ECE-GY 9941: Advanced Projects 3, Section BK32 Spring 2021 — Adam Akturin: aa8381
Prof. Amit Patel — Submission date: 09/09/2021

We Offer Wellness

Project purpose

The goal of this project is to learn how to create a robust and functional database system using modern methodologies and tools. I will learn how to create an information management system that consists of an OLTP database, a DW database, a web application, and a set of data analysis tools. Throughout the semester I will be presenting my progress, and at the of the term I will give a presentation on the final version of my project.

Project description

Summary of the project

My project is called "We Offer Wellness" (WOW). WOW is a health information management system, which can be used by hospitals to perform transactions and store important information. WOW will provide the following features:

- Store hospital name, address, specialty, emergency hot-line phone numbers, general inquiry phone numbers, registration and administration phone numbers, department, names, department phone number, and department location (building name and floor)
- Store doctors' names, office phone numbers, personal phone numbers, and specialties. In addition, for full-time doctors, WOW will store the hire date, and the yearly compensation. For consulting doctors, the system will the contract date, contract number, weekly contract rate, minimum weekly hours, and overtime rate/hour.
- Store name, address, phone number, birth date, race, marital status, gender, insurance company name, insurance number, and blood group of each patient. In addition, for each patient WOW will store their name, address, phone number, and relationship of emergency contact person. A patient can have more than one emergency contact person.
- Patient can be in-patient or out-patient. For out-patient, WOW will store the follow-up date, and, for in-patient it will record the bed number, floor, and discharge date.
- Maintain the registration of patients. A patient may have multiple registrations for different treatments. WOW will maintain the registration number and registration date.
- A doctor can treat multiple patients, patients can be created by multiple doctors.
- A doctor can provide treatment for multiple diseases and each disease can be cured by multiple doctors

- For each disease, WOW will store ICD (International Code of Disease), discerption, type of the disease (seasonal, viral, infectious, genetic, deficiency, physiologic, chronic etc.).
- For each treatment provided to patients, WOW will store treatment date, treatment type (Laboratory order, Drug prescription Surgery etc.), treatment result status (Complete, Follow-up or Terminated), and treatment description. For laboratory treatment type, WOW intend to store laboratory name, test type, test date, and test result (positive/ negative/ potential). For drug prescription treatment type, WOW intend to store drug name and dose. For surgery type of the treatment, WOW intend to store name of surgery, description, surgery date, and result (Successful/Unsuccessful). A patient can have more than one type of the treatment.
- When treatment status is marked as Complete or Terminated, WOW generates invoice for each registration. Invoice includes data about invoice number, invoice date, Laboratory Cost (if any), Prescription Drug cost (if any), Surgery cost (if any), Bed usage cost (if any), total cost, bill_to_insurance, and cost_to_patient.
- WOW receives payments from insurance company and patients against each invoice. There may be multiple payments by insurance company or patient again each invoice. For each payment, WOW intend to store payment date, payment amount, payment type (Credit Card, Debit Card, EFT, Check).

Systems involved

The project will have two different database systems of different vendor products. One database will be an Online Transaction Processing System (OLTP), and the other database will be Data Warehouse (DW). There will be a web application interfaced with the OLTP database. My web application will be written using Django, a Python web framework. My project will also have the following technical specifications:

- ETL (Extract, Transform, and Load) database code to load data from OLTP database, transform it matching DW schema design, and then load it to DW database.
- CDC approach (Change Data Capture) for ETL database routine to implement incremental ETL.
- Advanced database features such as External Tables, Partitioned Tables, function base indexes, PL/SQL(procedures, functions, packages, triggers).
- The DW systems will have additional analysis and reporting tools for making business decisions.
- EDI (Electronic Data Interface), and SQL Loader (DB utility for loading data to database from a text file).
- Role based database security management.
- Data movement utilities (exports/import, SQL Loader etc.) will be implemented.
- Data analysis tools with visualization, such as Tableau, or ClickView, will be implemented.
- My database application will be deployed on AWS.