Group Services

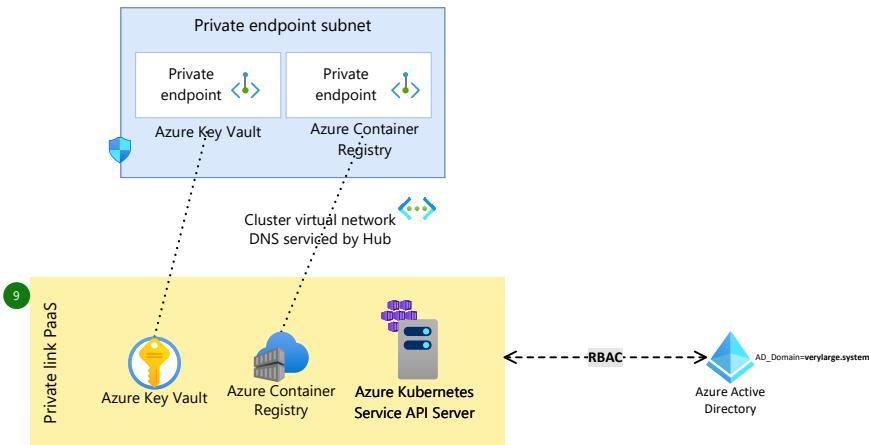


Figure 5.8: Fifth Stage: Link Private Container Registry with Key Vault

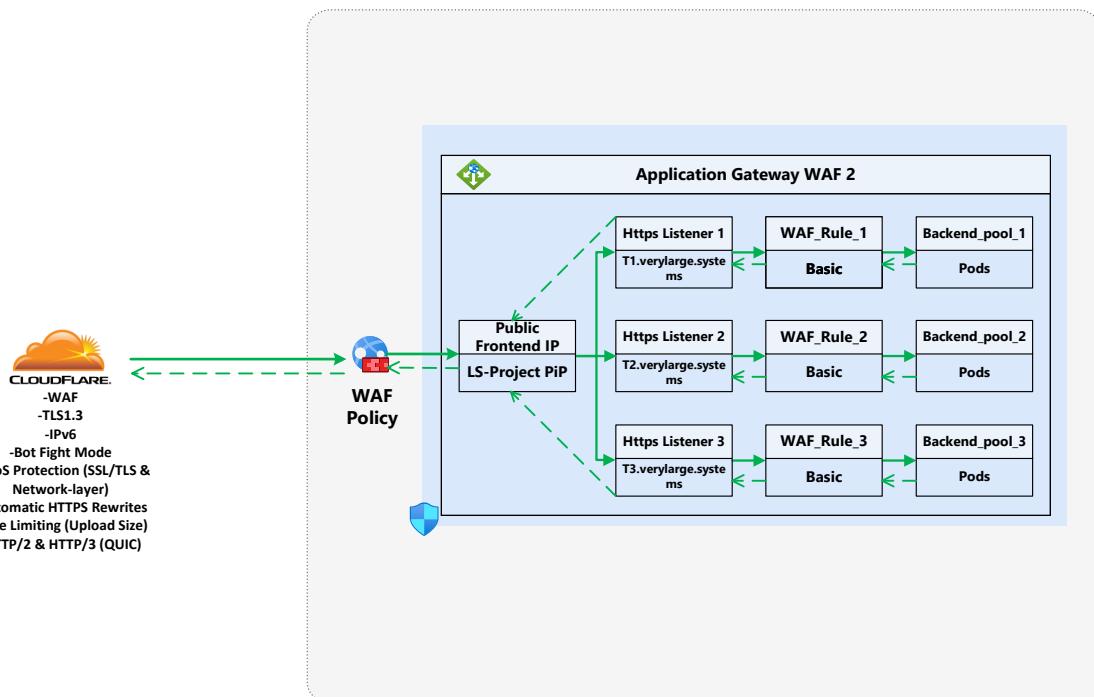


Figure 5.9: Ingress Network Traffic (a)

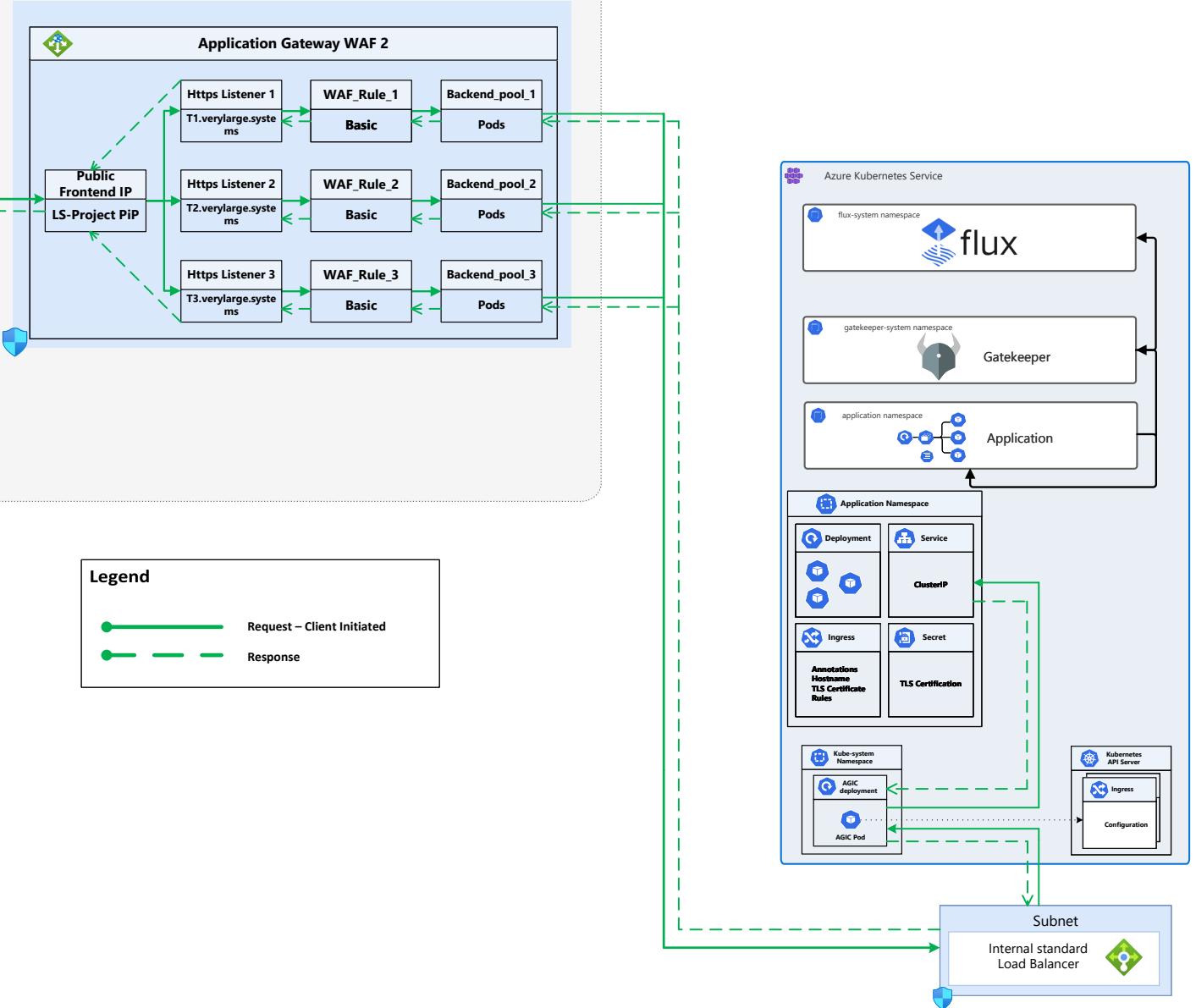


Figure 5.10: Ingress Network Traffic (b)

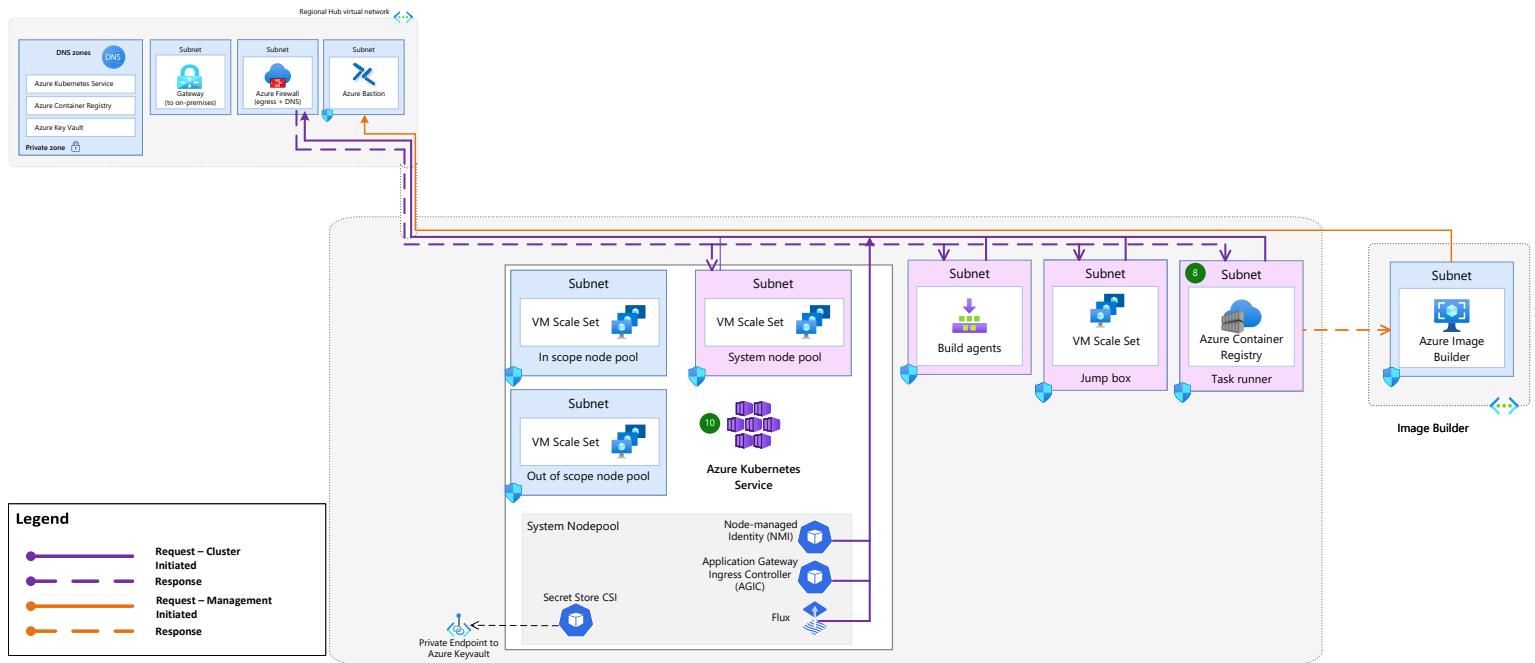


Figure 5.11: Egress Network Traffic

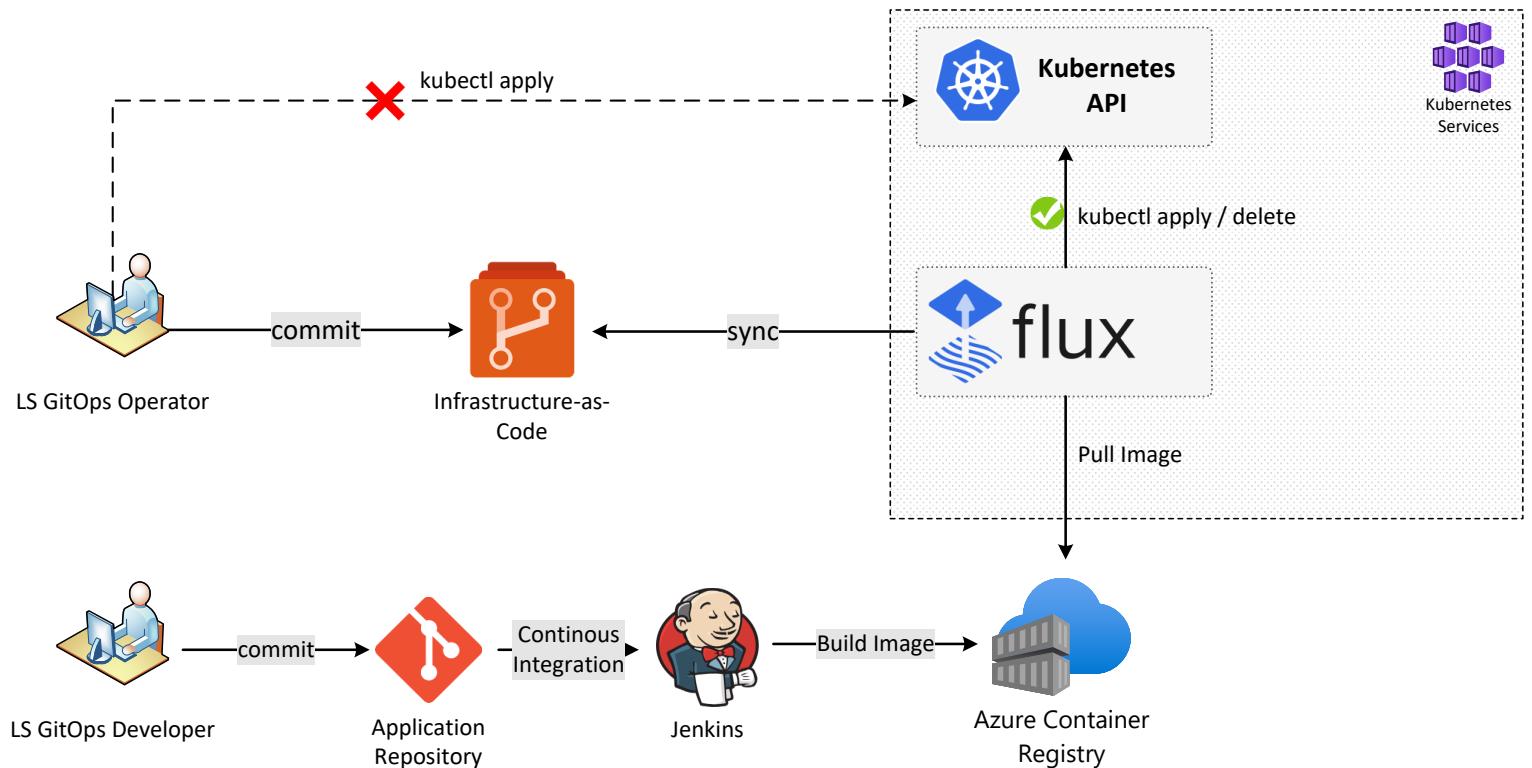


Figure 5.12: GitOps FluxCD Automatic Cluster Configuration

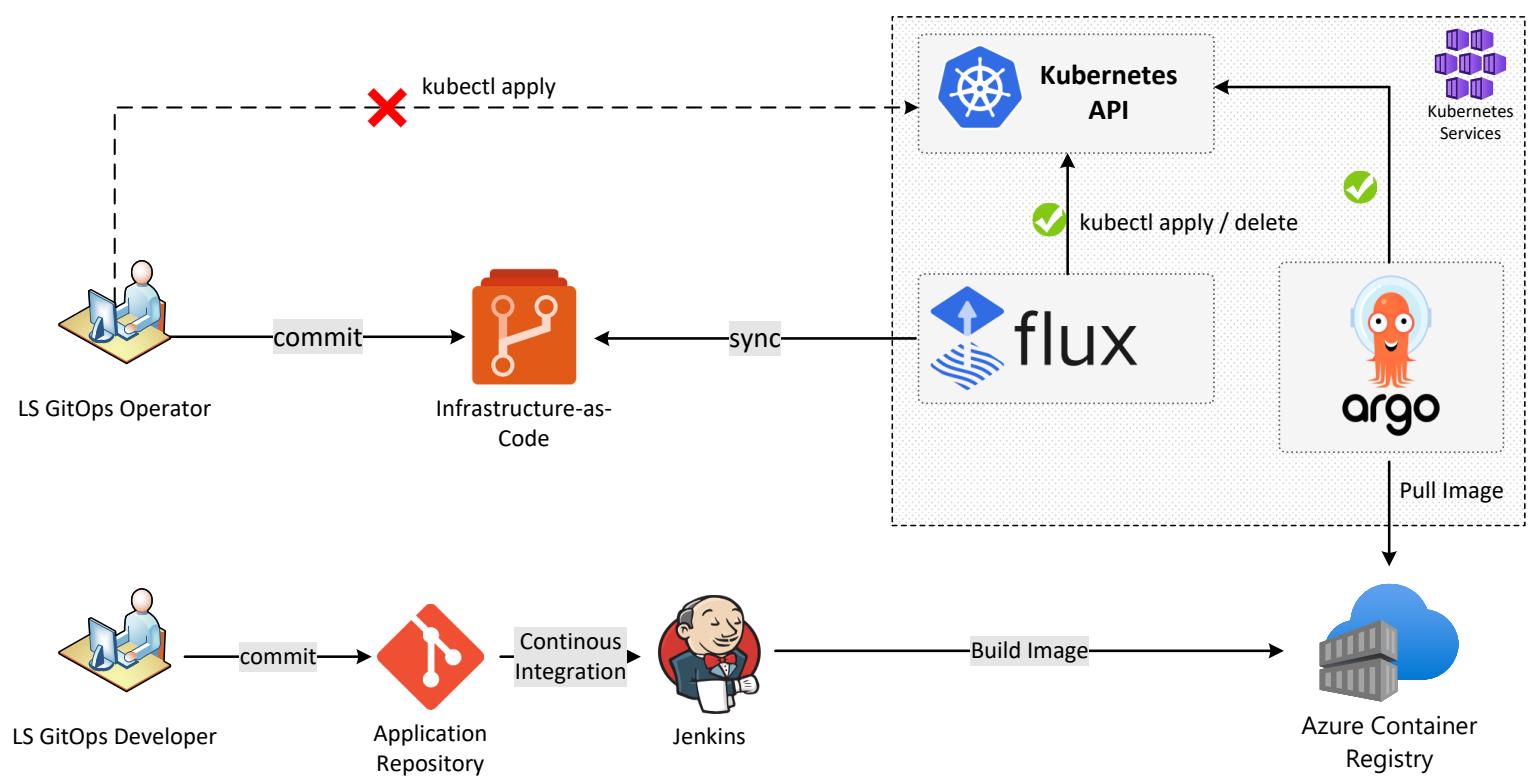


Figure 5.13: GitOps: IaC through FluxCD / Application through ArgoCD

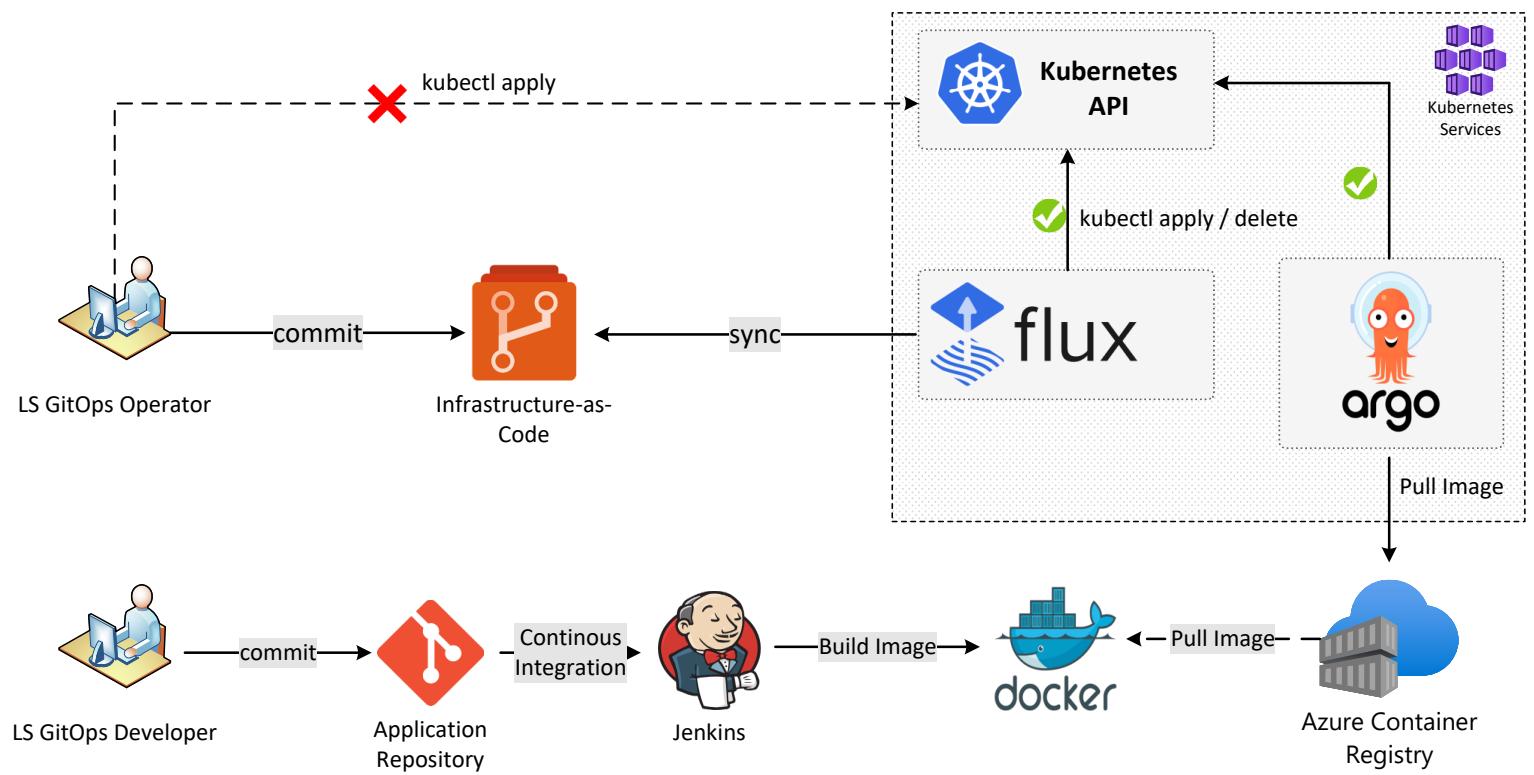


Figure 5.14: GitOps: Dual Layer of Containerized Secured Image Repository

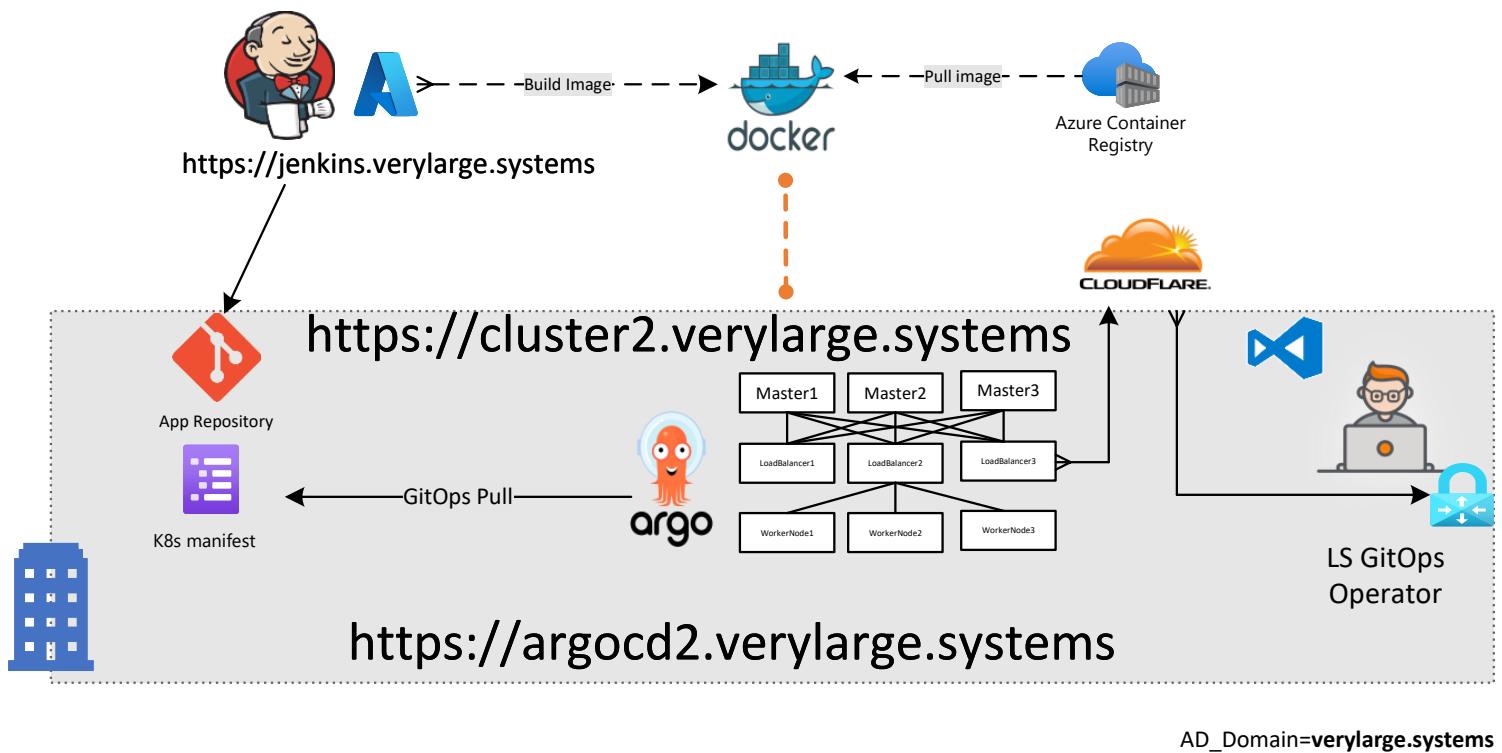


Figure 5.15: GitOps: On-site Deployment for Business Continuity & Disaster Recovery

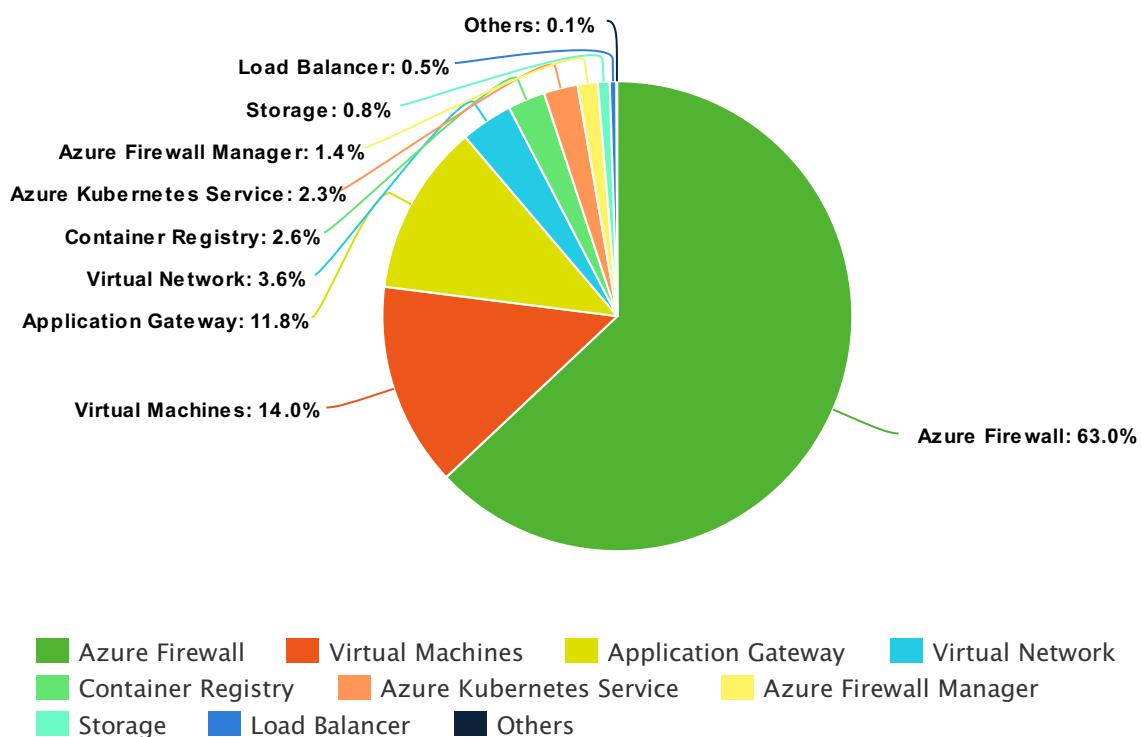


Figure 5.16: Cloud Cost Analysis

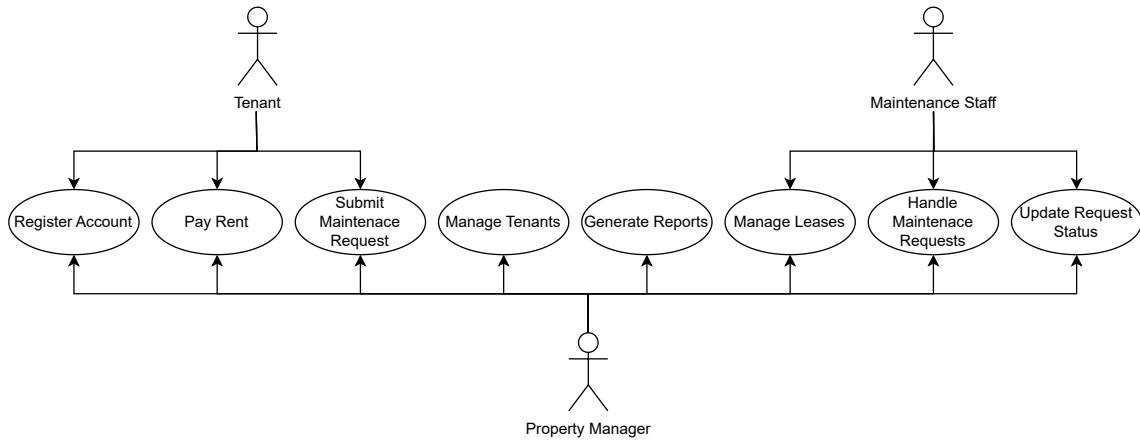
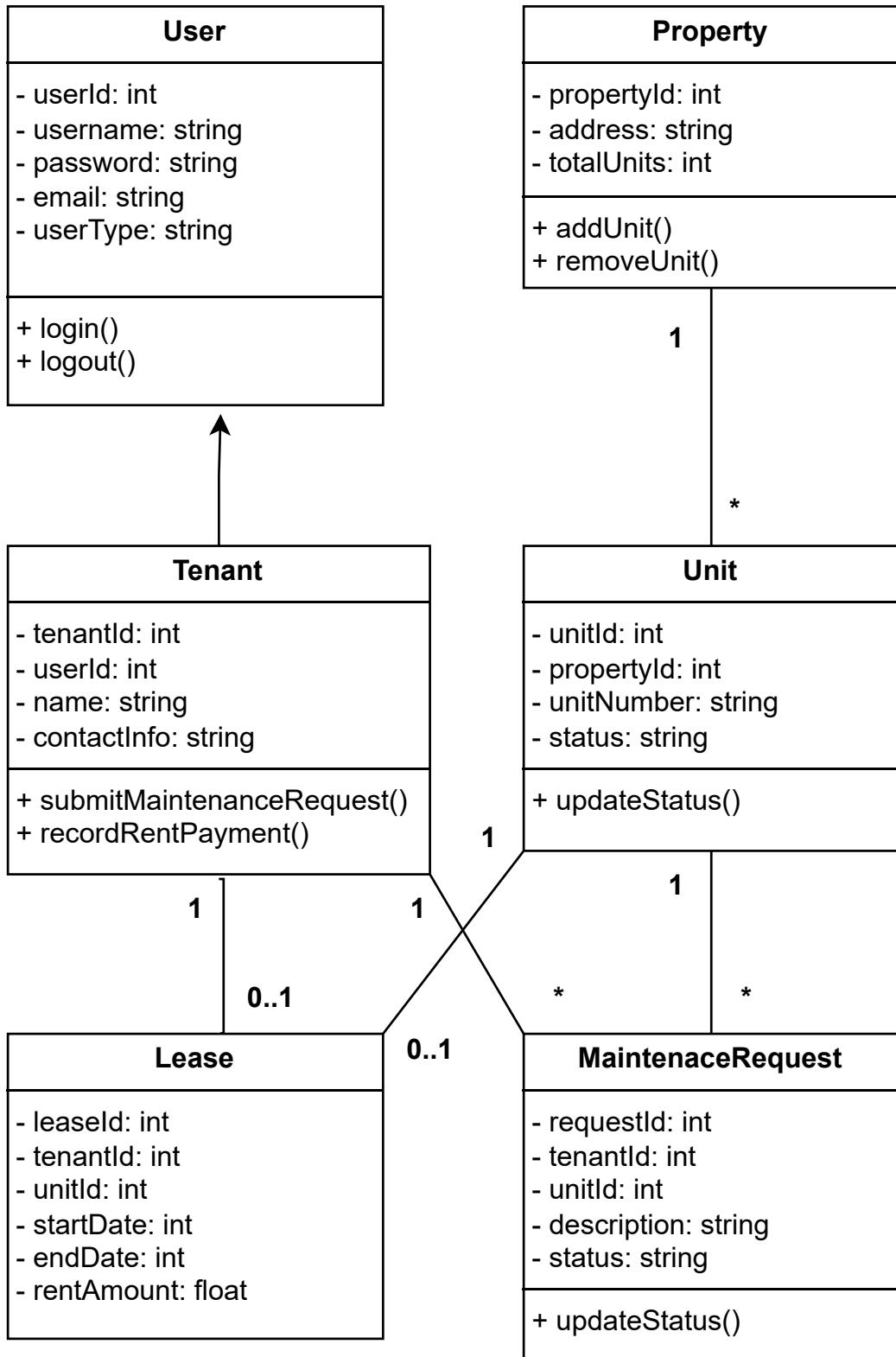
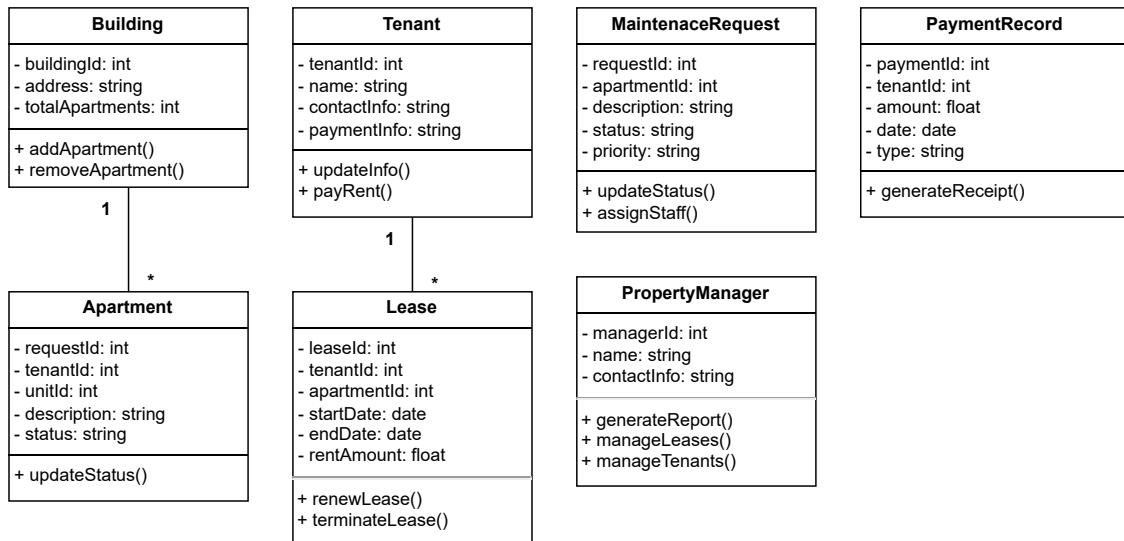
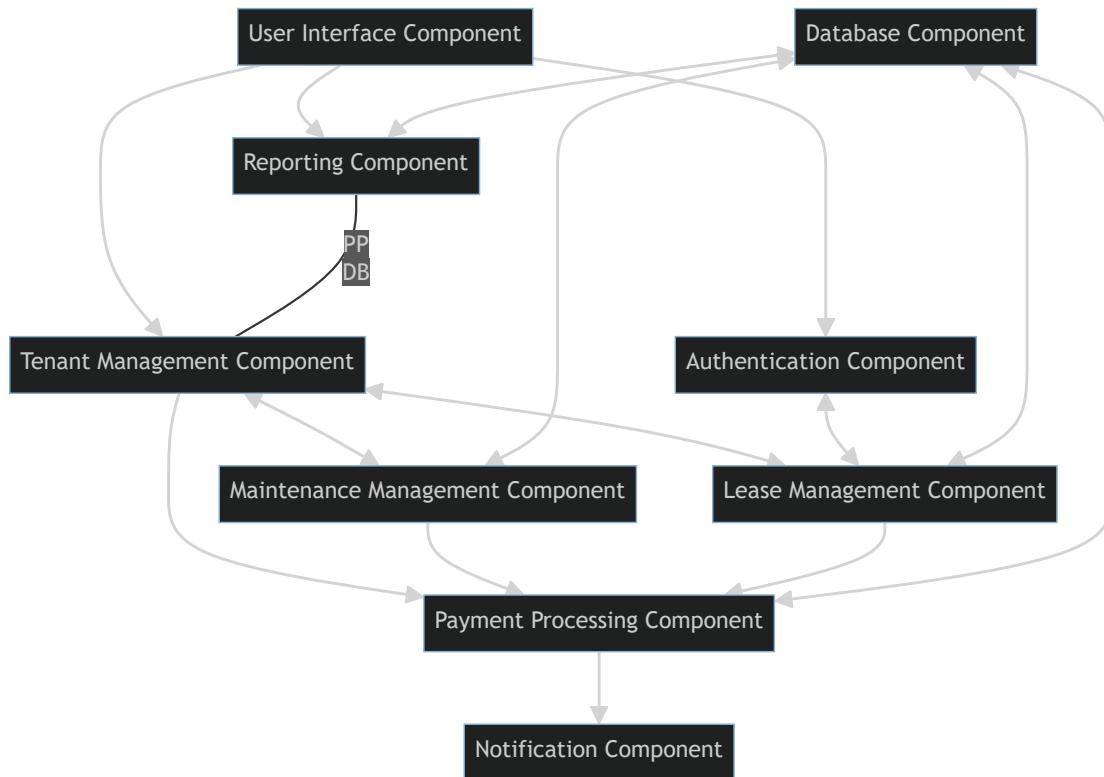


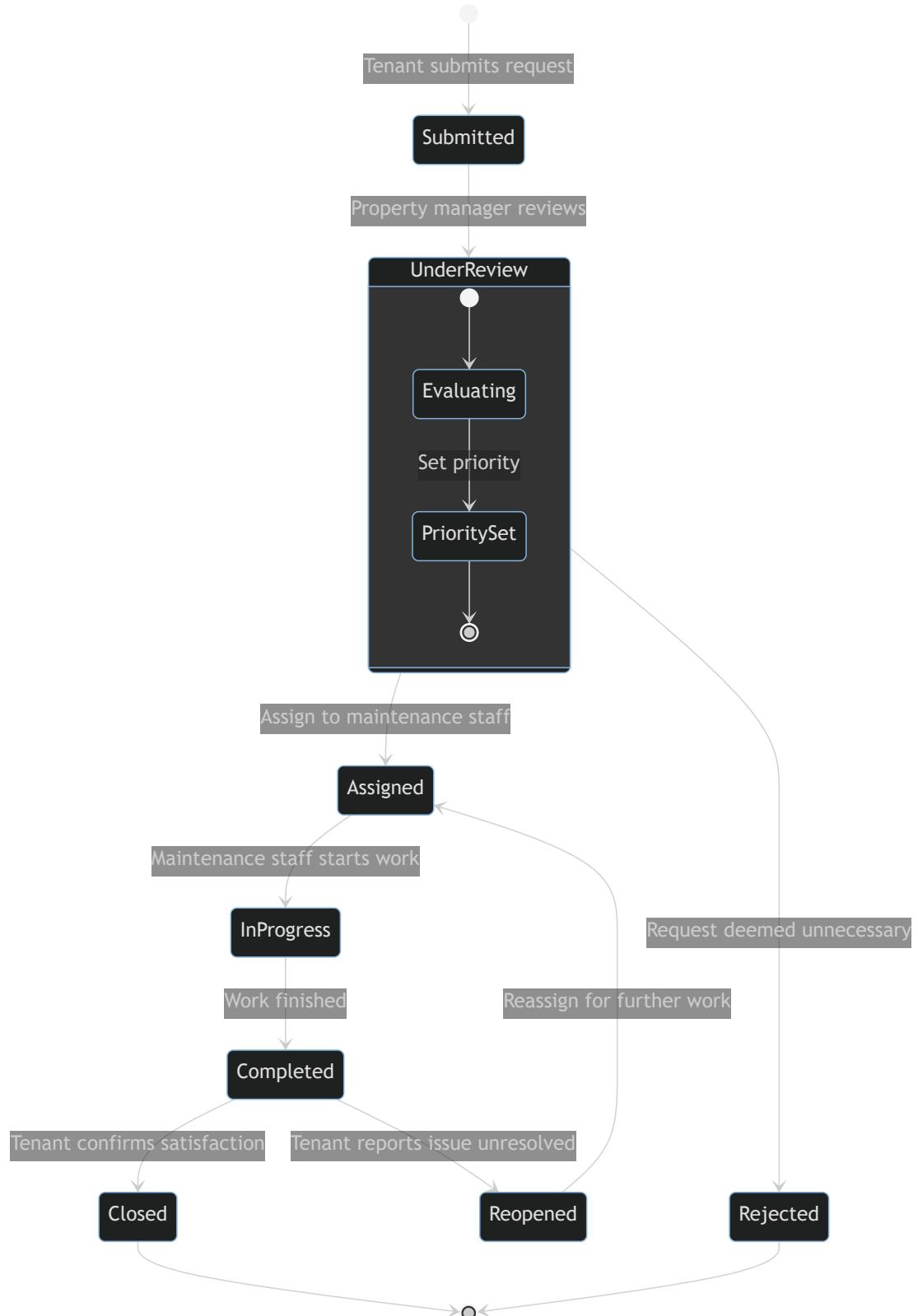
Figure 5.17: Use Case Diagram

5.5 | Use Case: Software Architecture for Residential Building Management

1. Tenant Management Service
2. Lease Management Service
3. Maintenance Request Service
4. Billing and Payments Service
5. Amenity Booking Service
6. Security and Access Control Service
7. Energy Management Service
8. Communication Service (for notifications)

**Figure 5.18:** Minimum Viable Product

**Figure 5.19:** Class Diagram**Figure 5.20:** Component Diagram

**Figure 5.21:** State Machine Diagram

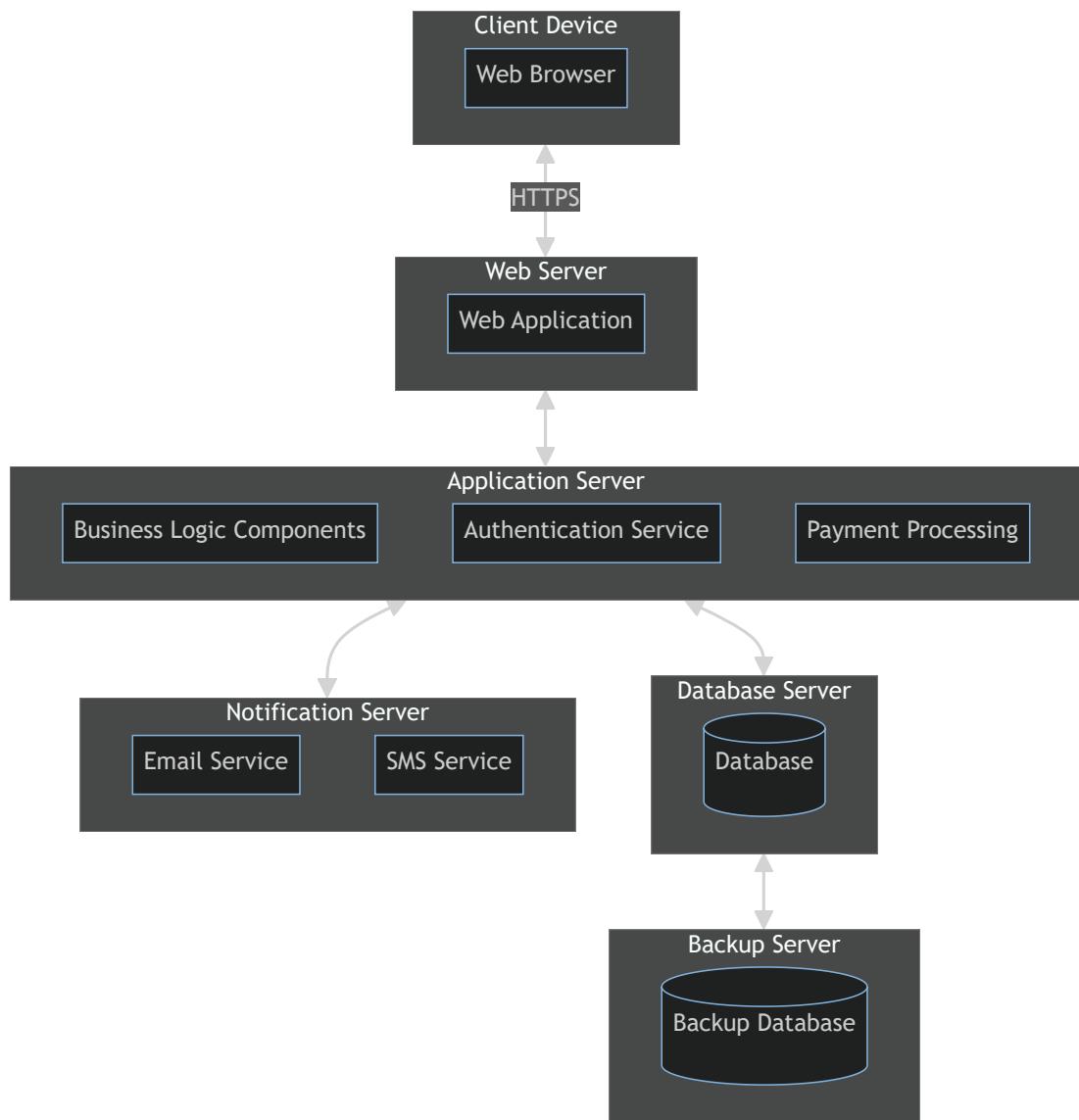


Figure 5.22: Deployment Diagram

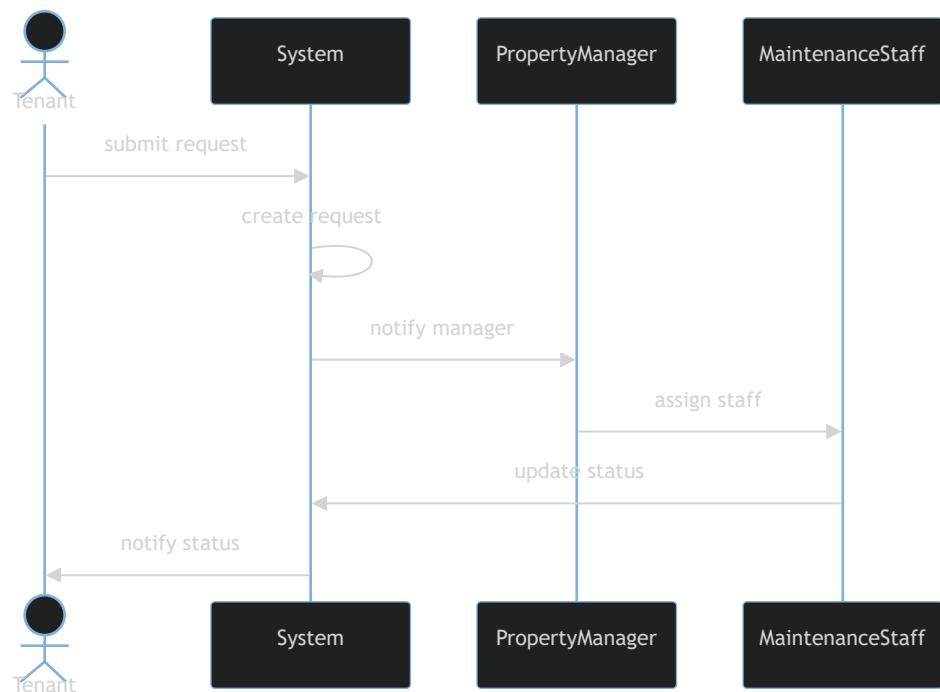


Figure 5.23: Sequence Diagram

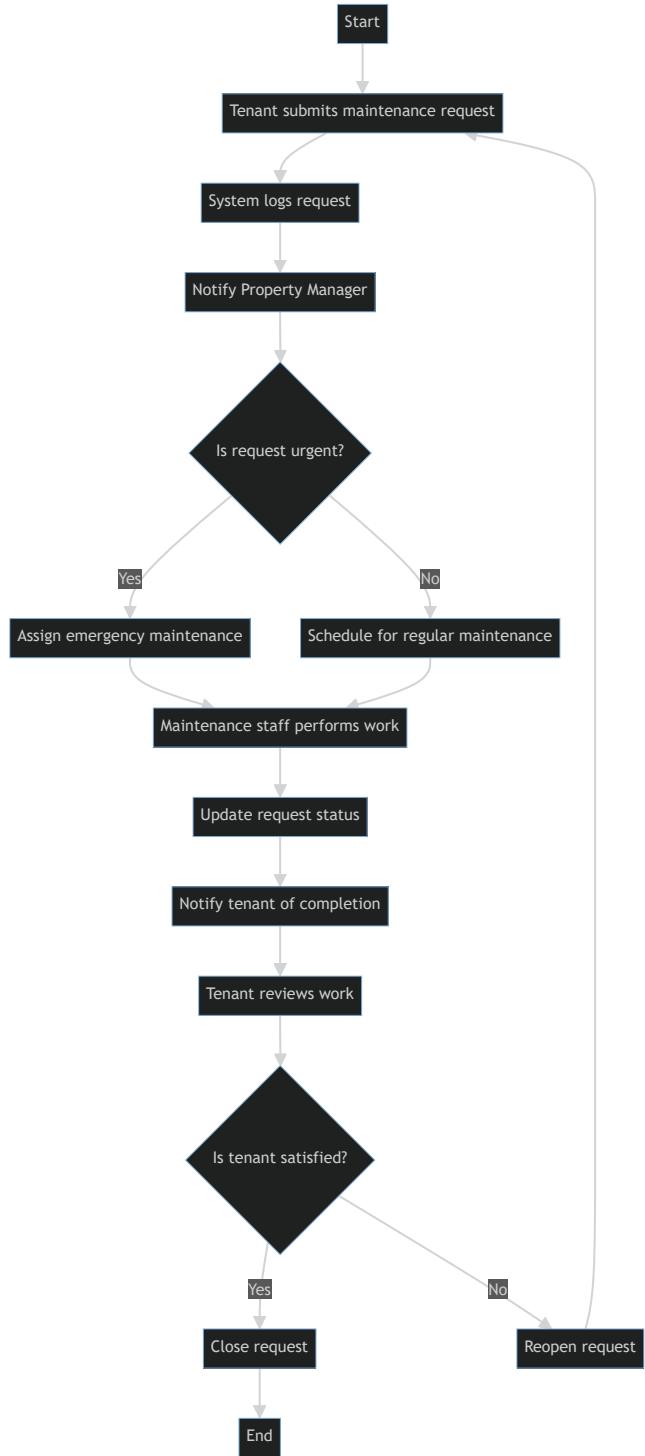


Figure 5.24: Activity Diagram

6 | Conclusion and Recommendations

6.1 | Conclusion

1. Efficient maintenance of existing residential complexes is crucial in light of Iraq's severe housing problem.
2. Maintenance cost estimates in most residential complexes are now done manually using meter readings and simple accounting software like Excel, which shows that there is room for technological advancement.
3. The smartphone industry in Iraq is booming, with Samsung and Apple devices dominating the market. This bodes well for the adoption of mobile applications in the country.
4. A residential building management software solution that is specifically designed for the Iraqi market has unrealized potential.

6.2 | Recommendations:

1. Create a home building management software for the Iraqi market that integrates capabilities for calculating maintenance costs and is compatible with prominent smartphone brands like Samsung and Apple. Capability to read meters digitally.
2. Compare in-house creation with using a pre-made solution in a cost-benefit analysis, taking into account: The initial investment expenses and the ongoing maintenance and update needs abilities to tailor offerings to Iraqi consumers.
3. To ensure the new management software is effective and well-received by users, launch a trial program in a subset of residential complexes.
4. Help the compound administrators and inhabitants adjust to the new technology by providing them with training and resources.
5. Consistently solicit user input to enhance the program and cater to the unique requirements of Iraqi housing complexes.

7 | References

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A | Appendix A

