Asante LLC Database Development Project

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Old Dominion University

IT450: Database Concepts

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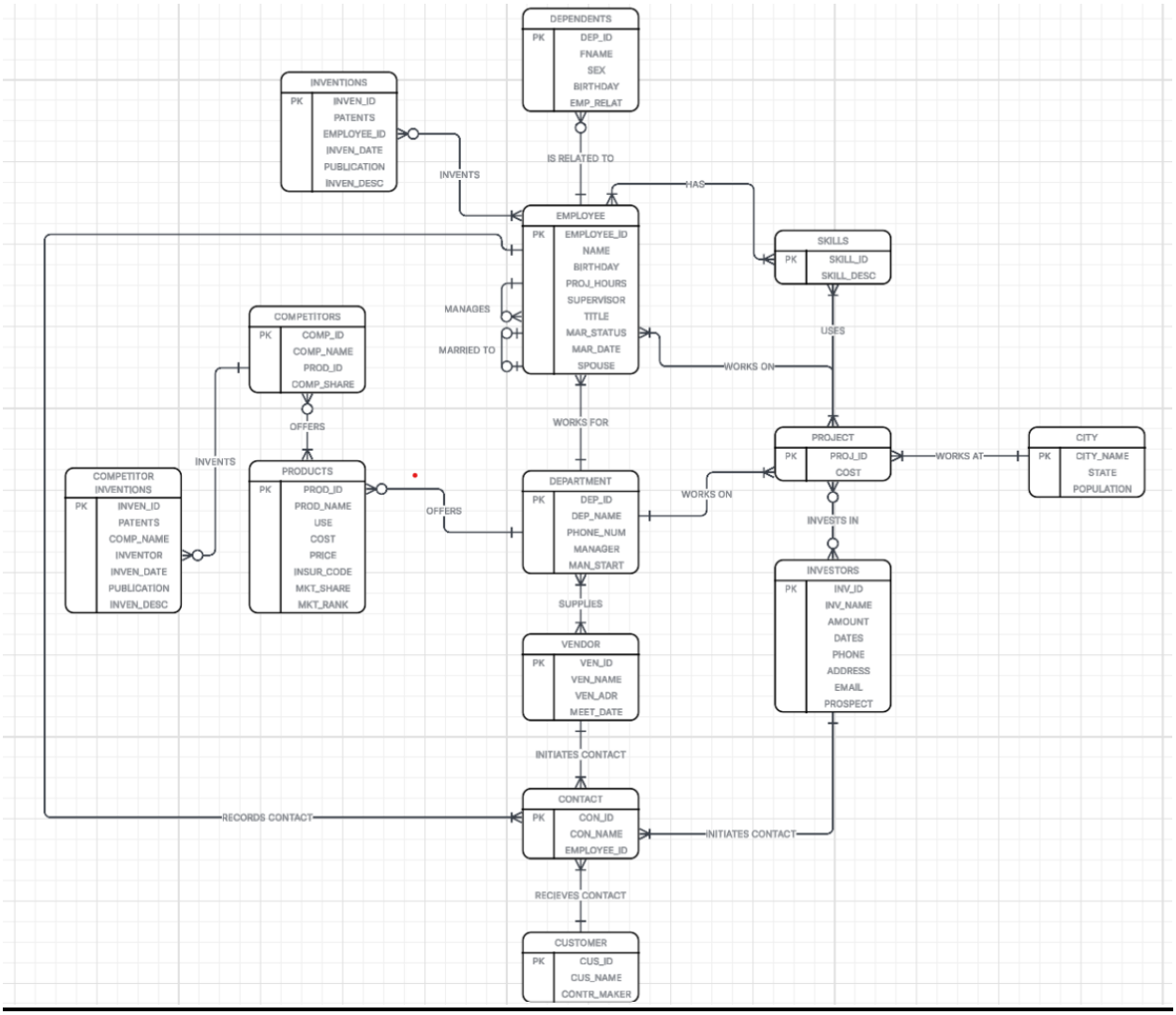
Data

Overview

Creating this database for Asante LLC was of utmost importance. We wanted to adhere to the business rules required by Asante LLC, such as identifying which employees work for which departments, as well as which projects are supervised by specific managers. The purpose of this project is to specify what is required for a database for Asante to be performative, without it being redundant or confusing because of the various entities involved.

The needs of the database are as follows: making sure that specific employees are identifiable by department and by the projects they are working on, along with knowing which investors are attached to each project, etc. The expected benefits of the project are outlining all the moving parts of Asante and making it easier to understand for database managers, while also allowing Asante to stay aware of the many components of their business.

Initial ERD



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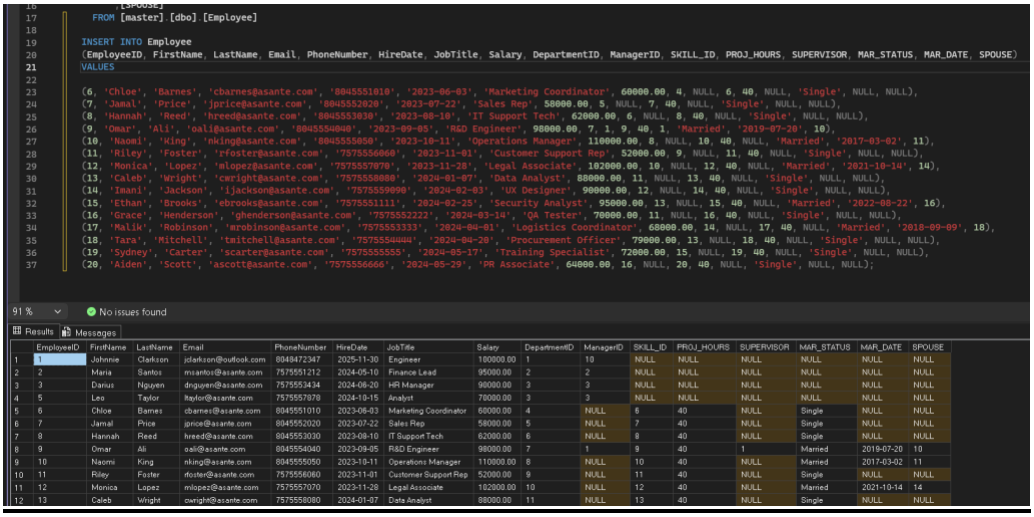
Normalization Process (Jaylen Hill)

```
CREATE TABLE CITY(
    CITY_NAME VARCHAR(50) PRIMARY KEY,
    STATE VARCHAR(50),
    POPULATION INT
);

CREATE TABLE INVESTORS(
    INV_ID INT PRIMARY KEY,
    INV_NAME VARCHAR(50),
    AMOUNT DECIMAL(10, 2),
    DATES DATE,
    PHONE VARCHAR(25),
    ADDR VARCHAR(50),
    EMAIL VARCHAR(50),
    PROSPECT VARCHAR(50)
);

CREATE TABLE SKILLS(
    SKILL_ID INT PRIMARY KEY,
    SKILL_DESC VARCHAR(50)
);

CREATE TABLE DEPARTMENT(
    DEPT_ID INT PRIMARY KEY,
    DEP_NAME VARCHAR(50),
    PHONE_NUM VARCHAR(25),
    MANAGER INT,
    MANL_START DATE
);

CREATE TABLE EMPLOYEE(
    EMPLOYEE_ID INT PRIMARY KEY,
    NAME VARCHAR(50),
    BIRTHDAY DATE,
    PROJ_HOURS INT,
    SUPERVISOR INT,
    TITLE VARCHAR(50),
```

```
    MAR_STATUS VARCHAR(20),
    MAR_DATE DATE,
    SPOUSE INT,
    DEP_ID INT,
    SKILL_ID INT,
    PROJ_ID INT
);

CREATE TABLE DEPENDENTS(
    DEP_ID INT PRIMARY KEY,
    FNAME VARCHAR(50),
    SEX VARCHAR(10),
    BIRTHDAY DATE,
    EMP_RELAT VARCHAR(50),
    EMPLOYEE_ID INT,
    FOREIGN KEY (EMPLOYEE_ID) REFERENCES EMPLOYEE(EMPLOYEE_ID)
);

CREATE TABLE PROJECT(
    PROJ_ID INT PRIMARY KEY,
    COST DECIMAL(10,2),
    CITY_NAME VARCHAR(50),
    INV_ID INT,
    FOREIGN KEY (CITY_NAME) REFERENCES CITY(CITY_NAME),
    FOREIGN KEY (INV_ID) REFERENCES INVESTORS(INV_ID)
);

CREATE TABLE VENDOR(
    VEN_ID INT PRIMARY KEY,
    VEN_NAME VARCHAR(50),
    VEN_ADDR VARCHAR(200),
    MEET_DATE DATE
);

CREATE TABLE CONTACT(
    CON_ID INT PRIMARY KEY,
    CON_NAME VARCHAR(50),
    EMPLOYEE_ID INT,
    VEN_ID INT,
    FOREIGN KEY (EMPLOYEE_ID) REFERENCES EMPLOYEE(EMPLOYEE_ID),
```

```
    FOREIGN KEY (VEN_ID) REFERENCES VENDOR(VEN_ID)
);

CREATE TABLE CUSTOMER(
    CUS_ID INT PRIMARY KEY,
    CUS_NAME VARCHAR(50),
    CONTR_MAKER VARCHAR(50)
);

CREATE TABLE PRODUCTS(
    PROD_ID INT PRIMARY KEY,
    PROD_NAME VARCHAR(50),
    USAGE VARCHAR(50),
    COST DECIMAL(10, 2),
    PRICE DECIMAL(10, 2),
    INSUR_CODE INT,
    MKT_SHARE VARCHAR(50),
    MKT_RANK INT
);

CREATE TABLE COMPETITORS(
    COMP_ID INT PRIMARY KEY,
    COMP_NAME VARCHAR(50),
    PROD_ID INT,
    COMP_SHARE VARCHAR(50),
    FOREIGN KEY (PROD_ID) REFERENCES PRODUCTS(PROD_ID)
);

CREATE TABLE INVENTIONS(
    INVEN_ID INT PRIMARY KEY,
    PATENTS VARCHAR(50),
    EMPLOYEE_ID INT,
    INVEN_DATE DATE,
    PUBLICATION VARCHAR(50),
    INVEN_DESC VARCHAR(50),
    FOREIGN KEY (EMPLOYEE_ID) REFERENCES EMPLOYEE(EMPLOYEE_ID)
);

CREATE TABLE COMPETITOR_INVENTIONS(
    INVEN_ID INT PRIMARY KEY,
```

```
    PATENTS VARCHAR(50),
    COMP_NAME VARCHAR(50),
    INVENTOR VARCHAR(50),
    INVEN_DATE DATE,
    PUBLICATION_DATETIME,
    INVEN_DESC VARCHAR(50)
);

ALTER TABLE EMPLOYEE
ADD FOREIGN KEY (SUPERVISOR) REFERENCES EMPLOYEE(EMPLOYEE_ID);

ALTER TABLE EMPLOYEE
ADD FOREIGN KEY (SPOUSE) REFERENCES EMPLOYEE(EMPLOYEE_ID);

ALTER TABLE EMPLOYEE
ADD FOREIGN KEY (DEP_ID) REFERENCES DEPARTMENT(DEPT_ID);

ALTER TABLE EMPLOYEE
ADD FOREIGN KEY (SKILL_ID) REFERENCES SKILLS(SKILL_ID);

ALTER TABLE EMPLOYEE
ADD FOREIGN KEY (PROJ_ID) REFERENCES PROJECT(PROJ_ID);

ALTER TABLE DEPARTMENT
ADD FOREIGN KEY (MANAGER) REFERENCES EMPLOYEE(EMPLOYEE_ID);
```

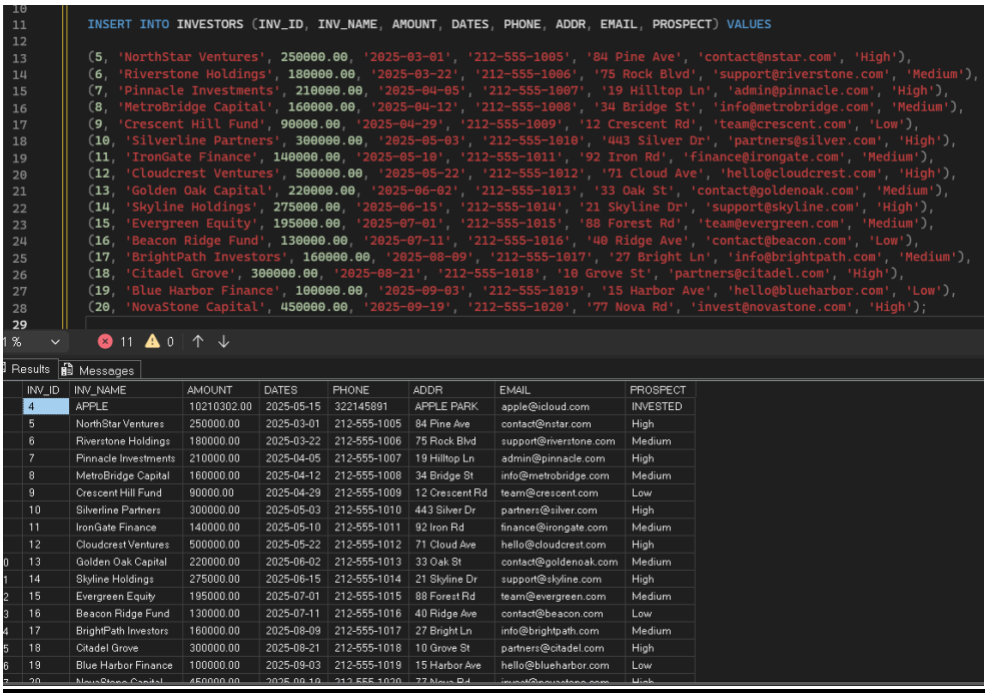


```
    [SPOUSE]
  FROM [master].[dbo].[Employee]

INSERT INTO Employee
(EmployeeID, FirstName, LastName, Email, PhoneNumber, HireDate, JobTitle, Salary, DepartmentID, ManagerID, SKILL_ID, PROJ_HOURS, SUPERVISOR, MAR_STATUS, MAR_DATE, SPOUSE)
VALUES

(6, 'Chloe', 'Barnes', 'cbarnes@asante.com', '8045551010', '2023-06-03', 'Marketing Coordinator', 60000.00, 4, NULL, 6, 40, NULL, 'Single', NULL, NULL),
(7, 'Jamal', 'Price', 'jprice@asante.com', '8045552020', '2023-07-22', 'Sales Rep', 58000.00, 5, NULL, 7, 40, NULL, 'Single', NULL, NULL),
(8, 'Hannah', 'Reed', 'hreed@asante.com', '8045553030', '2023-08-10', 'IT Support Tech', 62000.00, 6, NULL, 8, 40, NULL, 'Single', NULL, NULL),
(9, 'Omar', 'Ali', 'oali@asante.com', '8045554040', '2023-09-05', 'R&D Engineer', 98000.00, 7, 1, 9, 40, 1, 'Married', '2019-07-20', 10),
(10, 'Naomi', 'King', 'nking@asante.com', '8045555050', '2023-10-11', 'Operations Manager', 110000.00, 8, NULL, 10, 40, NULL, 'Married', '2017-03-02', 11),
(11, 'Riley', 'Foster', 'rfoster@asante.com', '7575556060', '2023-11-01', 'Customer Support Rep', 52000.00, 9, NULL, 11, 40, NULL, 'Single', NULL, NULL),
(12, 'Monica', 'Lopez', 'mlopez@asante.com', '7575557070', '2023-11-28', 'Legal Associate', 102000.00, 10, NULL, 12, 40, NULL, 'Married', '2021-10-14', 14),
(13, 'Caleb', 'Wright', 'cwright@asante.com', '7575558080', '2024-01-07', 'Data Analyst', 88000.00, 11, NULL, 13, 40, NULL, 'Single', NULL, NULL),
(14, 'Imani', 'Jackson', 'ijackson@asante.com', '7575559090', '2024-02-03', 'UX Designer', 90000.00, 12, NULL, 14, 40, NULL, 'Single', NULL, NULL),
(15, 'Ethan', 'Brooks', 'ebrooks@asante.com', '7575551111', '2024-02-25', 'Security Analyst', 95000.00, 13, NULL, 15, 40, NULL, 'Married', '2022-08-22', 16),
(16, 'Grace', 'Henderson', 'ghenderson@asante.com', '7575552222', '2024-03-14', 'QA Tester', 70000.00, 11, NULL, 16, 40, NULL, 'Single', NULL, NULL),
(17, 'Malik', 'Robinson', 'mrobinson@asante.com', '7575553333', '2024-04-01', 'Logistics Coordinator', 68000.00, 14, NULL, 17, 40, NULL, 'Married', '2018-09-09', 18),
(18, 'Tara', 'Mitchell', 'tmitchell@asante.com', '7575554444', '2024-04-20', 'Procurement Officer', 79000.00, 13, NULL, 18, 40, NULL, 'Single', NULL, NULL),
(19, 'Sydney', 'Carter', 'scarter@asante.com', '7575555555', '2024-05-17', 'Training Specialist', 72000.00, 15, NULL, 19, 40, NULL, 'Single', NULL, NULL),
(20, 'Aiden', 'Scott', 'ascott@asante.com', '7575556666', '2024-05-29', 'PR Associate', 64000.00, 16, NULL, 20, 40, NULL, 'Single', NULL, NULL);
```

91 % No issues found

Results Messages

	EmployeeID	FirstName	LastName	Email	PhoneNumber	HireDate	JobTitle	Salary	DepartmentID	ManagerID	SKILL_ID	PROJ_HOURS	SUPERVISOR	MAR_STATUS	MAR_DATE	SPOUSE
1	1	Johnnie	Clarkson	jclarkson@outlook.com	8048472347	2025-11-30	Engineer	100000.00	1	10	NULL	NULL	NULL	NULL	NULL	NULL
2	2	Maria	Santos	msantos@asante.com	7575551212	2024-05-10	Finance Lead	95000.00	2	2	NULL	NULL	NULL	NULL	NULL	NULL
3	3	Darius	Nguyen	dnguyen@asante.com	7575553434	2024-08-20	HR Manager	90000.00	3	3	NULL	NULL	NULL	NULL	NULL	NULL
4	5	Leo	Taylor	ltaylor@asante.com	7575557878	2024-10-15	Analyst	78000.00	3	3	NULL	NULL	NULL	NULL	NULL	NULL
5	6	Chloe	Barnes	cbarnes@asante.com	8045551010	2023-06-03	Marketing Coordinator	60000.00	4	NULL	6	40	NULL	Single	NULL	NULL
6	7	Jamal	Price	jprice@asante.com	8045552020	2023-07-22	Sales Rep	58000.00	5	NULL	7	40	NULL	Single	NULL	NULL
7	8	Hannah	Reed	hreed@asante.com	8045553030	2023-08-10	IT Support Tech	62000.00	6	NULL	8	40	NULL	Single	NULL	NULL
8	9	Omar	Ali	oali@asante.com	8045554040	2023-09-05	R&D Engineer	98000.00	7	1	9	40	1	Married	2019-07-20	10
9	10	Naomi	King	nking@asante.com	8045555050	2023-10-11	Operations Manager	110000.00	8	NULL	10	40	NULL	Married	2017-03-02	11
10	11	Riley	Foster	rfoster@asante.com	7575556060	2023-11-01	Customer Support Rep	52000.00	9	NULL	11	40	NULL	Single	NULL	NULL
11	12	Monica	Lopez	mlopez@asante.com	7575557070	2023-11-28	Legal Associate	102000.00	10	NULL	12	40	NULL	Married	2021-10-14	14
12	13	Caleb	Wright	cwright@asante.com	7575558080	2024-01-07	Data Analyst	88000.00	11	NULL	13	40	NULL	Single	NULL	NULL



```
INSERT INTO INVESTORS (INV_ID, INV_NAME, AMOUNT, DATES, PHONE, ADDR, EMAIL, PROSPECT) VALUES

(5, 'NorthStar Ventures', 250000.00, '2025-03-01', '212-555-1005', '84 Pine Ave', 'contact@nstar.com', 'High'),
(6, 'Riverstone Holdings', 180000.00, '2025-03-22', '212-555-1006', '75 Rock Blvd', 'support@riverstone.com', 'Medium'),
(7, 'Pinnacle Investments', 210000.00, '2025-04-05', '212-555-1007', '19 Hilltop Ln', 'admin@pinnacle.com', 'High'),
(8, 'MetroBridge Capital', 160000.00, '2025-04-12', '212-555-1008', '34 Bridge St', 'info@metrobridge.com', 'Medium'),
(9, 'Crescent Hill Fund', 90000.00, '2025-04-29', '212-555-1009', '12 Crescent Rd', 'team@crescent.com', 'Low'),
(10, 'Silverline Partners', 300000.00, '2025-05-03', '212-555-1010', '443 Silver Dr', 'partners@silver.com', 'High'),
(11, 'IronGate Finance', 140000.00, '2025-05-10', '212-555-1011', '92 Iron Rd', 'finance@irongate.com', 'Medium'),
(12, 'Cloudcrest Ventures', 500000.00, '2025-05-22', '212-555-1012', '71 Cloud Ave', 'hello@cloudcrest.com', 'High'),
(13, 'Golden Oak Capital', 220000.00, '2025-06-02', '212-555-1013', '33 Oak St', 'contact@goldenoak.com', 'Medium'),
(14, 'Skyline Holdings', 275000.00, '2025-06-15', '212-555-1014', '21 Skyline Dr', 'support@skyline.com', 'High'),
(15, 'Evergreen Equity', 195000.00, '2025-07-01', '212-555-1015', '88 Forest Rd', 'team@evergreen.com', 'Medium'),
(16, 'Beacon Ridge Fund', 130000.00, '2025-07-11', '212-555-1016', '40 Ridge Ave', 'contact@beacon.com', 'Low'),
(17, 'BrightPath Investors', 160000.00, '2025-08-09', '212-555-1017', '27 Bright Ln', 'info@brightpath.com', 'Medium'),
(18, 'Citadel Grove', 300000.00, '2025-08-21', '212-555-1018', '10 Grove St', 'partners@citadel.com', 'High'),
(19, 'Blue Harbor Finance', 100000.00, '2025-09-03', '212-555-1019', '15 Harbor Ave', 'hello@blueharbor.com', 'Low'),
(20, 'NovaStone Capital', 450000.00, '2025-09-19', '212-555-1020', '77 Nova Rd', 'invest@novastone.com', 'High');
```

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Results Messages

	INV_ID	INV_NAME	AMOUNT	DATES	PHONE	ADDR	EMAIL	PROSPECT
	4	APPLE	10210302.00	2025-05-15	322145891	APPLE PARK	apple@icloud.com	INVESTED
	5	NorthStar Ventures	250000.00	2025-03-01	212-555-1005	84 Pine Ave	contact@nstar.com	High
	6	Riverstone Holdings	180000.00	2025-03-22	212-555-1006	75 Rock Blvd	support@riverstone.com	Medium
	7	Pinnacle Investments	210000.00	2025-04-05	212-555-1007	19 Hilltop Ln	admin@pinnacle.com	High
	8	MetroBridge Capital	160000.00	2025-04-12	212-555-1008	34 Bridge St	info@metrobridge.com	Medium
	9	Crescent Hill Fund	90000.00	2025-04-29	212-555-1009	12 Crescent Rd	team@crescent.com	Low
	10	Silverline Partners	300000.00	2025-05-03	212-555-1010	443 Silver Dr	partners@silver.com	High
	11	IronGate Finance	140000.00	2025-05-10	212-555-1011	92 Iron Rd	finance@irongate.com	Medium
	12	Cloudcrest Ventures	500000.00	2025-05-22	212-555-1012	71 Cloud Ave	hello@cloudcrest.com	High
0	13	Golden Oak Capital	220000.00	2025-06-02	212-555-1013	33 Oak St	contact@goldenoak.com	Medium
1	14	Skyline Holdings	275000.00	2025-06-15	212-555-1014	21 Skyline Dr	support@skyline.com	High
2	15	Evergreen Equity	195000.00	2025-07-01	212-555-1015	88 Forest Rd	team@evergreen.com	Medium
3	16	Beacon Ridge Fund	130000.00	2025-07-11	212-555-1016	40 Ridge Ave	contact@beacon.com	Low
4	17	BrightPath Investors	160000.00	2025-08-09	212-555-1017	27 Bright Ln	info@brightpath.com	Medium
5	18	Citadel Grove	300000.00	2025-08-21	212-555-1018	10 Grove St	partners@citadel.com	High
6	19	Blue Harbor Finance	100000.00	2025-09-03	212-555-1019	15 Harbor Ave	hello@blueharbor.com	Low
7	20	NovaStone Capital	450000.00	2025-09-19	212-555-1020	77 Nova Rd	invest@novastone.com	High

```
(2, 'Python Programming'),
(3, 'Database Management'),
(4, 'Java Development'),
(5, 'Network Troubleshooting'),
(6, 'Cybersecurity Analysis'),
(7, 'Technical Writing'),
(8, 'Customer Service'),
(9, 'Data Visualization'),
(10, 'Cloud Computing'),
(11, 'Project Management'),
(12, 'Quality Assurance'),
(13, 'UX/UI Design'),
(14, 'System Administration'),
(15, 'Financial Modeling'),
(16, 'Server Maintenance'),
(17, 'Mobile App Development'),
(18, 'Machine Learning Basics'),
(19, 'Business Analysis'),
(20, 'IT Help Desk Support');
```

91 % No issues found

Results Messages

	SKILL_ID	SKILL_DESC
1	2	Python Programming
2	3	Database Management
3	4	Java Development
4	5	Network Troubleshooting
5	6	Cybersecurity Analysis
6	7	Technical Writing
7	8	Customer Service
8	9	Data Visualization
9	10	Cloud Computing
10	11	Project Management
11	12	Quality Assurance
12	13	UX/UI Design
13	14	System Administration
14	15	Financial Modeling
15	16	Server Maintenance
16	17	Mobile App Development

```
INSERT INTO DEPARTMENT (DEPT_ID, DEP_NAME, PHONE_NUM, MANAGER, MANL_START) VALUES

(4, 'Marketing', '757-555-0103', NULL, '2023-04-01'),
(5, 'Sales', '757-555-0104', NULL, '2023-05-01'),
(6, 'IT Support', '757-555-0105', NULL, '2023-06-01'),
(7, 'Research & Development', '757-555-0106', NULL, '2023-07-01'),
(8, 'Operations', '757-555-0107', NULL, '2023-08-01'),
(9, 'Customer Service', '757-555-0108', NULL, '2023-09-01'),
(10, 'Legal', '757-555-0109', NULL, '2023-10-01'),
(11, 'Quality Assurance', '757-555-0110', NULL, '2023-11-01'),
(12, 'Security', '757-555-0111', NULL, '2023-12-01'),
(13, 'Procurement', '757-555-0112', NULL, '2024-01-01'),
(14, 'Logistics', '757-555-0113', NULL, '2024-02-01'),
(15, 'Training', '757-555-0114', NULL, '2024-03-01'),
(16, 'Public Relations', '757-555-0115', NULL, '2024-04-01'),
(17, 'Product Design', '757-555-0116', NULL, '2024-05-01'),
(18, 'Compliance', '757-555-0117', NULL, '2024-06-01'),
(19, 'Executive Office', '757-555-0118', NULL, '2024-07-01'),
(20, 'Data Analytics', '757-555-0119', NULL, '2024-08-01');
```

91 % No issues found

Results Messages

	DEPT_ID	DEP_NAME	PHONE_NUM	MANAGER	MANL_START
1	1	HR Building	757-555-0102	8	2023-03-01
2	2	Finance Building	757-555-0101	6	2023-02-01
3	3	Engineering Building	757523454	5	2010-12-01
4	4	Marketing	757-555-0103	NULL	2023-04-01
5	5	Sales	757-555-0104	NULL	2023-05-01
6	6	IT Support	757-555-0105	NULL	2023-06-01
7	7	Research & Development	757-555-0106	NULL	2023-07-01
8	8	Operations	757-555-0107	NULL	2023-08-01
9	9	Customer Service	757-555-0108	NULL	2023-09-01
10	10	Legal	757-555-0109	NULL	2023-10-01
11	11	Quality Assurance	757-555-0110	NULL	2023-11-01
12	12	Security	757-555-0111	NULL	2023-12-01
13	13	Procurement	757-555-0112	NULL	2024-01-01
14	14	Logistics	757-555-0113	NULL	2024-02-01
15	15	Training	757-555-0114	NULL	2024-03-01
16	16	Public Relations	757-555-0115	NULL	2024-04-01

```
SELECT TOP (1000) [CITY_NAME]
      ,[STATE]
      ,[POPULATION]
  FROM [master].[dbo].[CITY]

INSERT INTO CITY (CITY_NAME, STATE, POPULATION)
VALUES
('Virginia Beach', 'Virginia', 450000),
('Chesapeake', 'Virginia', 251000),
('Richmond', 'Virginia', 226000),
('Newport News', 'Virginia', 180000),
('Hampton', 'Virginia', 137000),
('Alexandria', 'Virginia', 160000),
('Arlington', 'Virginia', 238000),
('Portsmouth', 'Virginia', 94000),
('Suffolk', 'Virginia', 98000),
('Roanoke', 'Virginia', 100000),
('Lynchburg', 'Virginia', 80000),
('Charlottesville', 'Virginia', 47000),
('Danville', 'Virginia', 42000),
```

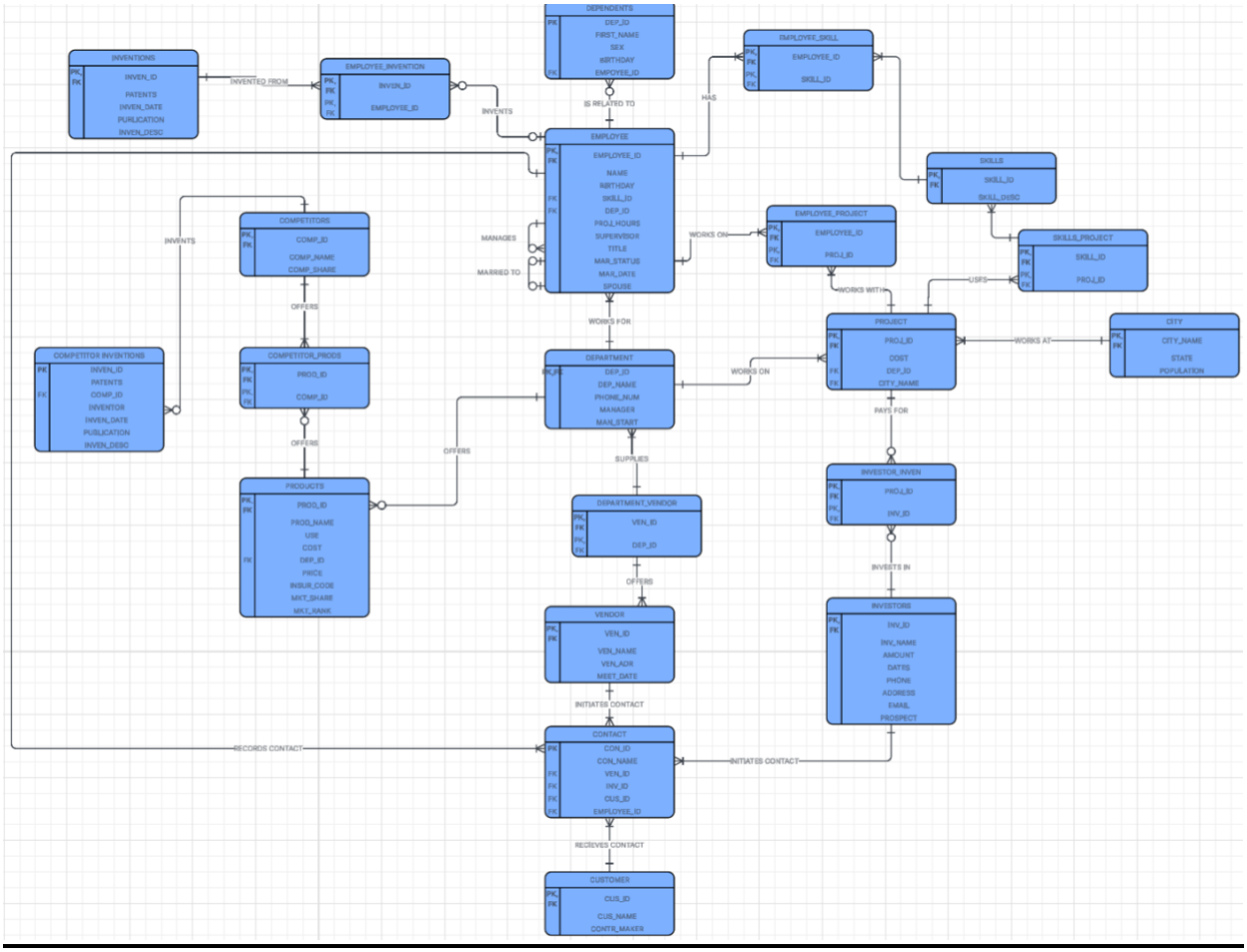
91 % 1 0

Results Messages

	CITY_NAME	STATE	POPULATION
5	Danville	Virginia	42000
6	Fredericksburg	Virginia	29000
7	Hampton	Virginia	137000
8	Hopewell	Virginia	23000
9	Lynchburg	Virginia	80000
10	Newport News	Virginia	180000
11	NORFOLK	VIRGINIA	23100
12	Petersburg	Virginia	33000
13	Portsmouth	Virginia	94000
14	Richmond	Virginia	226000
15	Roanoke	Virginia	100000
16	Salem	Virginia	25000
17	Staunton	Virginia	25000
18	Suffolk	Virginia	98000
19	Virginia Beach	Virginia	450000
20	Williamsburg	Virginia	15000

Query completed with errors.

Final ERD



[Final ERD Link]

Data Dictionary

Projects Table

Column Name: PROJ_ID, Data Type: Int, Key: Primary Key

Column Name: Cost, Data Type: Decimal (10,2)

Column Name: Dep_ID: Data Type: Int, Key: Foreign Key

Column Name: City_Name, Data Type: VARCHAR(50), Key: Foreign Key

Vendor Table

Column Name: Ven_ID, Data Type: Int, Key: Primary Key

Column Name: Ven_Name, Data Type: VARCHAR(50)

Column Name: Ven_ADR, Data Type: VARCHAR(100)

Column Name: Meet_Date, Data Type: DATE

City Table

Column Name: CITY_NAME, Data Type: VARCHAR(50), Key: Primary Key

Column Name: STATE, Data Type: VARCHAR(50)

Column Name: POPULATION, Data Type: INT

Employee Table

Column Name: EmployeeID, Data Type: INT, Key: Primary Key

Column Name: FirstName, Data Type: VARCHAR(50)

Column Name: LastName, Data Type: VARCHAR(50)

Column Name: Email, Data Type: VARCHAR(100)

Column Name: PhoneNumber, Data Type: VARCHAR(25)

Column Name: HireDate, Data Type: DATE

Column Name: JobTitle, Data Type: VARCHAR(50)

Column Name: Salary, Data Type: DECIMAL(10,2)

Column Name: DepartmentID, Data Type: INT

Column Name: ManagerID, Data Type: INT

Column Name: SKILL_ID, Data Type: INT

Column Name: PROJ_HOURS, Data Type: INT

Column Name: SUPERVISOR, Data Type: INT

Column Name: MAR_STATUS, Data Type: VARCHAR(20)

Column Name: MAR_DATE, Data Type: DATE

Column Name: SPOUSE, Data Type: INT

Investors Table

Column Name: INV_ID, Data Type: INT, Key: Primary Key

Column Name: INV_NAME, Data Type: VARCHAR(50)

Column Name: AMOUNT, Data Type: DECIMAL(10,2)

Column Name: DATES, Data Type: DATE

Column Name: PHONE, Data Type: VARCHAR(25)

Column Name: ADDR, Data Type: VARCHAR(50)

Column Name: EMAIL, Data Type: VARCHAR(50)

Column Name: PROSPECT, Data Type: VARCHAR(50)

Skills Table

Column Name: SKILL_ID, Data Type: INT, Key: Primary Key

Column Name: SKILL_DESC, Data Type: VARCHAR(50)

Dependents Table

Column Name: DEP_ID, Data Type: INT, Key: Primary Key

Column Name: FIRST_NAME, Data Type: VARCHAR(50)

Column Name: SEX, Data Type: VARCHAR(10)

Column Name: BIRTHDAY, Data Type: DATE

Column Name: EMPLOYEE_ID, Data Type: INT

Customer Table

Column Name: CUS_ID, Data Type: INT, Key: Primary Key

Column Name: CUS_NAME, Data Type: VARCHAR(50)

Column Name: CONTR_MAKER, Data Type: VARCHAR(50)

Contact Table

Column Name: CON_ID, Data Type: INT, Key: Primary Key

Column Name: CON_NAME, Data Type: VARCHAR(50)

Column Name: VEN_ID, Data Type: INT

Column Name: INV_ID, Data Type: INT

Column Name: CUS_ID, Data Type: INT

Column Name: EMPLOYEE_ID, Data Type: INT

Competitors Table

Column Name: COMP_ID, Data Type: INT, Key: Primary Key

Column Name: COMP_NAME, Data Type: VARCHAR(50)

Column Name: COMP_SHARE, Data Type: DECIMAL(5,2)

Products Table

Column Name: PROD_ID, Data Type: INT, Key: Primary Key

Column Name: PROD_NAME, Data Type: VARCHAR(50)

Column Name: USE, Data Type: VARCHAR(100)

Column Name: COST, Data Type: DECIMAL(10,2)

Column Name: DEP_ID, Data Type: INT

Column Name: PRICE, Data Type: DECIMAL(10,2)

Column Name: INSUR_CODE, Data Type: VARCHAR(20)

Column Name: MKT_SHARE, Data Type: DECIMAL(5,2)

Column Name: MKT_RANK, Data Type: INT

Inventions Table

Column Name: INVEN_ID, Data Type: INT, Key: Primary Key

Column Name: VEN_ID, Data Type: INT

Column Name: PATENTS, Data Type: VARCHAR(50)

Column Name: INVEN_DATE, Data Type: DATE

Column Name: PUBLICATION, Data Type: VARCHAR(100)

Column Name: INVEN_DESC, Data Type: VARCHAR(255)

COMPETITOR_INVENTIONS Table

Column Name: INVEN_ID, Data Type: INT, Key: Primary Key

Column Name: COMP_ID, Data Type: INT

Column Name: PATENTS, Data Type: VARCHAR(50)

Column Name: INVENTOR, Data Type: VARCHAR(50)

Column Name: INVEN_DATE, Data Type: DATE

Column Name: PUBLICPLICATION, Data Type: VARCHAR(100)

Column Name: INVEN_DESC, Data Type: VARCHAR(255)

EMPLOYEE_INVENTION Table

Column Name: EMPLOYEE_ID, Data Type: INT, Key: Primary Key

Column Name: INVEN_ID, Data Type: INT, Key: Primary Key

EMPLOYEE_SKILL Table

Column Name: EMPLOYEE_ID, Data Type: INT, Key: Primary Key

Column Name: SKILL_ID, Data Type: INT, Key: Primary Key

EMPLOYEE_PROJECT Table

Column Name: EMPLOYEE_ID, Data Type: INT, Key: Primary Key

Column Name: PROJ_ID, Data Type: INT, Key: Primary Key

SKILLS_PROJECT Table

Column Name: SKILL_ID, Data Type: INT, Key: Primary Key

Column Name: PROJ_ID, Data Type: INT, Key: Primary Key

DEPARTMENT_VENDOR Table

Column Name: DEP_ID, Data Type: INT, Key: Primary Key

Column Name: VEN_ID, Data Type: INT, Key: Primary Key

COMPETITOR_PRODS Table

Column Name: COMP_ID, Data Type: INT, Key: Primary Key

Column Name: PROD_ID, Data Type: INT, Key: Primary Key

Financial Analysis

The financial analysis evaluates the cost and financial benefits of implementing a centralized database system for Asante LLC. Labor cost estimates are based on the most recent U.S. Bureau of Labor Statistics data, and cloud hosting costs are taken from publicly available managed database service pricing. The analysis includes Total Cost of Ownership (TCO), Return on Investment (ROI), Net Present Value (NPV), and break-even point.

Total Cost of Ownership (TCO)

Labor Cost Benchmarks (2024–2025)

-Median hourly wage for database administrators in the U.S. was $50.30 in 2024 (Bureau of Labor Statistics, 2024).

-Recent estimates for database/software developers indicate an average hourly rate of $62 in November 2025 (Salary.com, 2025).

Based on these data, the estimated development and maintenance costs for the Asante LLC database are as follows:

Initial Development Costs:

Cost Item	**Hours/Units**	**Rate (USD/hour)**	**Cost (USD)**
Database Developer (design & implementation)	90 hrs	$62	$5,580
DBA / Systems Analyst (requirements gathering, ERD, normalization)	40 hrs	$50.32	$2,012
QA Testing / Data Validation	20 hrs	$45	$900
Project Manager / Oversight	10 hrs	$65	$650

Staff Training & Onboarding	10 hrs	$45	$450
Cloud Setup (managed DB instance)	One-time fee	-	$200
Initial Total			**$9,792**

Annual Operating Costs:

Cost Item	**Rate/Quantity**	**Yearly Cost (USD)**
Cloud DB hosting (managed service, small instance)	$40/month	$480
Backup & Security/Storage Overhead	$25/month	$300
DBA / IT Maintenance (updates, support)	30 hrs/yr x $50.30/hr	$1,509
Software/License Renewals or Tools	-	$300
Total Annual Operating Cost		**$2,589**

Total Cost Over 3 Years (TCO):

Formula: TCO(3yr) = Initial Cost + 3 ×Annual Operating Cost

TCO(3yr) = 9,792 + (3 × 2,589) = 17,559

Thus, the 3-year TCO is **$17,559**.

Return on Investment (ROI)

Assumptions:

-10 employees regularly use the system (HR, managers, directors)

-Each saves 3 hours per week on administrative tasks

-Value of employee time: $40/hour

$$\text{Weekly Savings} = 3 \text{ hrs} \times 40 \times 10 = \$1{,}200$$

$$\text{Annual Savings} = 1{,}200 \times 52 = \$62{,}400$$

Net Annual Benefit

$$\text{Net Benefit} = \text{Annual Savings} - \text{Annual Operating Cost} = 62{,}400 - 2{,}589 = 59{,}811$$

ROI Calculation

$$\text{ROI} = \text{Net Benefit}/\text{Initial Cost} \times 100 = 59{,}811/9{,}792 \times 100 \approx 611\%$$

The ROI of 611% indicates substantial financial benefits for the company (Bureau of Labor Statistics, 2024; Salary.com, 2025).

Net Present Value (NPV)

Using a 5% discount rate, the projected 3-year cash flows and NPV are calculated as follows:

Year	Cash Flow (USD)	Discount Factor (5%)	Present Values (USD)
1	59,811	0.9524	56,977
2	59,811	0.9070	54,200
3	59,811	0.8638	51,676

$$\text{NPV} = \text{Present Values} - \text{Initial Cost} = (56{,}977 + 54{,}200 + 51{,}676) - 9{,}792 = 153{,}061$$

A positive NPV of $153,061 indicates the project is financially sound (Amazon Web Services, 2025).

Break-even Analysis

$$\text{Break-Even} = \text{Initial Cost}/\text{Annual Savings} = 9{,}792/62{,}400 \approx 0.157 \text{ years}$$

$$0.157 \times 12 \approx 1.9 \text{ months}$$

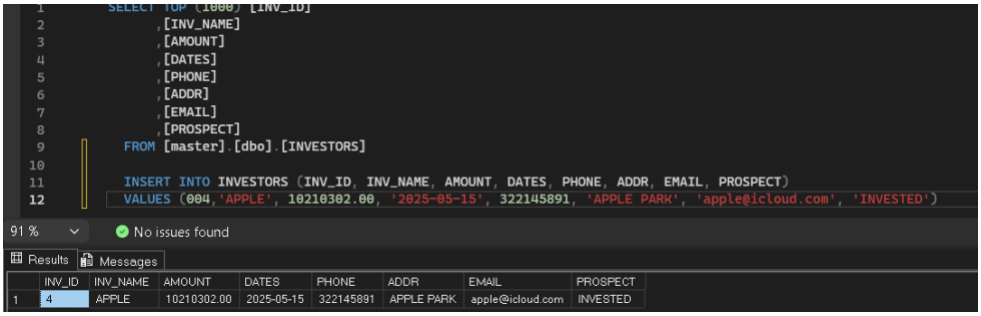
The system is expected to pay for itself in approximately 2 months.

Discussion

The financial analysis demonstrates that implementing a centralized database system for Asante LLC is highly cost-effective. Based on the latest U.S. labor data, initial development costs are estimated at $9,792, with annual operating costs of $2,589, resulting in a three-year total cost of ownership of $17,559 (Bureau of Labor Statistics, 2024; Salary.com, 2025). Savings are conservatively estimated, assuming 10 employees save three hours per week, which equates to annual savings of $62,400. This results in a first-year ROI of approximately 611%, a net present value of $153,061 over three years, and a break-even point of less than two months, indicating rapid cost recovery (Amazon Web Services, 2025). These calculations assume a 5% discount rate, standard cloud hosting costs, and moderate labor rates; actual savings could be higher if more employees use the system or time saved per employee increases. Overall, the analysis confirms that the database system will provide substantial financial benefits, improve operational efficiency, and is strongly justified as an investment for Asante LLC.

Implementation

In the implementation phase of my project, we created the database in Oracle/Access and designed the required tables with clearly defined attributes, primary keys, and foreign key relationships to enforce referential integrity. Each table included constraints that ensured data accuracy, such as unique identifiers and appropriate referential actions. After building the structure, we populated each table with 15–20 rows of imaginary data using INSERT statements, which are shown in my screenshots. We then validated that the database was fully operational by running INSERT, UPDATE, and DELETE commands and confirmed successful execution through the output messages displayed in the screenshots. Finally, we verified that all tables were correctly populated by viewing them in Datasheet/Result Grid mode, capturing screenshots that show the complete table contents. This implementation process allowed use to confirm that the database was functioning correctly before moving on to the query and analysis portion of the project.



```
INSERT INTO Department (DEPT_ID, Dep_Name, Phone_Num, Manager, Manl_Start)
VALUES (2, 'Finance Building', '757-555-0101', 6, '2023-02-01'),
(1, 'HR Building','757-555-0102', 8, '2023-03-01');
```

No issues found

Results | Messages

DEPT_ID	DEP_NAME	PHONE_NUM	MANAGER	MANL_START
1	HR Building	757-555-0102	8	2023-03-01
2	Finance Building	757-555-0101	6	2023-02-01
3	Engineering Building	757523454	5	2010-12-01

```
INSERT INTO INVESTORS (INV_ID, INV_NAME, AMOUNT, DATES, PHONE, ADDR, EMAIL, PROSPECT)
VALUES (004,'APPLE', 10210302.00, '2025-05-15', 322145891, 'APPLE PARK', 'apple@icloud.com', 'INVESTED')
INSERT INTO INVESTORS (INV_ID, INV_NAME, AMOUNT, DATES, PHONE, ADDR, EMAIL, PROSPECT)
VALUES
(201, 'Aurora Capital', 6000000, '2025-11-30', 7492038494, 'AURORA LANE', 'contact@auroracap.com', 'INVESTED'),
(202, 'BlueWave Group', 55930404, '2025-11-01', 4538742934, 'BLUEPARK WALKWAY', 'info@bluewave.com', 'WAITING'),
(203, 'Summit Partners', 30000, '2024-06-22', 3432565444, 'WESTBROOK RD', 'hello@summitpartners.com', 'INVESTED');

UPDATE INVESTORS
SET INV_NAME = 'Aurora Capital Partners'
WHERE INV_ID = 201;
```

No issues found

Results | Messages

	INV_ID	INV_NAME	AMOUNT	DATES	PHONE	ADDR	EMAIL	PROSPECT
1	4	APPLE	10210302.00	2025-05-15	322145891	APPLE PARK	apple@icloud.com	INVESTED
2	201	Aurora Capital Partners	6000000.00	2025-11-30	7492038494	AURORA LANE	contact@auroracap.com	INVESTED
3	202	BlueWave Group	55930404.00	2025-11-01	4538742934	BLUEPARK WALKWAY	info@bluewave.com	WAITING
4	203	Summit Partners	30000.00	2024-06-22	3432565444	WESTBROOK RD	hello@summitpartners.com	INVESTED

```
(EmployeeID, FirstName, LastName, Email, PhoneNumber, HireDate, JobTitle, Salary, DepartmentID, ManagerID)
VALUES
(2, 'Maria',   'Santos',   'msantos@asante.com',   '7575551212', '2024-05-10', 'Finance Lead',   95000.00,  2, 2),
(3, 'Darius',  'Nguyen',   'dnguyen@asante.com',   '7575553434', '2024-06-20', 'HR Manager',     90000.00,  3, 3),
(4, 'Aisha',   'Morgan',   'amorgan@asante.com',   '7575555656', '2024-09-01', 'Junior Engineer',75000.00,  1, 1),
(5, 'Leo',     'Taylor',   'ltaylor@asante.com',   '7575557878', '2024-10-15', 'Analyst',        70000.00,  2, 2);

UPDATE Employee
SET DepartmentID = 3, ManagerID = 3
WHERE EmployeeID = 5;

DELETE FROM Employee
WHERE EmployeeID = 4;
```

Conclusion

The Asante LLC database project has shown that a proper implementation of a relational database management system can improve the firm's ability to manage its employees, departments, projects, and financial information with a high level of efficiency and structure. During the requirements gathering phase, the team designed the initial ERD, normalizing it to 3NF, with the final ERD eliminating redundancies and update anomalies while still maintaining faithfulness to the business rules established. The next phase of implementation further validated the design, with functional tables, the enforcement of referential integrity (via the use of foreign keys) and successful executions of various Oracle SQL Plus commands, including insert, update, and delete operations. Currently, this system still relies on hypothesis testing and does not operate with real company data. There will need to be further investments and improvements into the relational database in order to ensure its future scalability. Fortunately, there are already financial incentives to adopt this relational database across Asante LLC, with a low initial cost of $9792, annual operational costs of $2589, and a break even period of 2 months. The ROI is high, at 611%, with a positive NPV across three years of product investment and deployment. Asante LLC's database system would greatly enhance its operational excellency and company efficiency, along with improved data-driven decision making abilities.

References

Amazon RDS for postgresql pricing. (n.d.). https://aws.amazon.com/rds/postgresql/pricing/

Database developer salary, Hourly Rate (September 01, 2025) in the United States | salary.com. (n.d.-b). https://www.salary.com/research/salary/listing/database-developer-salary

U.S. Bureau of Labor Statistics. (n.d.). *Occupational Employment and Wage Statistics (OEWS) tables*. U.S. Bureau of Labor Statistics. https://www.bls.gov/oes/tables.htm