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Functional Requirements Description (Revision 2)

Purpose: This document maintains the current business description, EERD, and business rules for the Database Development Project. Updates from previous revisions are provided in BLUE typeface for ease of reading.

Moving forward, this document constitutes the baseline for future submissions and assignments and its contents shall be included as appendices, as appropriate.

Short Company Description
For greater professional flexibility, the student will establish a consulting company -hereafter referred to as Risk Insights- to advise its clients on matters related to establishing threat analysis programs and analytic tradecraft. Risk Insights shall accomplish this by leveraging the owner's knowledge, skills, abilities, and contacts developed over 25 years experience in the public and private sectors to help prospective clients ascertain whether or not they require a program of analysis to evaluate risks -other than cyber- to their organization.

Database Rationale
As Risk Insights is not anticipated to generate revenue during the first few years of operation, the business functions shall be designed to maximize efficiency so as to not require additional headcount. Further, such functions shall be designed to support their scaling in the future. It is for that reason, a tailored database ('The Database') design was selected to hold data related to prospective and actual clients that would support functions, such as lead management; client requirements development; and visualizing staff portfolios.[1]

Business Rules / Requirements Description
The database supporting Risk Insights ('The Company') shall capture business leads in a deliberate manner. The company will engage some leads as business development contacts. Separately, the company seeks to convert some contacts to customers.

- The information initially captured shall be limited to high-level details regarding the business entity (who) so that future conversations may be had, should both parties continue the dialog.
- Should both parties begin their dialog about company services and potential client needs, the company shall capture details about these discussions. The information captured regarding a lead shall include the previously captured information as well as a journal log of contact interaction.
- When it is determined that the company possesses the capabilities to satisfy requirements that a business entity -which is captured as a lead- seeks to satisfy, the company shall capture those details as a client. The information captured regarding a client shall include previously captured information as well as specific details that facilitate the company and the client engaging in legitimate commerce.

- *All customers will be initially logged as contacts using customer code 1. As a customer progresses to a lead, and ultimately a client, their customer code shall be updated to either a 02 or 03, respectively. At any point in the process, a customer contact may be closed by coding the customer as 4.*

For each client, the company shall have an overarching project plan that encompasses the scope of work that the company performs for the client.
- Project plans shall actively be managed by an employee of the company.
- The overall plan will be decomposed into discrete tasks that company employees can accomplish.
- A project plan will only align to one customer, but a customer may have more than one plan. In this way, the company shall be able to reasonably manage the scope of any project plan for a customer.
- The specific structured details about the plan that will be captured in the database are to-be-defined, which are abbreviated as plan details.
- Plans shall be either Active (ACT) or Closed (CLS).

The Company shall have employees that service the business needs of its clients.
- An employee can support the business needs of a customer in differing ways that may include serving as a project manager or completing discrete tasks that support a larger project plan.
- As this database instance is customer centric, it is not meant to support other functions, such as timekeeping or payroll. As such, only the to-be-defined employee details related to customer support, which are abbreviated as employee details.
- To support future scalability, not every employee will work on customer related tasks.
- Each project plan shall have one and only one company employee designated as the project manager.
- Before an employee concludes their service with the company, all of their incomplete tasks shall be turned over to other employees. However, completed tasks by a departing employee shall remain aligned to that employee for archival purposes.
- Each employee shall be assigned a numerical code code of either 1 (active) or 0 (not active).

For purposes of efficiency, project plans shall be subdivided into tasks that are accomplished by employee
- To improve customer experience, details related to the accomplishment of tasks shall be captured.
- Company employees can support many tasks across different project plans.
- Task types may include, but are not limited to,

Task Type	Task Code
Requirements Analysis	RQMT
Engineering Services	ENG
Research and Development	RnD
Analysis and Production	AnP

- Task status can include not started (NST), in-progress (INP), or complete (CMP)
- Document types shall conform to the ISO conventions for files

To better capture the actual work accomplished by any employee, work that is accomplished on any task shall be captured in a work log.

- The business rule acknowledges the potential necessity for different employees to complete specific and unique work that support just one task.
- This log shall contain references to both the task being worked on, the employee completing the work, and specific details on the work being accomplished.
- The specific attributes to be captured shall be refined at a future date.

As much of what Risk Insights delivers is knowledge-based, the Company anticipates the majority of deliverables required to accomplish tasks shall be documents.

- Each created document can satisfy, in whole or part, a task aligned to a project plan.
- The document table shall store summary details about the actual document itself, such as its status (draft/final), type (document, briefing slides, spreadsheet, etc), and a short description.
- To simplify database design, the database shall store a file path or link to the actual document and not the document itself.
- Document status can include not started (NST), in-progress (INP), or complete (CMP)

Detailed Business Rule Explanation

Entity Overview: Based on the requirements stated above five initial entities are envisioned for the Database: CUSTOMER, PLAN, EMPLOYEE, TASK, WORK_LOG,and DOCUMENT. Appendix A provided depictions of these entities.

- None of the entities described are weak and will all have primary keys.
- Initial attributes are from the requirements description.
- Value sets and non-relational attributes will be further refined in subsequent design documents.
- Though the value sets (data types) are to-be-determined, no requirement exists yet for composite or multivalued attributes. As such, all attributes will almost certainly be simple.

Relationship Overview:

Through requirements analysis, the relationship between the different types of customers shall be modelled as a super/subtype inheritance relationship, that are further described below

- The subgroupings of customers are LEAD, CONTACT, and CLIENT. Each subentity inherits the CUSTOMER attributes. Through a customer_code attribute the status of the customer development shall be maintained and additional facets unique to the client captured as attributes.
- Disjointness. The disjointness relationship between CUSTOMER and CONTACT, LEAD, and CLIENT is overlapping since every CUSTOMER is a least a LEAD and at different points CONTACT and, ultimately, a CLIENT
- Completeness. The relationship between CUSTOMER and CONTACT, LEAD, and CLIENT is total, meaning that every CUSTOMER is at least LEAD.

Through requirements analysis, five relationship types are identified: *supported_with*, *serves as*, *breakdown into*, *works*, *completes,* and *deliverable*. All relationships between entities are binary (degree = 2). The participating entities for each relationship type -as well as a further detailed description of the relationship are listed below.

- Supported_with (between CUSTOMER, PLAN)
  - The cardinality ratio of this relationship is one-to-many (1:M), because while each plan can only refer to a specific customer; a customer could be supported by multiple plans.
  - Since separate tables are not being created for leads and customers, the minimum participation in this relationship is zero, because plans are only developed for customers and not leads.
- Serves_as (between PLAN, EMPLOYEE)
  - The cardinality ratio of this relationship is one-to-one (1:1), because the business rules stipulate that a customer's project plan shall have one, and only one, employee designated at the Project Manager.
  - This relationship has a mandatory, existence dependent relationship, because project plans are required to have an employee assigned as project manager.
- Breakdown_into (between PLAN, TASK)
  - The cardinality ratio of this relationship is one-to-many (1:M), because a task will be a component of one, and only one, plan; however, a plan may be subdivided into many unique tasks.
  - Since every plan will have at least one task, this relationship is mandatory (existence-dependent).
- Work (between EMPLOYEE, TASK)
  - The cardinality ratio of this relationship is one-to-many (1:M), because while each employee can log multiple work actions supporting different tasks, every work log entry can only be accomplished by one employee.
  - Since both tasks and employees must exist and work assigned before making log entries, this strong relationship is mandatory (existence-dependent).
- Completes (between WORK_LOG, TASK)
  - The cardinality ratio of this relationship is one-to-many (1:M), because while a task likely requires multiple work log entries that result in task completion, every work log entry only supports one task.

    - Since both tasks and employees must exist and work assigned before making log entries, this strong relationship is mandatory (existence-dependent).
- Deliverable (between TASK, DOCUMENT)
    - The cardinality ratio of this relationship is one to many, because each document shall be aligned to wholly, or in part, satisfy a requirement within a task; however a task may require the preparation of multiple documents.
    - Since a task may not necessarily require the preparation of a document to complete the task, the minimum participation in this relationship is zero.

Due to the iterative development process employed, no attributes at this time were refined into relationships. Though no recursive relationship requirements were identified, the design does support their addition in the future should scaling requirements dictate. It is probable that attributes may be added to relationships in the future as the database design is refined.

Fully-labeled ERD: See Appendix A. This EERD was updated on April 1 to include data types and constraints.

References

1. Veloxity. “CRM FOR CONSULTING FIRMS – WHY IS IT IMPORTANT?,” May 21, 2021. https://www.veloxity.com/crm-for-consulting-firms-why-is-it-important/.
2. Elmasri, Ramez, and Shamkant Navathe. Fundamentals of Database Systems. 7th ed. Pearson, 2015.
3. Casteel, Joan. Oracle 12c: SQL. 3rd ed. Cengage Learning, 2015.

AIT-524 / DL1: Revised EERD (Module 5.2)
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CHECK Constraints: ending dates within tables must be after starting dates; customer codes may only be 00, 01, 02, or 03.
UNIQUE The only anticipated 'unique' data element outside of primary keys is the clients EIN
Per Oracle Docs, all attributes in sub/supertype design must be NOT NULL