



BAYSIL VALIDATES ITS HEALTH APPLICATION AS A MULTI-TENANT CLOUD SOLUTION

Baysil is an application that converts practitioners' health care plans into step-by-step personalized and engaging formats patients can access through their mobile device. Baysil came to CENG looking to validate that their app can be deployed in a multi-tenant cloud environment while also testing the security and scalability of their application for marketplace launch.

Officially incorporated in 2018, Baysil's goal is to help non-physician healthcare practitioners manage client records more efficiently while serving patients better. Baysil's strength comes from its workers' extensive understanding in both the healthcare environment and software development creating a technical solution that is specifically designed to help the patient-practitioner experience.

BENEFITS FOR PRACTITIONERS AND PATIENTS ALIKE

Using Natural Language Processing (NLP) to back its application, Baysil streamlines interactions between practitioners and their clients, while providing multiple user experience benefits to both parties.

Normally, when a practitioner first works with the client, they are required to manually integrate the patient records. Baysil automatically integrates the client's records into its system saving the practitioner valuable time.

From there, the real work happens.

Once the patient's records and care plan are in the system, the application converts the plan into a step-by-step personalized format for the patients to act on. Baysil then sends this information to the client's phone reminding them when and how to do their regular recovery plan on a daily basis. These reminders are crucial for a patient to stay invested in the therapy, as many clients need the scheduled activities and notifications to stay on track for rehabilitation.

As the client progresses through, Baysil monitors and provides real-time outcome data to the practitioner's healthcare plan assisting in identifying patient problems and adjusting treatments as necessary. This information is sent to the practitioner through automated feedback during the process, allowing them to monitor their patients' progress more accurately.

Overall, the Baysil application provides two major benefits:

- Through the simplified integration and client assessment, the app saves practitioners an average of 3 minutes per 15-minute appointment. That doesn't seem like much, but it allows practitioners to see up to 8 more patients a day translating to approximately \$120,000 in added annual revenue (as long as demand keeps up)
- By providing the step-by-step personalized plan, identifying client's problems, and providing updated treatments, Baysil increases the patient's level of satisfaction throughout the treatment period. For healthcare clinics, this is a significant benefit because a 5% increase in patient retention and satisfaction can increase clinic profits by 25% to 95%.

Before getting their time saving/engagement raising app into the marketplace, Baysil had to validate its technical functionality.

COMPLYING, VALIDATING, AND SCALING

Baysil came to CENG in order to validate their product through 3 different objectives:

1. Assess that their application is secure and complies with PHIPA and PIPEDA standards
 - Secure healthcare data is an incredibly important factor not only for clients and their practitioners, but also for the Personal Health Information Protection Act (PHIPA) and the Personal Information Protection and Electronic Documents Act (PIPEDA). Since Baysil handles a lot of sensitive health information, it must adhere to the guidelines set out by both PHIPA and PIPEDA, ensuring the application is extremely secure so that sensitive information can remain private and isn't vulnerable to cybersecurity attacks.
2. Validate that their application can be deployed in a multi-tenant cloud without compromising any functionality
 - Wanting to deploy their solution in a commercial cloud, such as Azure or AWS, Baysil needed to validate that the application would work in a multi-tenant cloud-based environment.

CENG MEMBERS



3. Scale test to see if the application can handle 700 users at once

- Based on Baysil's 12-month business plan of acquiring new customers, the application needs to handle a projected load of 700 concurrent users without any crashes or reduction in quality of service.

PREPPING THE PROJECT SPACE ON THE CENG N TESTBED

CENG N provided Baysil a cloud tenancy on its testbed, with a 10G link for the data network and 1G for the management network.

The cloud tenancy was comprised of 4 virtual machines (VMs). The Baysil application ran on 3 VMs deployed as a Kubernetes cluster, while the last VM ran JMeter simulating up to 700 concurrent users at once. The project also used open source monitoring tool, Prometheus, to measure the performance of the product as the number of simulated users increased.

TESTBED RESULTS

Upon completion, the project was a success. The tenant deployed Baysil application was secure during the testing, allowing only authorized users and organizations to access personal information. This complies with PHIPA and PIPEDA requirements that personal information on the application cannot be collected, used, or disclosed without the patient's consent.

In terms of the health care application itself, Baysil used CENG N's multi-tenant cloud-based environment to validate that it can run in a commercial cloud without downgraded performance.

Lastly, Baysil scaled up to 700 concurrent users without any performance problems, also maintaining all security functionality of the application.

THE CENG N ADVANTAGE

CENG N was the perfect testing environment for Baysil, as their multi-tenant cloud service offering mirrors the same offering found in the main public cloud providers today, with two major distinctions.

First, CENG N's testbed was provided at no cost to Baysil. Secondly, with a premade testing environment, Baysil didn't have to design or develop a plan to test their solution saving valuable time and added costs.

GOING INTO THE MARKET

Baysil will be commercializing their product with the security and privacy proof points necessary to launch under the health sector's strict standards, while at the same time maintaining the functionality to streamline and improve the patient-practitioner relationship.

After completing the project, Baysil has confidence in their application's security, scalability, and functionality on a commercial cloud. They're able to go into the marketplace much faster providing better healthcare software to both practitioners and patients alike.

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