SQL Warriors

Business Intelligence Analyst Applicant for the Arizona Cardinals

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BUS4 112

Q1) Why this role in database management excites us and how it aligns with our career goals

Job Position: Business Intelligence Analyst with the Arizona Cardinals Football team

- Involves data analytics and impactful decision making within the sports industry
- This career aligns with our passion for sports and technology
- This role integrates SQL, PowerBI, and Python
- Enables us to fulfill our career goal of developing hands-on experience with applying technology to real-world scenarios
- Opportunity to collaborate with as stakeholders, consultants, vendors, and finance department
- Enhance our interpersonal and leadership skills while contributing to our company's efficiency and future.

ARIZONA CARDINALS

Q1A: Our team's collective expertise and passion for database management.

Power BI Experience:

- Experience in building Power BI Dashboards to visualize key metrics and support data-driven decision-making.
- Using DAX for specific calculations to create different types of bar charts, line graphs, and pie charts

SQL Experience:

- a Certified SQL Developer certification, demonstrating proficiency in SQL fundamentals, including data querying, table joins, subqueries, and data manipulation.

Data Warehouse Buildout and Documentation

- Tracking and organizing inventory, then recording this data into excel
- Utilizing SQL to sort the information and created able for different categories of clothing, which would also fit the category documentation by creating the data tables.

Project Management Experience:

- Experience with managing competing priorities, coordinating across diverse teams, and ensuring timely delivery of project deliverables.
- Maintained professionalism and clear communication throughout the project lifecycle.

Q1B: Bridging the gap between academic learning and real-world application through our project

- Turned ERD and SQL concepts into a working Oracle LiveSQL database
- Utilizing the database, we were able to answer operational questions related to ticket revenue and fan engagement
- Showcased how we can use different SQL statements to create practical solutions to real questions
- Created a relational database ensuring data accuracy and consistency(ERD → Database and ensuring it runs properly)

Q2: Why this company appeals to us

- Gain experience analyzing and interpreting sales and pricing data to drive smarter business decisions and improve revenue outcomes
- Working with relational databases and develop SQL queries to extract data for business analysis
- Involves SQL which is relevant for us since we've learned it throughout our courses and applied concepts throughout the project
- Organization uses Oracle Live SQL which is a tool we've had experience with for a whole semester

Q3: Why we are the best fit for this job

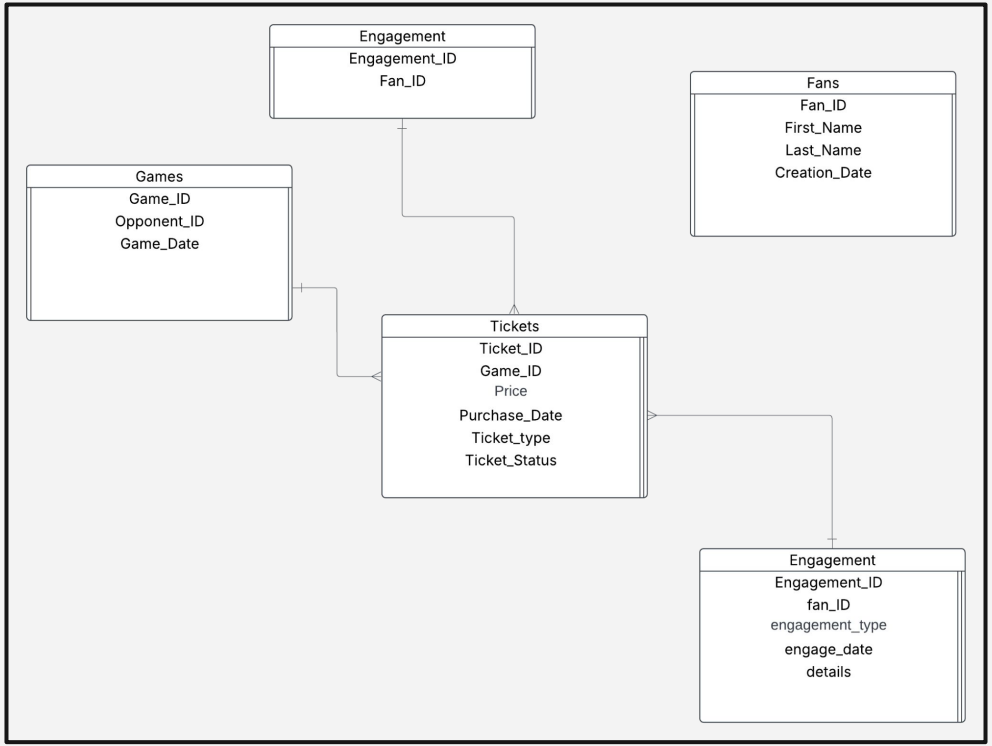
- Designed a functional and organized relational database.
- Experience with Power BI, Data Warehouse Buildout and SQL
- Created a relational database ensuring data accuracy and consistency(ERD → Database and ensuring it runs properly)
- Developed SQL queries to efficiently extract, filter and analyze data to create insights for determining business decisions(examples on next slide)

Query #1: Which games were able to generate the highest ticket revenue, and what is the number of fan engagements for that game?

Solution:

SELECT g.game_id,g.opponent,g.game_date,
(So to answer this question, we need the game data such as ID, opponent, and date)
SUM(t.price) AS total_revenue,
(To calculate the total revenue, we need to sum the ticket prices for each game)
COUNT(e.engagement_id) AS total_engagements
(We also need to count engagements for the fans who bought tickets for that game)
FROM games g
JOIN tickets t ON g.game_id = t.game_id
(We connect each ticket ot the game it was purchased for since the ticket prices are tied to the record of tickets sold)
LEFT JOIN engagements e ON t.fan_id = e.fan_id
(Join engagements to fans who bought tickets to a game. We use left join specifically so that fans without any engagements are still accounted for, but it'll just show up as 0 engagements)
GROUP BY g.game_id, g.opponent, g.game_date
(Since we are aggregating sum and count, we need to group them by each unique game. This ensures that we get a row per game instead of per ticket)
ORDER BY total_revenue DESC;
(Since we're focusing on the games with the highest revenue, we need this data to pop up at the top)

Snowflake Schema



Query #2: What engagement platform is most popular amongst fans?

Solution:

SELECT engagement_platform, COUNT(*) AS total_uses FROM engagements
(Takes the platform they engaged on and then adds a count to it and labels it as total_uses)
WHERE engagement_platform IS NOT NULL **(This is where it would filter out the information that is NULL)**
GROUP BY engagement_platform **(Groups all the rows into a table by each platform)**
ORDER BY total_uses DESC; **(This is where it would show the Ranking of platforms by popularity)**

ENGAGEMENT_PLATFORM	TOTAL_USES
Mobile App	1
Website	1
Stadium’s Team Store	1

Q4: Project Overview & Team Roles

Project at a Glance

- **Purpose:** Design and implement a database system managing database for fans, tickets, games, and engagements for the Cardinals using SQL.

- **Goals:**

    1. Create a database to store and manage information about fans, ticket, game and engagements
    2. Kept database accurate and consistent by connecting tables through foreign keys
    3. Draft a correct ERD in 3NF
    4. Load sample data for testing allowing us to test queries based on revenue and engagement

- **Outcome:** Developed a fully functional 4-table system in Oracle LiveSQL that runs error-free; accurate reporting aligning with our needs.
- **Roles:**

1. Creating ERD that was the blueprint for our database
2. Creating our database(created tables, keys, and sample data)
3. Tested our script, fixed-data type issues to make sure our database ran without any errors
4. Making sure we project managed well to meet deliverables and deadlines
5. Made sure our queries were business related that aligned with the Arizona Cardinals goals

Q5: How Our Database Works & Why It Stands Out

Purpose

- Track fan behavior, ticket sales, and engagement across different games.
- Support marketing insights and fan experience improvements.

Main Tables

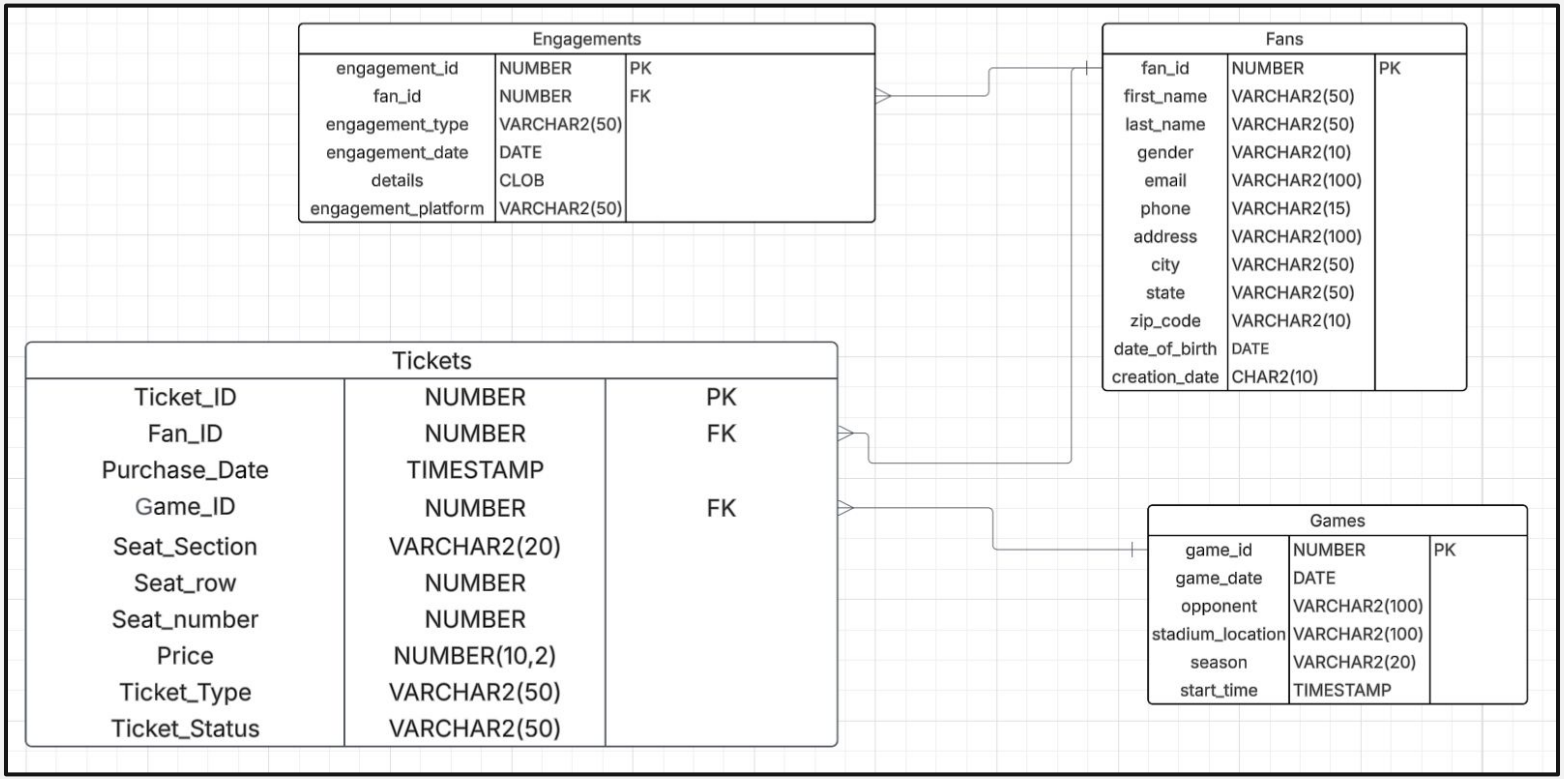
- Fans
- Games
- Tickets
- Engagements

Datatypes: (VARCHAR2 for phone, CLOB for text) and (TIMESTAMP) for accurate times.

Unique Features

- Track fan interactions (surveys, merch sales, platform usage).
    - Enabled marketing intelligence through analytics.

ERD


Engagements
engagement_id NUMBER PK
fan_id NUMBER FK
engagement_type VARCHAR2(50)
engagement_date DATE
details CLOB
engagement_platform VARCHAR2(50)
Fans
fan_id NUMBER PK
first_name VARCHAR2(50)
last_name VARCHAR2(50)
gender VARCHAR2(10)
email VARCHAR2(100)
phone VARCHAR2(15)
address VARCHAR2(100)
city VARCHAR2(50)
state VARCHAR2(50)
zip_code VARCHAR2(10)
date_of_birth DATE
creation_date CHAR2(10)
Tickets
Ticket_ID NUMBER PK
Fan_ID NUMBER FK
Purchase_Date TIMESTAMP
Game_ID NUMBER FK
Seat_Section VARCHAR2(20)
Seat_row NUMBER
Seat_number NUMBER
Price NUMBER(10,2)
Ticket_Type VARCHAR2(50)
Ticket_Status VARCHAR2(50)
Games
game_id NUMBER PK
game_date DATE
opponent VARCHAR2(100)
stadium_location VARCHAR2(100)
season VARCHAR2(20)
start_time TIMESTAMP

SQL Database

Fans Table

```
CREATE TABLE Fans (
   fan_id         NUMBER PRIMARY
KEY,
   first_name     VARCHAR2(50),
   last_name      VARCHAR2(50),
   gender         VARCHAR2(10),
   email          VARCHAR2(100),
   phone          VARCHAR2(15),
   address        VARCHAR2(100),
   city           VARCHAR2(50),
   state          VARCHAR2(50),
   zip_code       CHAR2(10),
   date_of_birth  DATE,
   creation_date  TIMESTAMP
);
```

Engagements Table

```
CREATE TABLE Engagements (
   engagement_id      NUMBER PRIMARY
KEY,
   fan_id             NUMBER,
   engagement_type    VARCHAR2(50),
   engagement_date    TIMESTAMP,
   details            CLOB,
   engagement_platform VARCHAR2(50),
   CONSTRAINT fk_engagement_fan
FOREIGN KEY (fan_id) REFERENCES
Fans(fan_id)
);
```

SQL Database continued

Games Table

```
CREATE TABLE Games (
    game_id          NUMBER PRIMARY KEY,
    game_date        DATE,
    opponent         VARCHAR2(100),
    stadium_location  VARCHAR2(100),
    season           VARCHAR2(20),
    start_time       TIMESTAMP
);
```

Tickets Table

```
CREATE TABLE Tickets (
    ticket_id      NUMBER PRIMARY KEY,
    fan_id         NUMBER,
    purchase_date  TIMESTAMP,
    game_id        NUMBER,
    seat_section   VARCHAR2(20),
    seat_row       NUMBER,
    seat_number    NUMBER,
    price          NUMBER(10, 2),
    ticket_type    VARCHAR2(50),
    ticket_status  VARCHAR2(50),
    CONSTRAINT fk_ticket_fan FOREIGN KEY (fan_id)
REFERENCES Fans(fan_id),
    CONSTRAINT fk_ticket_game FOREIGN KEY (game_id)
REFERENCES Games(game_id)
);
```

Example Data

FAN_ID	FIRST_NAME	LAST_NAME	GENDER	EMAIL	PHONE	ADDRESS	CITY	STATE	ZIP_CODE	DATE_OF_BIRTH	CREATION_DATE
1	Johnson	Luong	Male	jluong1020@gmail.com	6692745819	123 Blossom Hill Rd	San Jose	California	-	05-JUN-99	04-JAN-20 12.00.00.000000 AM
2	Leann	Nguyen	Female	Leannnguyen05@gmail.com	4802657081	473 Trevor Street	Tucson	Arizona	-	14-JUL-74	09-AUG-10 12.00.00.000000 AM
3	Sebastian	Dang	Male	dangsebastian212@gmail.com	6028951253	8371 Holmes Ave	Mesa	Arizona	-	31-AUG-87	21-JAN-14 12.00.00.000000 AM

GAME_ID	GAME_DATE	OPPONENT	STADIUM_LOCATION	SEASON	START_TIME
103	07-SEP-24	Las Vegas Raiders	Statefarm	2024-2025	07-SEP-24 01.25.00.000000 PM
101	18-NOV-23	Dallas Cowboys	AT&T Stadium	2023-2024	18-NOV-23 05.20.00.000000 PM
102	06-OCT-24	San Francisco 49ers	Levis Stadium	2024-2025	06-OCT-24 01.05.00.000000 PM

Example Data

ENGAGEMENT_ID	FAN_ID	ENGAGEMENT_TYPE	ENGAGEMENT_DATE	DETAILS	ENGAGEMENT_PLATFORM
1	3	Survey Participation	18-FEB-17 12.00.00.000000 AM	Fan Satisfaction based on overall experience	Mobile App
2	1	Contest Entry	08-SEP-22 12.00.00.000000 AM	Entered to win an autographed football from Hall of Fame player	Website
3	2	Merchandise Purchase	14-NOV-15 12.00.00.000000 AM	Bought a Jersey and hat	Stadium's Team Store

TICKET_ID	FAN_ID	PURCHASE_DATE	GAME_ID	SEAT_SECTION	SEAT_ROW	SEAT_NUMBER	PRICE	TICKET_TYPE	TICKET_STATUS
3001	1	25-JUN-24 12.00.00.000000 AM	103	Section 451	7	1	125	Standard	Confirmed
3002	2	25-MAY-23 12.00.00.000000 AM	101	Section 134	4	19	225	VIP	Cancelled
3003	3	22-APR-24 12.00.00.000000 AM	102	Section 125	1	5	125	Standard	Confirmed

Q6: Using AI Tools

- **DiagramGPT** generated us an initial outline of our ERD, which we then polished and revised into our final version.
- To refine our ERD we:
  - Made our Primary Key ID's more specific
  - Renamed attributes for clarity
  - Removed unnecessary attributes ex.endtime
  - Added necessary attributes ex. gender
  - Fixed Data types
- **Result**: AI increased our efficiency and assisted in creating a more accurate and business appropriate ERD.

Q7: Business Decisions

- **Improving customer/fan retention:**
- Engagement table allows for tracking fan interaction history to identify highly engaged fans.
- Marketing team can take advantage of this and send them exclusive offers and invites loyalty programs.
- Also can be used to enhance marketing strategies.
- **Optimizing and Forecasting Sales**
- Determine what games generate the most sales.
- Figure out popular sections and price points.
- **Track the performance of engagement channels**
- Determine what platforms perform the best/worse.
- Focus investing into the high-performing channels to maximize ROI.
- Allocate some resources to improve the underperforming channels.

Q8: What We Enjoyed Most

- Collaborating with individuals with different experiences.
- Gaining hands on experience with creating an ERD and a database.
- Learning from our mistakes. Ex: using the wrong data types.
- Gained experience with writing business-focused SQL queries that answered organizational questions
- Turning valuable data into actionable solutions, making the project feel realistic and meaningful.

Q9: What We'd Improve Next Time

- **Adding more data:** Load extra rows that are related to business operations to see if our queries are still effective
- **Adding more tables/attributes**
  - Tracking other revenue activities such as concession sales and team store AND track payment method
  - Adding a table that tracks fan experience ratings (1–5 stars)
  - Attribute: Where did you hear about us from?

Q10: Most significant challenge encountered

Challenge #1: Fixing our ERD to create our Database

- Our ERD had inconsistencies with the data types
- Analyzed each data value and determined the appropriate data type

Challenge #2: Errors with our SQL code

- Code didn't run due to foreign key constraint error
- Realized that we created Tickets tables before Games
- Problematic because child table was created before parent table (rule: foreign key must always reference a primary key in another table)

Thank you for your time.
We appreciate the opportunity and hope to be considered as a strong candidates for this position