DAMG 6210 Elevator Management Database

Database Specification: Purpose, Business Problems Addressed and Business Rules

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Database Purpose:

The purpose of the system is to design and implement a database that maintains a coherent and consistent record of client data. This implementation aims to challenge traditional techniques, introduce sales pipelines, and track accurate business KPIs while maintaining all the cornerstones of database design, allowing the organization to avoid duplication of the client data and generate sales and revenue insights. The database will be used by the Otis Worldwide organization to track the elevator sales and callbacks requested by their customers.

Business Problems Addressed:

- Allow Otis Elevators administrative, marketing, and sales staff to generate descriptive reports.
- Implement callback (complaints) registering pipeline for under-contract units to capture critical product insights.
- Implement system-generated maintenance job pipeline for under-contract units based on contract level agreements.
- Implement YTD revenue pipeline for all commercial contracts and their service-level-agreements.
- Generate insights through complex sales pipelines for analyzing business KPIs for targeted marketing initiatives.
- Allow sales staff to anticipate concession and merchandise inventory needs for different demographics.

Business Rules:

- Each contract will have one customer
- Each contract will have one sales representative
- Each contract will have one or more units
- Each callback will have one unit
- Each callback will have one employee (mechanic)
- Each callback will have one route
- Every maintenance job is system-generated
- Every maintenance job will have one unit number
- Every maintenance job will have one employee (mechanic)
- Every maintenance job will have one route
- Every unit will have one product
- Every unit may or may not be active
- Every unit will only have one building
- Each building will be assigned to one route
- Every building may have one or more units

- Each route will be assigned to one territory
- Every route may have one or more buildings
- Each territory will be assigned to one region
- Every territory may have one or more routes
- Each region will be assigned to one country
- Every region may have one or more territories
- Every country may have one or more region
- Each person may either be a customer or employee
- Every customer will have one company
- Every employee will have one company
- Every customer will have one or more user
- Every employee will have one or more user
- Every employee will have one role
- Every user will have one person (customer or employee)
- Every organization will have one or more companies
- Every company will have one or more employee
- Every company will have one or more customer

Design Requirements (Credit to Professor Simon Wang):

- Use Crow's Foot Notation.
- Specify the primary key fields in each table by specifying PK beside the fields.
- Draw a line between the fields of each table to show the relationships between each table. This line should be pointed directly to the fields in each table that are used to form the relationship.
- Specify which table is on the one side of the relationship by placing a one next to the field where the line starts.
- Specify which table is on the many side of the relationship by placing a crow's feet symbol next to the field where the line ends.

Design Decisions:

Entity Name	Why Entity Included	How Entity is Related to Other Entities
Person	The Person entity is the key entity of the database where all employees and customers will be stored.	The Person entity is related to the Employee and Customer entities through identifying relationships. A person can either be an Employee or a Customer.
Employee	Employee of the OTIS company is a person who represents the company. An employee is designated with different roles. Based on its role, an Employee can handle callback requests or approve price negotiations resp.	The Employee entity is directly related to the Person entity. It is also related to the Company entity.
Customer	Customer Entity is a part of a company who is purchaser of the various products sold by OTIS.	Customer is related to a company and the sale which is finalized. Customer also has a user associated with it.
UserDetails	UserDetails Entity can be a customer, employee of the company. User Entity will be used to store the credentials along with the person (customer or employee) id.	UserDetails entity is related to a customer or an employee entity.
Role	Role Entity is used to define different roles which would help to differentiate the role and position of the employee.	Role is related to employee entities to differentiate between them.
Organization	Organization is an abstract/physical entity which will host multiple companies. Organization entity is also used to compute country-level KPI, reports and YTD revenue reports	Organization is only related to a company.
Company	Company is the critical physical entity which will capture & link different entities of sale, employee, customer, callback & maintenance job.	Company is related to sales, employees, customers, callback & maintenance jobs.
Product	The Product entity provides details of the products and its types which are manufactured by OTIS.	The Product entity is related to the unit.
ProductType	ProductType entity is used as lookup entity for identifying the type of the associated product	ProductType entity is related to Product
Sale	Sales Entity will have details about the total sales of the elevators sold by the respective company.	Sales entity is related to the Employee and Customer entity. It will be also related to the Unit entity
Unit	Unit is a physical entity which is derived from a product (eg. a *Elevator* product which is installed in a building get converted to a *physical* unit)	Unit is related to a building, sale and product entities
Callback	Callback Entity will provide details about the complaints raised by the customer and it will be handled by the employees of the company.	Callback entity will be managed by the Employee entity. It will record the details of the Unit and Route entities.
MaintenanceJobs	Maintenance Job would be system-generated based on the Sale level agreement defined the visit frequency for the unit	Maintenance Job is related to route, unit and employee (mechanic)
Building	Building entity is used as a dimension entity for fine-grained analysis for callback reports generation, sales & maintenance job revenue analysis. It is also used to convert the logical entity of a product into a physical entity unit.	Building entity is related to the Unit entity where it will locate the Unit in the building, it is also related to the route entity which will allow to locate the route of the building

Route	Route entity is used as a dimension entity for fine-grained analysis for callback reports generation, contract & maintenance job revenue analysis. It is also used for automated maintenance job creation and callback dispatching	Route entity will be related to the Building entity. It will be also related to the Callback and MaintenanceJobs entities which will ensure proper
Territory	Territory is used in the Sales pipeline, where a Sales Rep will be assigned to a territory and manage every sale finalized by them. It can also be used in territory level callback reports generation, sales & maintenance job revenue analysis.	Territory entity will be directly related to the Route entity.
Region	Region is used in price negotiation and credit limit, where a branch manager will be assigned to a region and would approve any contract agreements & price negotiations.	Region entity is related to the Territory and Country entities to track the Units, it will also be related to the Company entity as a Company will be managing a single region.
Country	Country is used to associate any created organization. It can also be used for country level callback report analysis and sales & revenue streams. Country Entity which will have details of the country from where the callbacks / complaints are received. It will store the country name and country code.	Country entity is related to the Region entity.
Gender	Gender entity is used to store gender role for any assigned person	Gender entity is related to the Person entity
Status	Status entity is used to correctly mark the job status of either a callback & maintenance jobs	Status entity is related to Callback & Maintenance Job entity

Changes/ Revisions:

Date	Topic	Revision	Author
11/17/2022	Project Database Design Feedback	1. Last name added to Person entity 2. Middle name removed from Person entity	Akshita Barot Aniruddha Tambe Foram Bhatt Kinjal Thakkar Siddhant Kohli
12/8/2022	Updated design document: Added new support entities	1. Gender entity 2. Status entity 3. Product Type	Aniruddha Tambe Kinjal Thakkar