Team: Wrong Tutorial

Project Title: Smooth Delivery

Project Description:

1. **Overview:**

The KKIVF Centre at KK Women's and Children's Hospital is Singapore's largest fertility centre. The organisation faces not just a high volume of traffic but also handles a complex and timing-dependent IVF treatment procedure. Patients in the fertility clinic often feel lost and are unsure of what to do at various steps throughout their treatment. The nature of IVF is also such that patients have many questions for doctors are nurses. This problem is further exacerbated by doctors, nurses and staff possibly being too stretched to answer many enquiries or to provide constant direct assistance.

2. **Solution:**

Our proposed solution is a personalized, AI-enabled chat Assistant that addresses this need by being a companion to the patient throughout the journey of the patient. Each patient would have an AI assistant that is cognizant of the stage of treatment the patient is currently in and pushes timely and relevant information to the patient - for example, information on how and when to administer a self-injection. The guidance provided would be both in and outside the the hospital. This could be particularly useful since briefings from the doctors, nurses or pharmacists may not be well remembered by patients and brochures or handouts detailing the entire treatment procedure would be cumbersome and difficult to read. Furthermore, the nature of IVF is such that it puts patients in an embarrassing position, and using technology will help patients to both understand the journey better and also ask questions that they might otherwise find difficult.

In order to increase accessibility of the assistant to all kinds of users, we have decided to build the assistant such that it will be served over a responsive web chatbot. Given our architecture, this can only easily be integrated with messaging services like Facebook messenger as well.

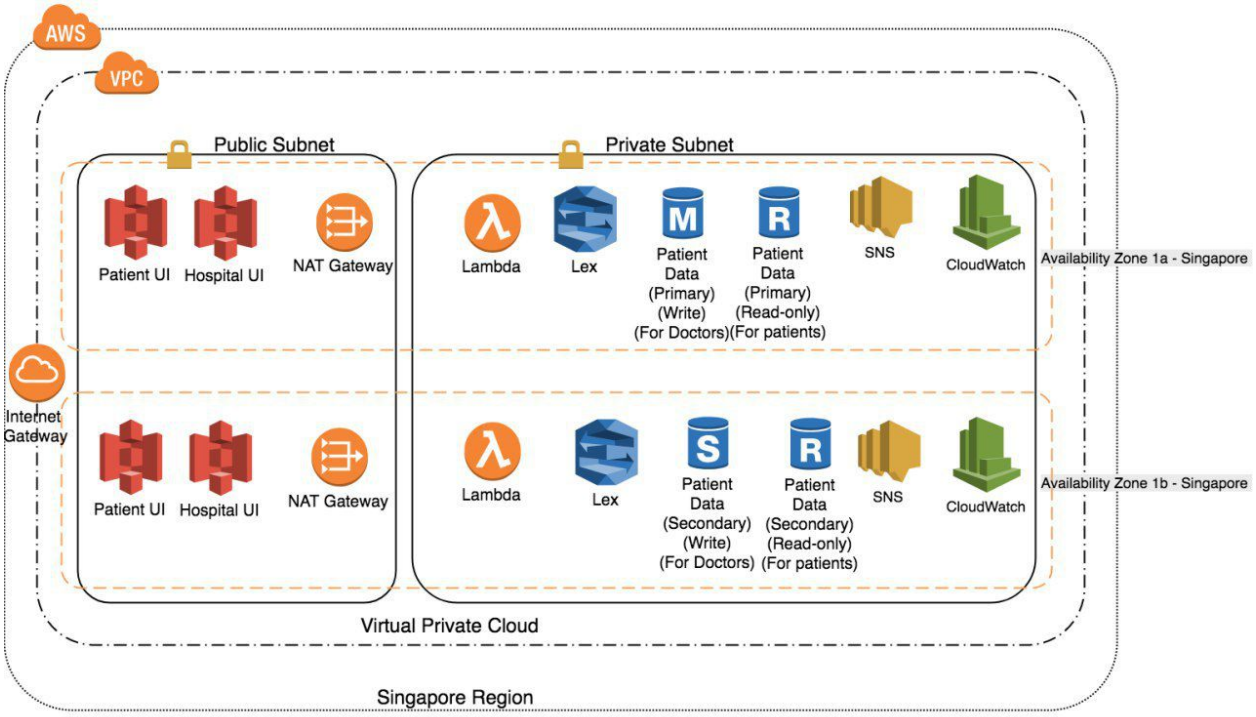
Our patient will also be able to chat in natural language with our assistant at any time to get an answer to whatever enquiries they may have - be it generic enquiries or enquiries specific to the stage of treatment they are in. The assistant can also be augmented with automated speech recognition capabilities and translation capabilities to extend the coverage of the assistant over possible use cases.

As part of providing guidance to patients, another key feature of the assistant would be to also provide indoor navigation assistance between different stages of treatment. For example, after counselling, the next stage of treatment would be to go for scans. The assistant can provide directions or a visual aid of how the patient can get to the next station.

3. Architecture:

The solution is designed to be highly robust. Lambda functions make the application highly scalable. Secure networking with the Virtual Private Cloud and authentication using Cognito ensures the security of sensitive medical information. Backup servers in more than one availability region, combined with auto-replication of the databases and S3 Buckets ensures high availability and reliability of the service and integrity of data. The high-level architectural diagram is shown below.

Figure 3.1: Architecture Diagram



*** Cognito and API Gateway although used in our solution, have been omitted from the diagram.*

4. Implications:

The successful implementation of this platform has massive positive implications for healthcare services. As IVF centre operations are complex, a successful proof-of-concept in such an environment implies that a similar solution and software architecture can be easily applied to other types of clinics. A very crucial point is also that the solution we propose forms a strong foundation that the hospital can leverage to easily extend more features, such as direct communication between counsellors and patients, and an easy way of monitoring services provided to patient, automating billing processes along the way.

5. Appendix:

Figure 5.1: Chart showing interactions between various AWS services while our solution is in use