INTERNSHIP REPORT IN BUSINESS ANALYTICS

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Data Engineer Intern

Acadia
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with us. Growth Never Ends

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ACKNOWLEDGEMENT

I am overjoyed to learn that pursuing an internship with **Acadia Technologies** was such a wise move for me. Over the last four months, I've gained important experience working with the company's core development team. It's fantastic to learn that Acadia Technologies was able to expose me to data engineering skills. This type of hands-on experience may be quite beneficial, and I am confident that it will benefit my professional aspirations.

Acadia Technologies deserves my gratitude for offering such a wonderful and enjoyable internship experience. It is apparent that the organization values its interns and is devoted to assisting them in their professional growth and development.

I'd also like to thank **Kent State University** for their assistance in helping me get this opportunity. The instructors and staff that assisted me throughout the internship process need to be recognized for their commitment to assisting students in succeeding.

I'd like to thank my internship supervisor, Professor **Dr. Alan Brandyberry** for his guidance and assistance. Having a competent supervisor may make or break an internship experience.

This report was prepared entirely by me and has not previously gotten academic credit at this or any other school.

I'd like to thank **Mr. Madhu Sunkara** for his assistance and direction as my job supervisor at Acadia Technologies.

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1. Introduction to Organization

Acadia Technologies is a major data engineering firm that specializes in healthcare software development. The corporation was founded in 2010 and is headquartered in Duluth, Georgia, United States, with activities spread over global.

The objective of the firm is to revolutionize the healthcare sector by offering cutting-edge software solutions that enhance patient outcomes while lowering healthcare expenses. Their key principles include creativity, teamwork, and dedication to quality.

Acadia Technologies is a data engineering firm that focuses on using data analytics and machine learning to extract insights from huge, complicated data sets. Their skilled data engineers and scientists collaborate closely with clients to create personalized solutions that are suited to their individual requirements.

Acadia Technologies offers a variety of software development services for the healthcare business in addition to data engineering services. Their solutions include, among other things, electronic medical record (EMR) systems, telemedicine platforms, and mobile health applications. These technologies are intended to improve patient care and streamline healthcare processes, allowing providers to focus on providing high-quality treatment.

Healthcare management system software from Acadia Technologies is a comprehensive solution that assists healthcare providers in a variety of disciplines, including contactless visitor management, OPD/IPD management, billing management, appointment management, insurance and credit tracking, central sterile supply department tracking, MIS reports, e-prescriptions, nursing care, and ward management. This software solution is intended to assist healthcare professionals manage their day-to-day operations more efficiently, allowing them to deliver better care to patients while saving time and money.

Acadia Technologies is dedicated to having a beneficial influence on society in terms of corporate social responsibility. They collaborate with non-profit organizations and community groups to assist healthcare programs and give resources to underprivileged populations.
Acadia Technologies, in general, is a dynamic data engineering firm that is having a huge influence on the healthcare business. Their cutting-edge software solutions are improving patient outcomes, lowering healthcare costs, and pushing the field of data analytics forward.

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2. Executive Summary

As a data engineer intern at Acadia Technologies, I worked closely with the data engineering team to obtain hands-on experience in data processing, modelling, and analysis. I participated in the creation of unique software solutions to extract insights from huge, complicated data sets using programming languages such as Python and SQL during my internship. I was actively involved in healthcare management initiatives such as data pipeline design and implementation, data cleaning, and data transformation procedures. To ensure optimal efficiency and scalability, I also collaborated with senior data engineers to identify and implement enhancements to current data processing systems. My mastery of data engineering skills and methods, together with my attention to detail and problem-solving abilities, were clear during the internship. While working with colleagues and stakeholders, I was able to effectively accomplish all projects allocated to me on schedule and exhibit good cooperation and communication abilities.

Overall, my internship at Acadia Technologies gave me useful knowledge of the fields of software development and data engineering.

3. Skills

- Azure data services such as Azure Data Factory, Azure Databricks, and Azure SQL Database.
- Design, implement, and manage data pipelines and workflows.
- Version control systems such as Git.
- Programming Language Python.
- Microsoft SQL and Power BI.

4. Roles & Responsibilities

Information on the work completed and Challenges encountered.

I took part in the following.

Development of a data pipeline: I worked on the design and implementation of data pipelines, which allow for the smooth transmission of data across multiple systems, applications, and databases. We used Azure Data Factory, Azure Blob Storage, and other tools to do this.

Data modelling: It Entails creating data models that correctly describe the organization's data while also allowing for efficient data processing and analysis. This requires the usage of technologies like Azure SQL Data Warehouse, Azure Analysis Services, and Azure Cosmos DB.

Database management: It is the administration and optimization of databases to achieve optimal performance and scalability. This includes database backup and recovery, performance tweaking, and capacity planning.

Data integration: It is combining data from several sources to produce a single picture of the organization's data. This entails using products like Azure Data Lake, Azure Data Catalogue, and Azure Data Share.

Data analysis and reporting: The development of reports and dashboards that offer insights into the organization's data requires tight collaboration with data analysts. Utilizing programs like Power BI, Excel, and SQL Server Reporting Services is necessary for this.

Security and compliance: This entail making sure that the data of the organization is safe and in accordance with pertinent laws like HIPAA, GDPR, and PCI-DSS. To guarantee data privacy and security, this entails adopting encryption, access limits, and monitoring systems.

Cloud infrastructure management: It entails overseeing and enhancing the company's cloud infrastructure to guarantee top efficiency, scalability, and performance. Utilizing programs like Azure Monitor, Azure Resource Manager, and Azure Automation, this entails activities like resource allocation, monitoring, and automation.

5. Challenges

I encountered several difficulties throughout my internship as an Azure data engineer, including:

Learning Azure Services: As an intern, I find it challenging to become familiar with all the Azure services. There are several services, and each one has a unique goal, set of capabilities, and set of restrictions. Effectively comprehending and utilizing these services was difficult.

Data Integration: Another difficulty I ran into was integrating data from several sources. Medical equipment, administrative systems, electronic health records (EHR), and other sources all contribute data to the healthcare industry. It took a lot of work and great attention to detail to transform and integrate this data.

Data security: Sensitive healthcare information must be shielded from unauthorized access. As an intern, it was my responsibility to follow industry-recognized security practices to make sure the data I worked with was safe and secure.

Performance optimization: Azure offers several optimization techniques to boost the efficiency of data processing and analysis. However, when dealing with enormous datasets, optimizing data processing operations can be difficult. I had to figure out how to speed up and improve the efficiency of my data processing procedures.

Communication: Working with different teams and stakeholders, such as data analysts, developers, and business users, was a part of my internship. To ensure that everyone was on the same page and that tasks were performed on time and to a high degree, effective communication skills were necessary.

I was able to overcome these obstacles and gain essential skills in data engineering, cloud computing, and problem-solving that I can use in a variety of situations and sectors.

5.1. What was the problem that you were trying to solve during your internship?

I was given the duty of resolving an issue with data integration for a healthcare customer during my internship as an Azure data engineer. The customer had a lot of data in electronic health records (EHR), as well as other data sources including medical equipment. However, because this data was not integrated, there was no efficient or effective way to analyze it.

It was my responsibility to develop and put into use an Azure service-based data integration solution that could effectively transform and merge data from many sources into a single format. Scalability, security, and compliance with industry norms and rules were requirements for the solution.

I created and constructed an Azure data pipeline to extract, transform, and load (ETL) data from diverse sources into a centralized data lake to address this issue. To construct the pipeline, I utilized Azure Data Factory, Azure Databricks, and Azure Data Lake Storage. The pipeline's features include automation of the ETL process, handling of massive amounts of data, and compliance and data security protections.
The solution was effective in merging the client's data and creating a centralized and secure data lake for analysis and reporting. It provided the customer with previously inaccessible insights into their data, resulting in enhanced patient care and operational efficiency.

5.2. What is the business value in solving that problem?

During my Azure data engineer internship, I had the opportunity to solve a data integration challenge for a healthcare customer. The client was able to acquire a holistic perspective of patient care, enhance patient outcomes, and minimize healthcare expenditures by combining data from several sources into a unified format.

For starters, having a centralized and comprehensive picture of patient data allows healthcare practitioners to make more educated decisions regarding patient care, resulting in better patient outcomes. Providers, for example, may detect possible health risks early on and give tailored therapies, minimizing hospitalizations and readmissions.

Second, data integration can aid in the reduction of healthcare expenditures. Providers can optimize operations and avoid needless procedures and treatments by identifying areas of inefficiency and waste. This can save money for both the provider and the patient.

Finally, data integration can bring useful insights for medical research and development. Researchers can find new trends, patterns, and viable treatment solutions by analyzing massive amounts of integrated data. This can lead to new medical discoveries and breakthroughs.
Overall, solving the data integration challenge for the healthcare customer has a high commercial value since it may lead to better patient care, cost savings, and useful insights for healthcare research and development.

5.3. What approach did you/the company decided to take to tackle the issue?

During my Azure data engineer internship, we used Azure Data Factory and Azure SQL Database to solve the data integration problem for the healthcare customer.

To begin, we utilized Azure Data Factory to coordinate and automate the migration of data from diverse sources into a single data store. This includes pulling data from various systems, converting it to a standardized format, and feeding it into the Azure SQL Database.

The combined data was then stored and managed using Azure SQL Database. The database was created to support the intricate connections between various data sources, enabling Second, we utilized Azure SQL Database to store and manage the combined data. The database was designed to accommodate the complex relationships between different data sources, enabling easy querying and analysis. Seamless analysis and querying.

To further verify the correctness and comprehensiveness of the integrated data, we also conducted data quality checks and monitoring. This required setting up warnings and alerts for any problems or abnormalities that could occur when integrating the data.

Overall, we used a mix of Azure Data Factory and Azure SQL Database to solve the data integration problem for the healthcare customer, as well as data quality checks and monitoring to assure the correctness and completeness of the integrated data.

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5.4. How did you address any of the challenges in Q5?

During my Azure data engineer internship, we encountered various obstacles in integrating data for a healthcare customer. Dealing with data from older systems with varied data formats and structures was one of the problems.

We utilized Azure Data Factory to turn the data into a standardized format that could be readily linked into the central data repository to overcome this difficulty. We also conducted data quality checks and monitoring to guarantee the correctness and completeness of the integrated data, which assisted us in identifying and resolving any errors or anomalies that may have arisen throughout the data integration process.
Another problem was guaranteeing the security and privacy of integrated data, which was especially difficult given the sensitive nature of healthcare data. To solve this issue, we put in place rigorous access restrictions and encryption mechanisms to protect the data from unauthorized access or breaches.

Overall, we used Azure Data Factory to standardize the format of the data, implemented data quality checks and monitoring to ensure data accuracy and completeness, and put strict security and privacy measures in place to protect the integrated data.

5.5 What was the project outcome? How the project can be future improved in the future?

Legacy data from the healthcare client was successfully integrated into a centralized data repository using Azure Data Factory as the project's conclusion. The customer was able to get important insights into their healthcare operations and make data-driven choices to enhance patient care and outcomes since the integrated data was accurate, complete, and secure.

We might use more sophisticated analytics and machine learning models in the future to further improve the project by gaining deeper insights into the data and spotting patterns or trends that might not be immediately obvious. To make the client's findings more usable and accessible, we may also investigate more sophisticated data visualization tools. Finally, to guarantee that the integrated data is accurate, full, and safe throughout time, we may continue to monitor and enhance data quality and security procedures.

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6. Contributions

Interning as an Azure data engineer, I made the following contributions to the project:

- Helping to create the data integration pipelines with Azure Data Factory
- The creation and execution of data quality checks and data profiling procedures to guarantee the accuracy and completeness of the integrated data.
- Working along with the data analyst and client stakeholders to comprehend their demands and guarantee the integrated data is suitable for them.
- Identifying and fixing data integration problems as they appeared.
- Creating documentation of the data integration processes and data sources for future use and upkeep.

Overall, my efforts made it possible for the healthcare client to successfully integrate its old data into a centralized data repository, gaining significant insights into its operations and enabling it to make data-driven choices to enhance patient care and results.

6.1. If your work was part of a team effort, what was your individual contribution to the project?

My unique contributions to the project as an Azure data engineer intern working in a team were as follows:

- Helping to create the data integration pipelines with Azure Data Factory
- The creation and execution of data quality checks and data profiling procedures to guarantee the accuracy and completeness of the integrated data.
- Working in partnership with the data analyst and client stakeholders to comprehend their demands and make sure the integrated data satisfies them.
- Identifying and fixing data integration problems as they appeared.
- Creating documentation of the data integration processes and data sources for future use and upkeep.
- I'm educating the team on Azure Data Factory and other Azure data engineering tools while also assisting with the onboarding of new team members.
- Taking part in team meetings and making suggestions for ways to enhance the project's data integration procedures and effectiveness.

I was able to give a superior integrated data solution to the healthcare customer by making my own personal contributions to the team's success.

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7. Conclusion

Overall, my internship as an Azure data engineer for a project integrating healthcare data was enjoyable and instructive. To assist the customer in gaining knowledge and making wise choices to enhance patient care and results, I was entrusted with combining data from diverse healthcare sources into a centralized data warehouse.

I utilized Azure data engineering technologies including Azure Data Factory, Azure Databricks, and Azure SQL Database to solve this problem while collaborating with a team. I had difficulties while working on the project, such as time restrictions and data quality problems, but I was able to get over them with the team's help and via excellent communication and problem-solving.

I actively participated in the creation of data integration pipelines using Azure Data Factory, the design of ETL procedures, and data validation tests as an individual contributor to the project. I also worked with the team to create the data transformation procedures and contributed to the creation of the data model.

The project's accomplishment was the seamless integration of healthcare data from many sources into a single data warehouse, which allowed the customer to receive insightful information about their patient care procedures. As the project moves ahead, there is still room for improvement, such as adding additional automated testing and data validation procedures to further increase data quality and productivity.

Overall, my internship as an Azure data engineer gave me excellent skills and experience that I may employ in my future job. I developed a better grasp of Azure data engineering tools and learnt how to collaborate with a team to create a high-quality solution for a client because of the project.

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THANK YOU !!!