Cloud Engineering for Medicaid and Risk Adjustment

Harbinger enhanced an existing Medicare Claim Processing system to incorporate Medicaid Claim Processing and Risk Adjustment.

This system was targeted for the **Payer market** in the **state of Pennsylvania**.

Significant cloud engineering – on AWS (Amazon Web Services) – was utilized for generating scale and performance.

About

The client is a US-based health data management company that caters to Health Plans. They wished to incorporate Medicare and Medicaid in the same system and simplify Risk Adjustment.

Business Situation

The client is a US-based health data management company that caters to Health Plans. They wished to **incorporate Medicare and Medicaid** in the same system and **simplify Risk Adjustment**.

❑ They had an existing system that was on the Cloud. However, they were not optimizing their cloud investment. Several cloud elements and services remained unutilized.

❑ The performance of the existing system, for processing large number of Risk Adjustment records, was less than desirable.

❑ Optimum utilization of the cloud investment was required.

Harbinger's Solution

Harbinger, with its extensive knowledge of technology and subject matter expertise, identified that the potential of the hosting infrastructure was not sufficiently optimized. As a solution, the below native cloud technologies and cloud-compatible services were carefully evaluated, selected, and utilized.

AWS

❑ AWS was used in the client's pre-existing Medicare platform, so it was extended to the Medicaid part as well.

❑ Parallel execution was accomplished with multithreading –most of the data comprised independent transactions which allowed parallel execution.

❑ An in-memory object, which multiple threads would access, was moved to file storage thus providing a performance boost.

Amazon Redshift

❑ Redshift is a cloud data warehouse that is used for data analytics more than data storage. Redshift was already utilized by the system.

❑ Harbinger compared the benefit and disadvantages of SQL Server with Redshift. Redshift does not support Stored Procedures and generic SQL Functions which can be a challenge with a traditional mindset.

❑ Redshift, however, helped to process a very high volume of data. The requirement was to process 50 million records in 1-2 hours which required high performance and optimization. Redshift was leveraged to achieve that goal.

❑ This involved ensuring that the business logic was in the application layer, thus leaving Redshift purely for data processing.

❑ The SQL queries were optimized. For instance, case statements were replaced with update statements.

Amazon SQS

❑ This AWS message queuing service was used for the main communication throughout the system.

❑ A few queuing mechanisms were enhanced using custom code.

❑ Further code optimization was done using some features of AWS.

SignalR

❑ SignalR was used for real time In-App notifications.

❑ Data processing of the size required by the system takes hours, so the users are notified when the process completes or fails so that they do not have to keep waiting and checking.

❑ SignalR was used to send the notifications based on predefined triggers and actions.

Amazon SNS / SES

❑ This was used for user notifications via emails.

❑ The platform used Two Factor Authentication which requires email or SMS.

Twilio

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❑ The platform used Two Factor Authentication which requires SMS or email.

Benefits

With optimum utilization of cloud technologies provided by AWS, the Harbinger solution ensured enhanced **performance, scalability, efficiency, and accuracy**.

Here are some data points that tell the story:

Input file	Clusters created	Time taken without optimization	Time taken after code optimization
100 claims	5,200	5.32 min	1.16 min
10k claims	520,000	15 min	6 min
100k claims	5,200,000	21 min	14 min
300k claims	15,600,000	(Hung System)	26 min
400k claims	20,800,000	(Hung System)	54 min