SkillSync

Matching the Right Talent with AI Precision

TEAM 5

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Table Of Contents

Technology & Algorithms Used

Compound AI Solution

Leveraging and combining the power of AI into a well-harmonized candidate scoring solution.

GPT 3.5 Turbo

Deep Translate

Sentence Transformers

OCR

Algorithm

From Text to Structure: Automating Job Description Analysis with Large Language Models

1

OCR Engine

We used EasyOCR to read the Job Description files. We use batch processing to parallelize and reduce latency.

2

LLM

We used GPT 3.5 Turbo to read this unstructured data and create semi-structured JSON output with information like required skills, preferred skills, language skills, experience required, job responsibilities and skill importance scores.

Algorithm

Cosine Match: Aligning Experience to Responsibilities

1

Translate

We used Deep Translate to translate the Mission Experience of each consultant.

2

Embedding

We used all-MiniLM-L6-v2 model to create vector embeddings for each experience they have and each job responsibility.

3

Average Cosine Similarity

We calculated the average cosine similarity of each sentence in the experience and each job responsibility to avoid outliers that are a perfect match. We also min max scaled the values.

Algorithm

Skill Match: Candidate Skills Scoring Matrix

1

Levenshtein Fuzzy Matching

We use Levenshtien distance to match the consultant's skills to the skills in the job requirement.

2

LLM Skill Priority Scoring

We used GPT 3.5 to analyze the job descriptions to give a priority level to each skill in the job description.

3

Final Weighted Skills Scoring Matrix

Using levels as weights we create the final skill matrix consisting of the matched required and preferred skills.

Algorithm

Data-Informed, Customizable Logic-Powered Scoring

1

Skills Match

Using the scoring matrix, we assign custom weights for each skill matched.

2

Cosine Match

Using a dynamic scoring logic to prioritize cosine similarity in certain scenarios by increasing its impact on the score.

3

Avalibility Scoring

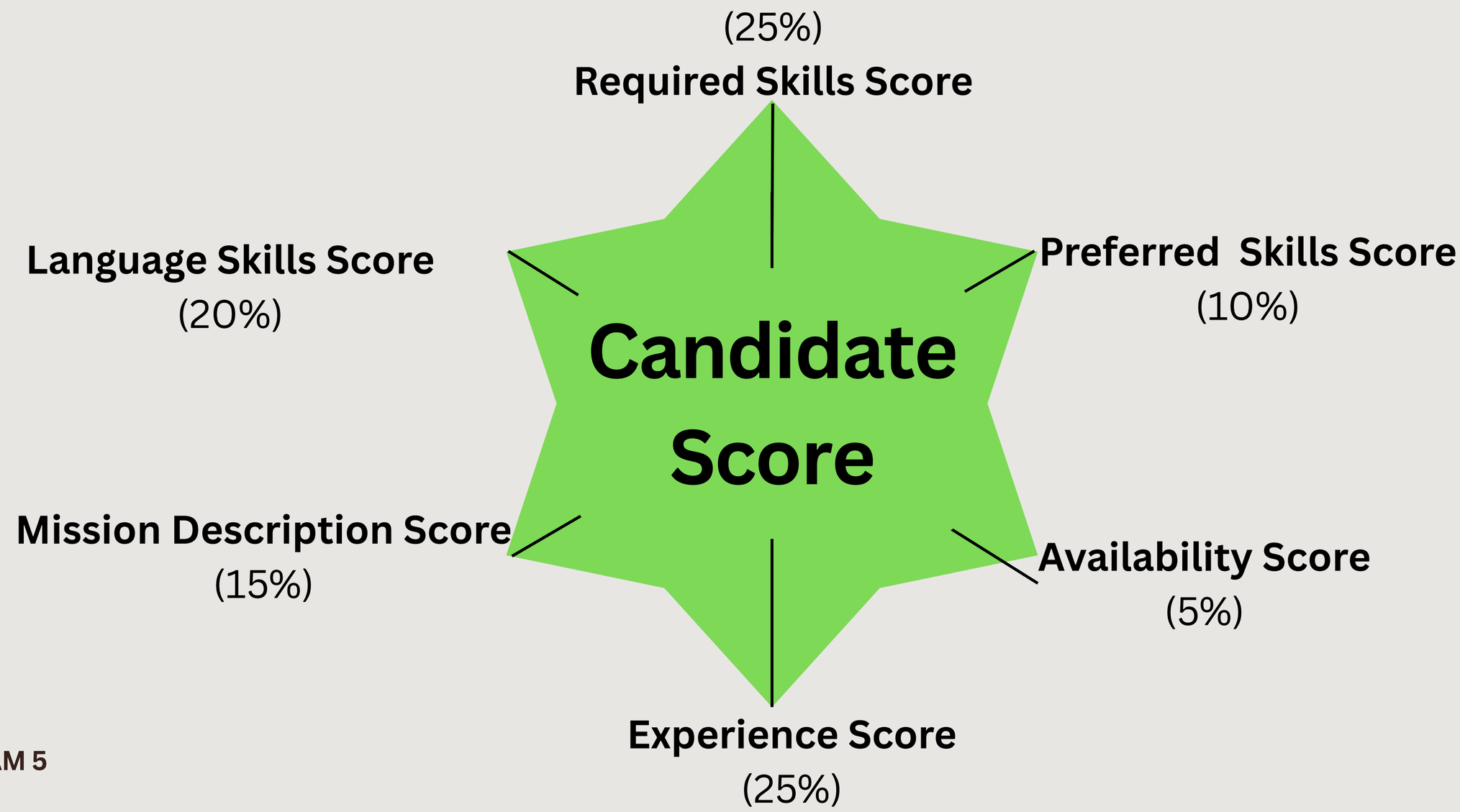
Using custom logic to check and filter consultants that will not be available for the duration of the job while assigning a score based on availability.

4

Experience Match

Using the required experience extracted via GPT 3.5 from the job description and creating a custom score for the match of the years of experience of each consultant.

Scoring Method



USER INTERFACE

Architecture Flow - Microsoft Azure - Detailed

POC Phase - Considering only 3 Job Roles (Data Engineer, Data Analyst and Scrum Master)

Input File - PDF of Job Requirement

Azure ML

Output File - Json output of Job Skills Required

Azure Blob Storage

Py Notebook - Step_1_OCR_Job_desc_features_AZURE.ipynb

Azure ML

Py Notebook - STEP2.1_Translating_Embedding_Mission_DSC_AZURE.ipynb

Json output of Job Skills Required

mission_df_sentence_embeddings.pkl +

Py Notebook - STEP2.2_JSON_Matching_Cosine_Similarity_AZURE.ipynb

user_similarity_ranking.csv

Input CSV Files

Input CSV Files

Azure ML

Py Notebook - STEP3.1Pivot_ProcessingAZURE.ipynb

lang_pivoted.csv + skills_pivoted.csv + Users_Lang_Skills.csv

Py Notebook - STEP3.2_Invert_Months_ProcessingAZURE.ipynb

staffing_inverted.csv

staffing_inverted.csv + skills_pivoted.csv + Users_Lang_Skills.csv

Py Notebook - STEP3.3Mapping_Updated_AZURE.ipynb

final_scores.csv

Py Notebook - STEP4_CandidateScoring.ipynb

candidate_scores.csv (scaled finalized scores)

Power BI

Azure Blob Storage

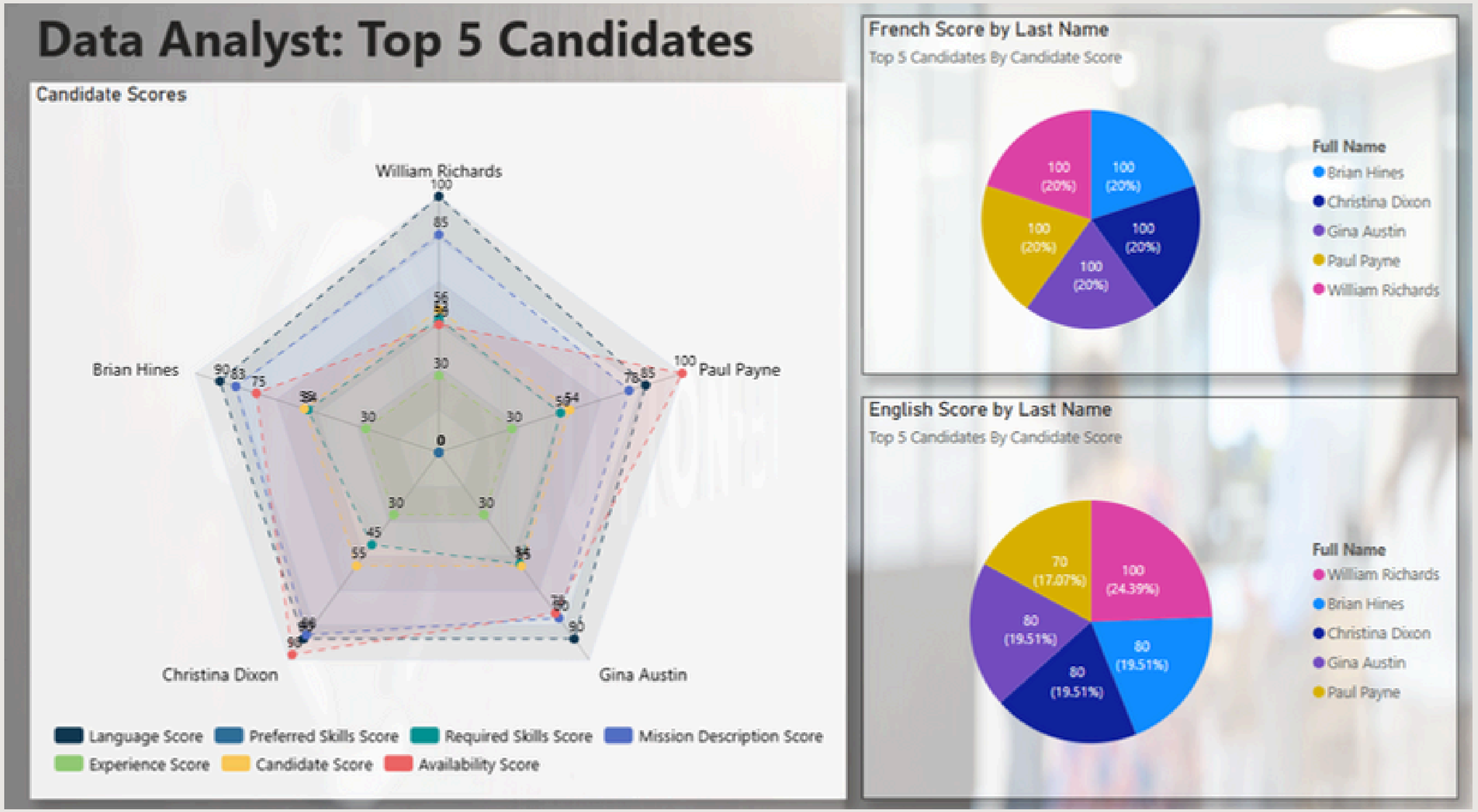
Solutions BI Consultants CSV Sheets

Azure Data Factory

Azure SQL DB

Solutions BI Consultants Database

Dashboard


Data Analyst: Top 5 Candidates
Candidate Scores
William Richards
Paul Payne
Gina Austin
Christina Dixon
Brian Hines
Language Score
Preferred Skills Score
Required Skills Score
Mission Description Score
Experience Score
Candidate Score
Availability Score
French Score by Last Name
Top 5 Candidates By Candidate Score
Full Name
Brian Hines
Christina Dixon
Gina Austin
Paul Payne
William Richards
English Score by Last Name
Top 5 Candidates By Candidate Score
Full Name
William Richards
Brian Hines
Christina Dixon
Gina Austin
Paul Payne

Top Candidates for Data Analyst/Data Engineer

William Richards

Years of experience: 2.0

Atlassian Jira Software, DAX, Denodo Platform, GitHub Enterprise, Google BigQuery, Google Cloud Platform, Google Vertex AI, JavaScript, Looker, MDX, MATLAB, Microsoft Analytics Platform System (SSAS), Microsoft Azure, Microsoft Azure Data Factory, Microsoft Azure DevOps Services, Microsoft Azure SQL Database, Microsoft Power BI, Microsoft SQL Server, Microsoft SQL Server Integration Services (SSIS), Microsoft SQL Server Reporting Services (SSRS), Oracle Database, Python, R, SAP BusinessObjects BI, Snowflake Data Cloud, T-SQL, VBA.

Languages: French, English

Brian Hines

Years of experience: 2.0

Atlassian Jira Software, DAX, Google BigQuery, Informatica PowerCenter, Microsoft Azure Data Lake Store, Microsoft Azure DevOps Services, Microsoft Power BI, Microsoft SQL Server, MicroStrategy, PostgreSQL, Python, Qlik Sense, R, SQL, Snowflake Data Cloud, T-SQL, Tableau Desktop and Online, Talend Open Studio.

Languages: French, English

Christina Dixon

Years of experience: 2.5

Airbyte, Amazon Web Services, Atlassian Bitbucket, Atlassian Jira Software, DBT, Data Galaxy, Databricks Lakehouse Platform, Dataiku, Denodo Platform, Fivetran, GitHub Enterprise, GitLab, Google BigQuery, IBM Cognos Analytics, IBM DataStage, IBM DB2, IBM Netezza Performance Server, Informatica Intelligent Cloud Services, Informatica PowerCenter, Looker, Matillion ETL, MATLAB, Microsoft Azure, Microsoft Azure Data Factory, Microsoft Azure Data Lake Store, Microsoft Azure DevOps Services, Microsoft Azure SQL Database, Microsoft Azure Synapse Analytics, Microsoft Fabric, Microsoft Power BI, Microsoft SQL Server, MicroStrategy, Oracle Business Intelligence Enterprise Edition, Oracle Database, PL/SQL, PostgreSQL, Project Management, Python, SQL, SnapLogic Intelligent Integration Platform, Snowflake Data Cloud, Teradata Database, Terraform.

Languages: French, English

Gina Austin

Years of experience: 1.5

DAX,
Informatica Intelligent Cloud Services,
Informatica PowerCenter,
Microsoft Power BI,
Microsoft SQL Server,
Python,
SQL,
Snowflake Data Cloud.

Languages: French, English

Paul Payne

Years of experience: 2.0

Amazon Web Services, DAX, Databricks Lakehouse Platform, Domo, GitHub Enterprise, Google Cloud Platform, Microsoft Azure, Microsoft Azure Data Factory, Microsoft Azure DevOps Services, Microsoft Azure SQL Database, Microsoft Fabric, Microsoft Power BI, Microsoft SQL Server, Microsoft SQL Server Integration Services (SSIS), Project Management, Python, R, SAP BusinessObjects BI, SQL, Snowflake Data Cloud, Tableau Desktop and Online.

Languages: French, English

Top Candidates for Scrum

Nielsan Nancy

Years of experience: 2.5

Atlassian Jira Ssoftware
Microsoft Power BI
Microstrategy
Postgresql
Python R SQL
Snowflake data cloud
Tableau desktop
Teradata database
Teradata Vantage

Languages: French, English

Shelby green

Years of experience: 1.5

DAX
Informatica
Intelligent Cloud Services
Powercenter
Microsoft Power BI
Microsoft SQL Server
Python
SQL
Snowflake
Data Cloud

Languages: French, English

David Campbell

Years of experience: 2.0

Atlassian Jira Software
DAX, Denodo, Platform, Github enterprise, Google Bigquery, Google cloud platform, Google Vertex AI, Javascript, Looker, MDX, Matlab , Microsoft analytics platform system (ssas), Microsoft Azure, Microsoft Azure Data Factory Microsoft Azure Devops Services, Microsoft Azure SQL Database, Microsoft Power BI, Microsoft SQL server, Microsoft SQL server integration services (ssis), Microsoft SQL server reporting services (ssrs), Oracle database, Python, R, SAP Business objects

Languages: French, English

Cynthia Reeves

Years of experience: 2.0

Atlassian Jira Software, DAX, Google Bigquery, Informatica Powercenter, Microsoft Azure Data Lake Store, Microsoft Azure Devops Services, Microsoft Power BI, Microsoft sql server, Microstrategy postgresql , Python, Qliksense, R, SQL, Snowflake data cloud, t-sql, Tableau desktop.

Languages: French, English

Hines Brian

Years of experience: 2.0

Amazon Web Services, DA Databricks Lakehouse Platform, Domo, GitHub Enterprise, Google Cloud Platform, Microsoft Azure, Microsoft Azure Data Factory, Microsoft Azure DevOps Services Microsoft Azure SQL Database, Microsoft Fabric, Microsoft Power BI, Microsoft SQL Server, Microsoft SQL Server Integration Services (SSIS), Project Management, Python, R, SAP BusinessObjects BI, SQL, Snowflake Data Cloud, Tableau Desktop and Online.

Languages: French, English

Limitations

Scrum Master

Scrum Master's skills do not exist in the skills table

- Fix: Dynamically increase the weightage on the Mission Description similarity score

Domain Description

- The Domain Description Column of the Skills Table was not used in the formulation of the score
- The Domain Description could have helped us generate a better score for Job Descriptions that do not have specific skills that overlap in our skills table

Double Matching

- The similarity score generated from the Mission Description might include skills that also exist in the skills table, leading to a double count for the duplicated skills.
- Our goal for the similarity score was to capture skills that do not exist in the Skills table

THANK YOU

For Listening

APPENDIX

Prompt-Engineering

```
You are an expert in job description analysis. Extract structured information from the following job descr
and categorize skills and languages using a 1–3 scale as per the given guidelines.

### Job Description:
{job_description}

### Guidelines for Scaling (1-3)

- **Required & Preferred Skills**:
  - **3** = Critical expertise (e.g., "Expert in Python", "2+ years experience in Kubernetes")
  - **2** = Required but not expert level (e.g., "Required: Java, C++")
  - **1** = Mentioned but not explicitly required (e.g., "Nice to have: AWS")

- **Languages**:
  - **3** = Critical requirement (e.g., "Fluency in French is essential")
  - **2** = Important but secondary (e.g., "Functional English required")
  - **1** = Nice to have (e.g., "Basic German knowledge preferred")

### Output Format (Strict JSON):
{{
  "Job Title": "",
  "Required Skills": [{{"skill": "", "level": <1|2|3>}}],
  "Preferred Skills": [{{"skill": "", "level": <1|2|3>}}],
  "Experience Required": ,
  "Languages": [{{"language": "", "level": <1|2|3>}}],
  "Responsibilities": ["", "..."],
  "Location": "",
  "Salary": "",
  "Additional Notes": {{
    "Duration": "",
    "Type": "",
    "Mode of work": ""
  }}
}}

Ensure the JSON is properly formatted, strictly follows the structure, and only includes relevant data.
```

GPT 3.5 Turbo

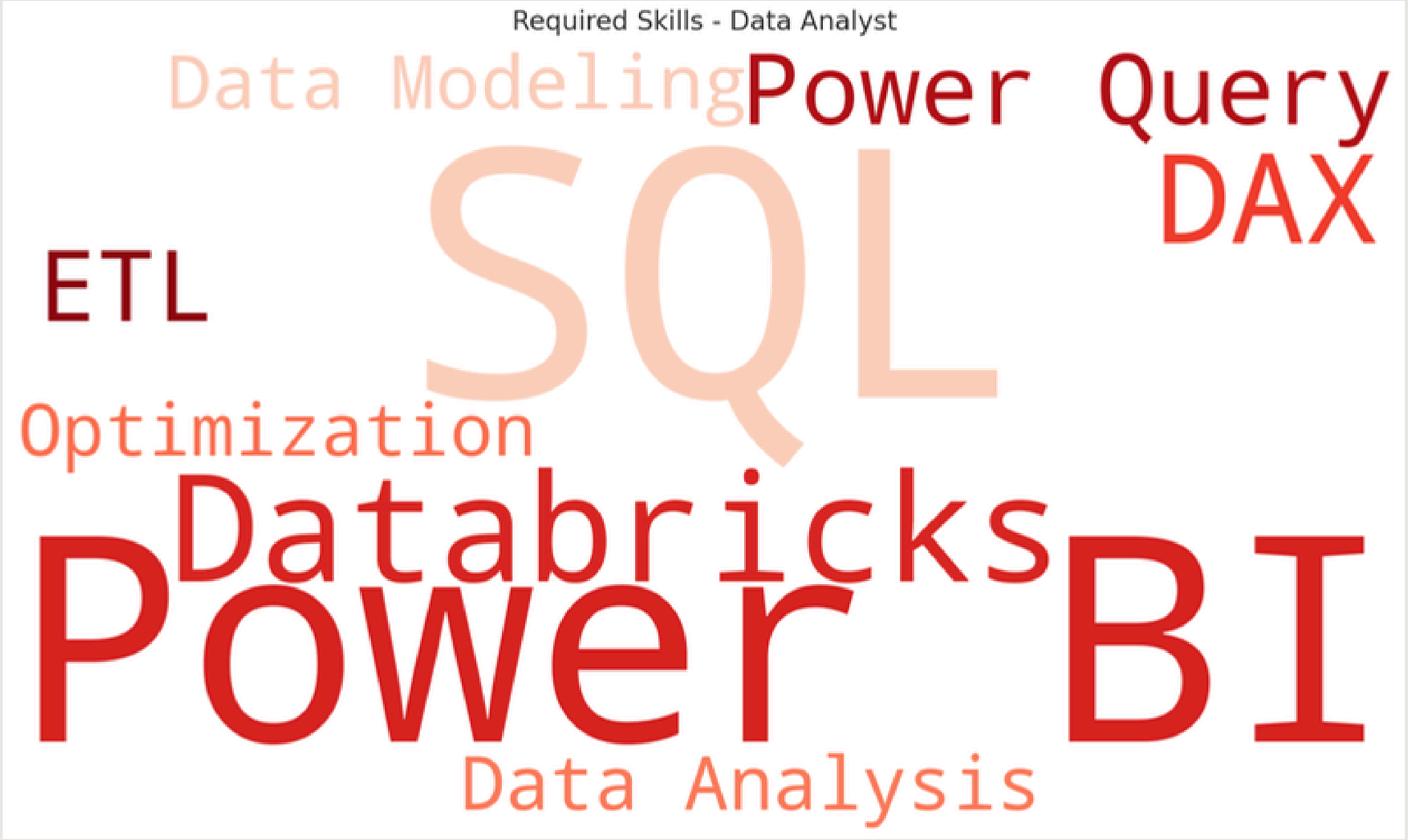
```
Analyze the following job description and extract structured information with precise values:

Job Description:
{job_description}

Extracted Features:
- Job Title: (Extract only the exact job title)
- Required Skills: (List only the required skills as an array, e.g., ["Python", "SQL", "Azure"])
- Preferred Skills: (List only preferred skills as an array, e.g., ["Machine Learning", "AWS"])
- Experience Required: (Extract only the numeric value of years, e.g., 5.0 if the job states "5+ years of experience
- Languages: (Extract languages explicitly mentioned in the job description, e.g., ["English", "French"])
- Responsibilities: (Extract job responsibilities in a structured bullet-point list)
- Location: (Extract exact location, if mentioned)
- Salary: (Extract exact salary range or numeric value if mentioned, otherwise leave empty)
- Additional Notes: (Any other relevant information without filler text)

Provide the extracted information strictly in JSON format.
```

ollama-mistral

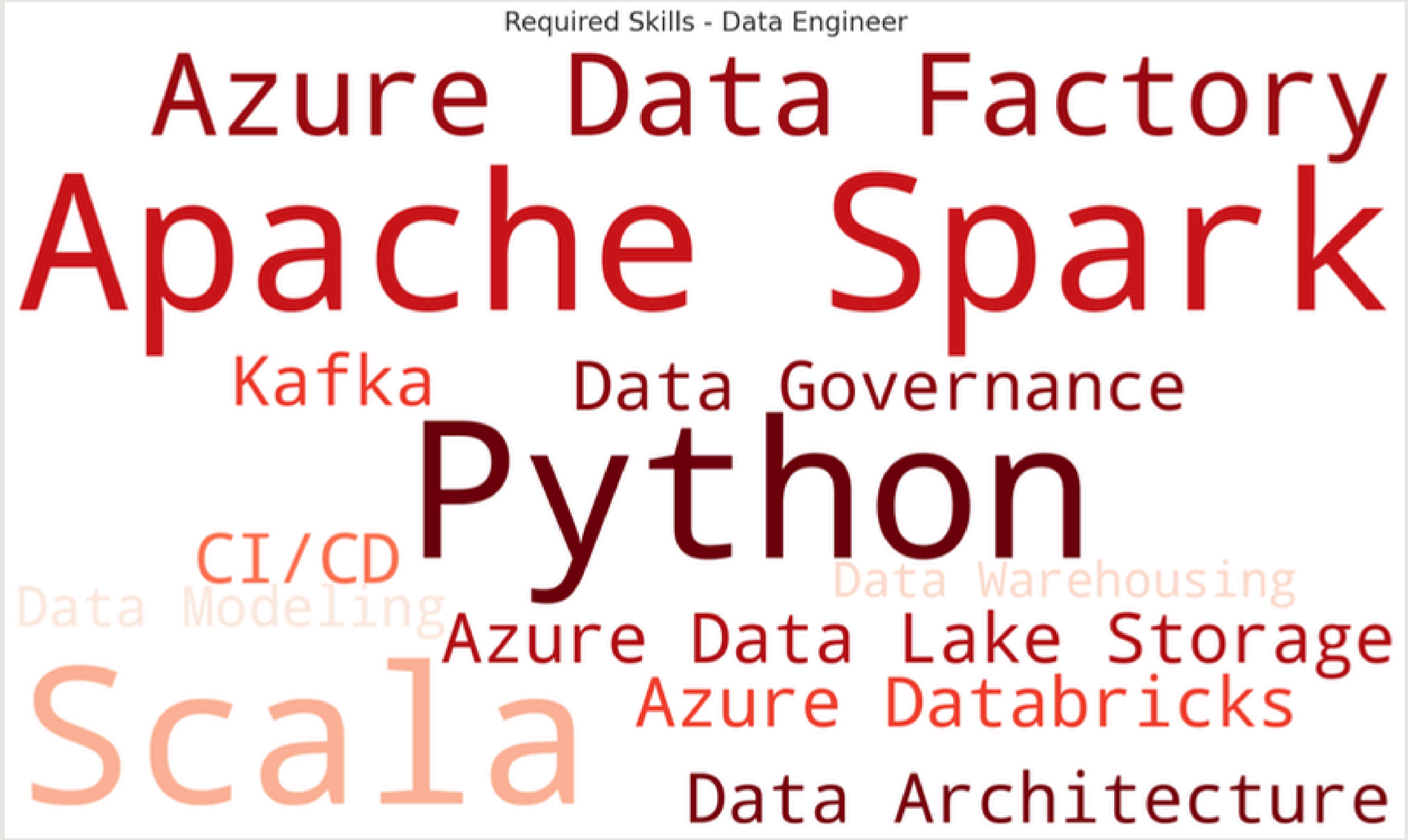
GPT 3.5 Turbo - Output


```
{
  "Job Title": "Data Analyst - Marketing Analytics",
  "Required Skills": [
    { "skill": "SQL", "level": 3 },
    { "skill": "Power BI", "level": 3 },
    { "skill": "Databricks", "level": 3 },
    { "skill": "DAX", "level": 2 },
    { "skill": "Power Query", "level": 2 },
    { "skill": "ETL", "level": 2 },
    { "skill": "Data Analysis", "level": 1 },
    { "skill": "Data Modeling", "level": 1 },
    { "skill": "Optimization", "level": 1 }
  ],
  "Preferred Skills": [
    { "skill": "Marketing Data", "level": 1 }
  ],
  "Experience Required": 5.0,
  "Languages": [
    { "language": "English", "level": 3 },
    { "language": "French", "level": 3 }
  ],
  "Responsibilities": [
    "Manage and improve marketing datasets.",
    "Develop dashboards and reports in Power BI.",
    "Optimize the performance of Power BI datasets.",
    "Integrate data from various platforms (Google Analytics, CRM, marketing tools).",
    "Write efficient SQL, DAX, and Power Query code.",
    "Collaborate closely with analysts to understand their needs.",
    "Create queries in Databricks and SSMS.",
    "Ensure data quality and reliability.",
    "Support colleagues through code reviews and technical support.",
    "Design data models tailored to business objectives."
  ],
  "Location": "Montreal",
  "Additional Notes": {
    "Duration": "10 months (renewable)",
    "Type": "Full-time",
    "Mode of work": "Hybrid (2 days per week in the office in Montreal)"
  }
}
```

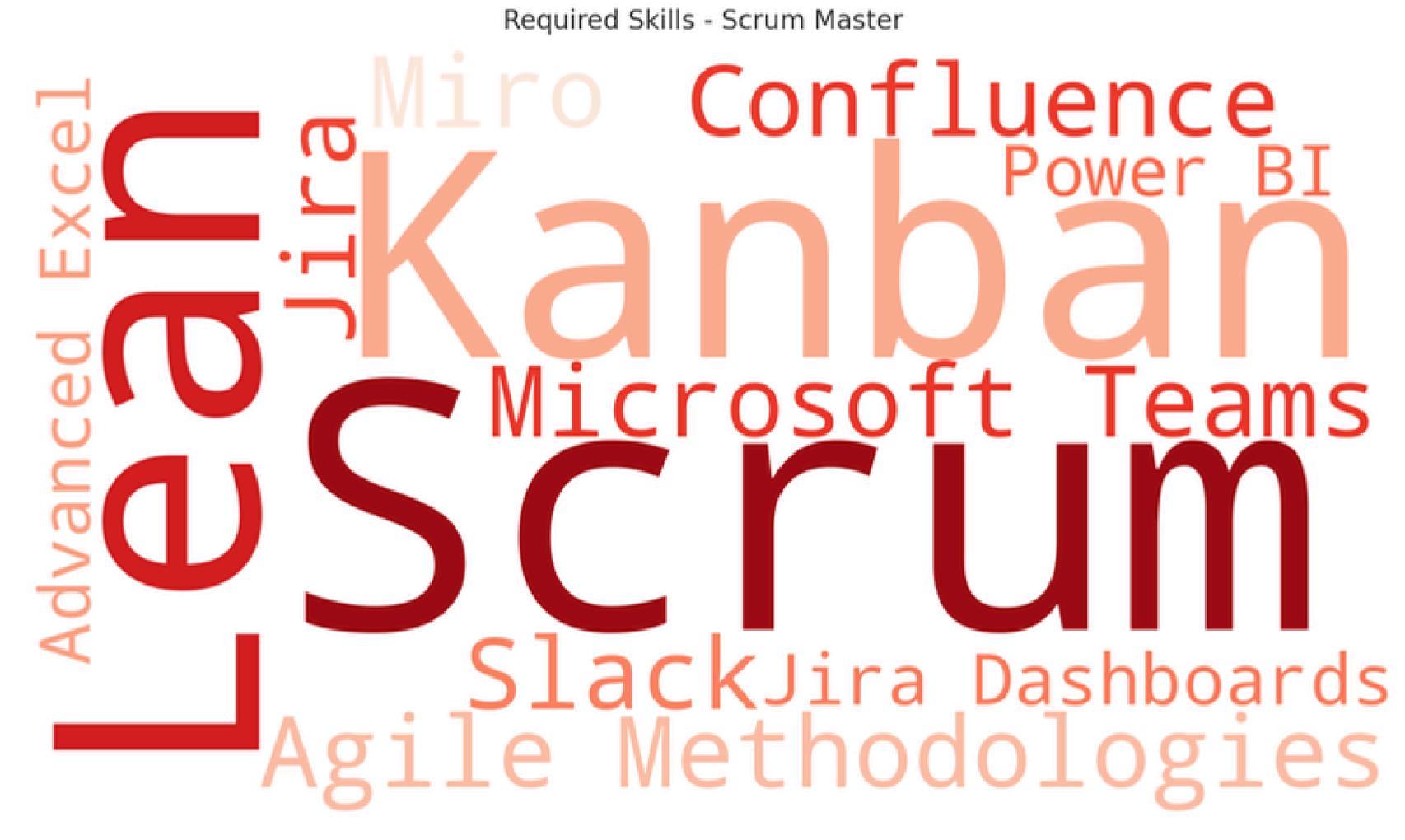
WORD CLOUD - DATA ANALYST



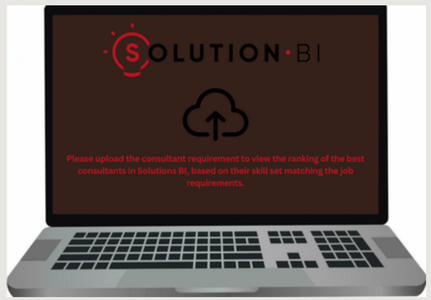
WORD CLOUD - DATA ENGINEER



WORD CLOUD - SCRUM MASTER



Architecture Flow - Microsoft Azure



Azure ML

Azure Blob Storage

Azure ML

Azure Blob Storage

Azure Data Factory

Azure SQL DB

Solutions BI Consultants
CSV Sheets

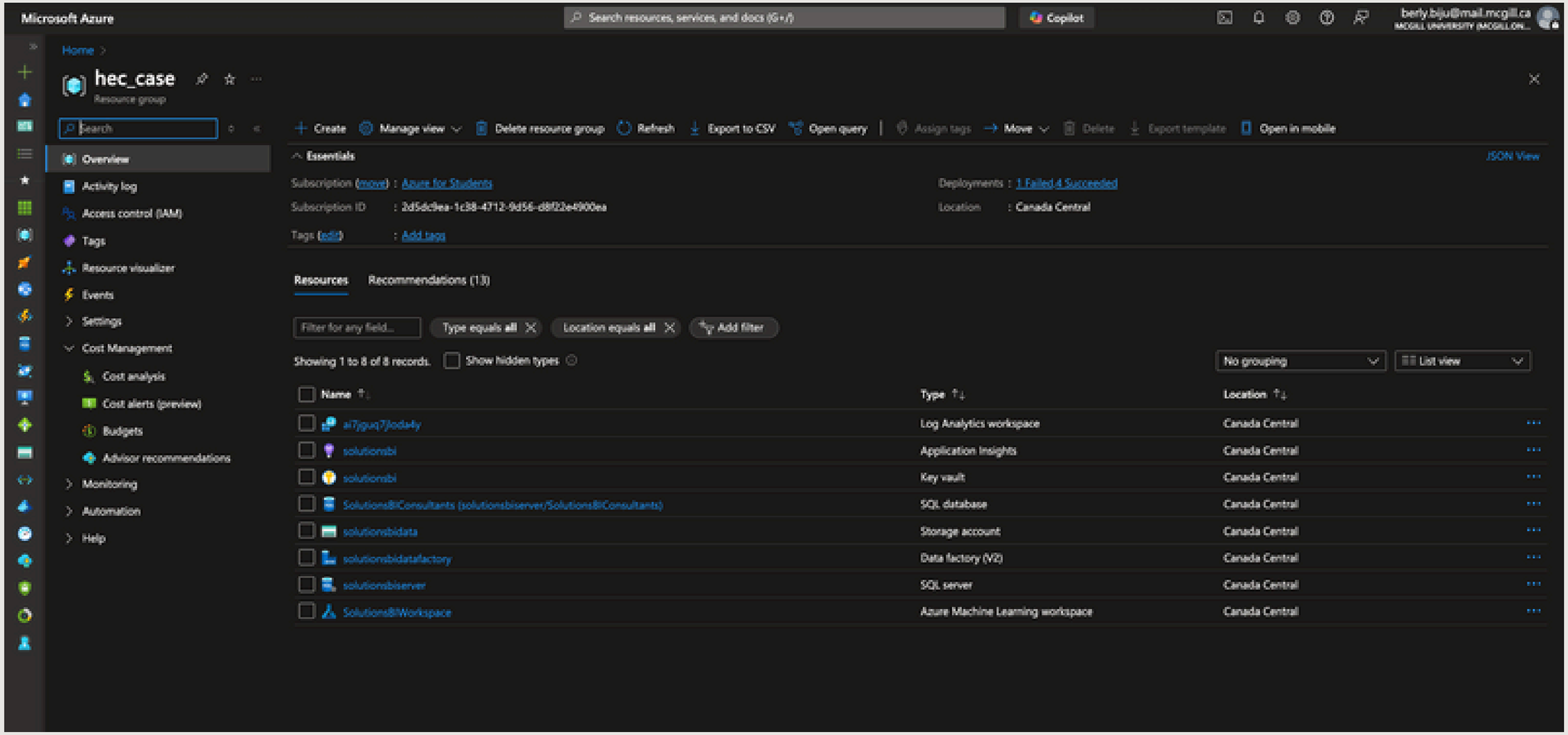
Solutions BI Consultants
Database

Power BI

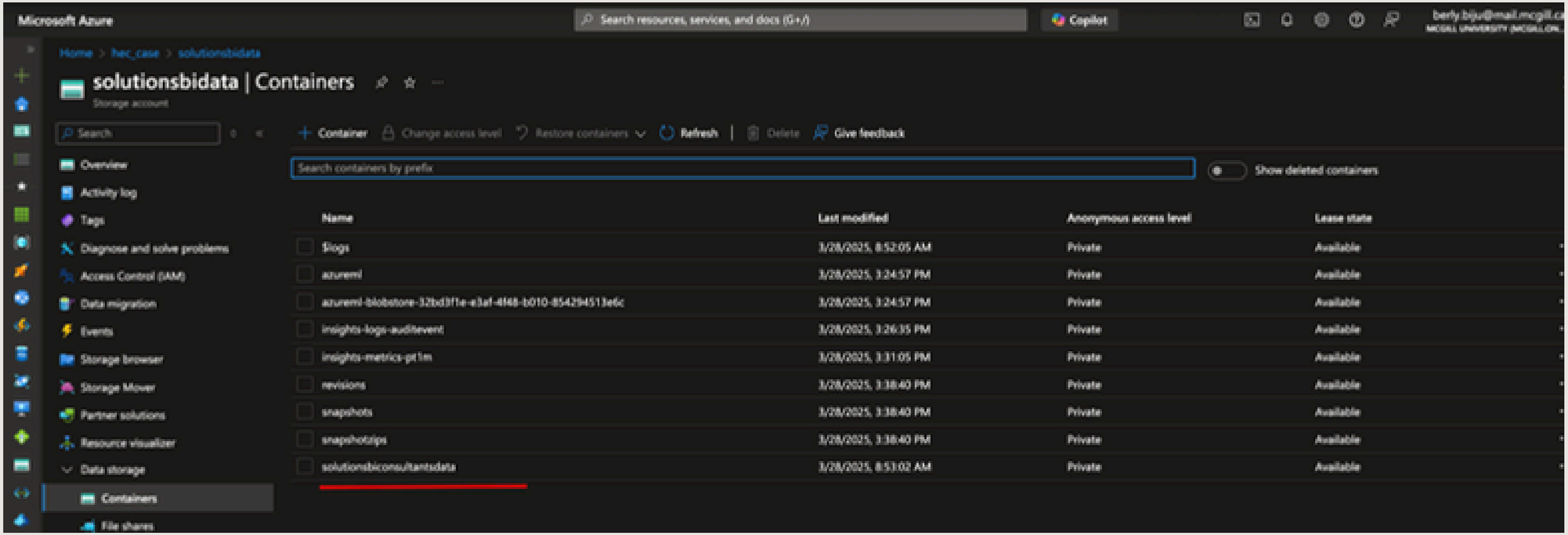
TEAM 5

Architecture - Microsoft Azure - Screenshots

RESOURCE GROUP

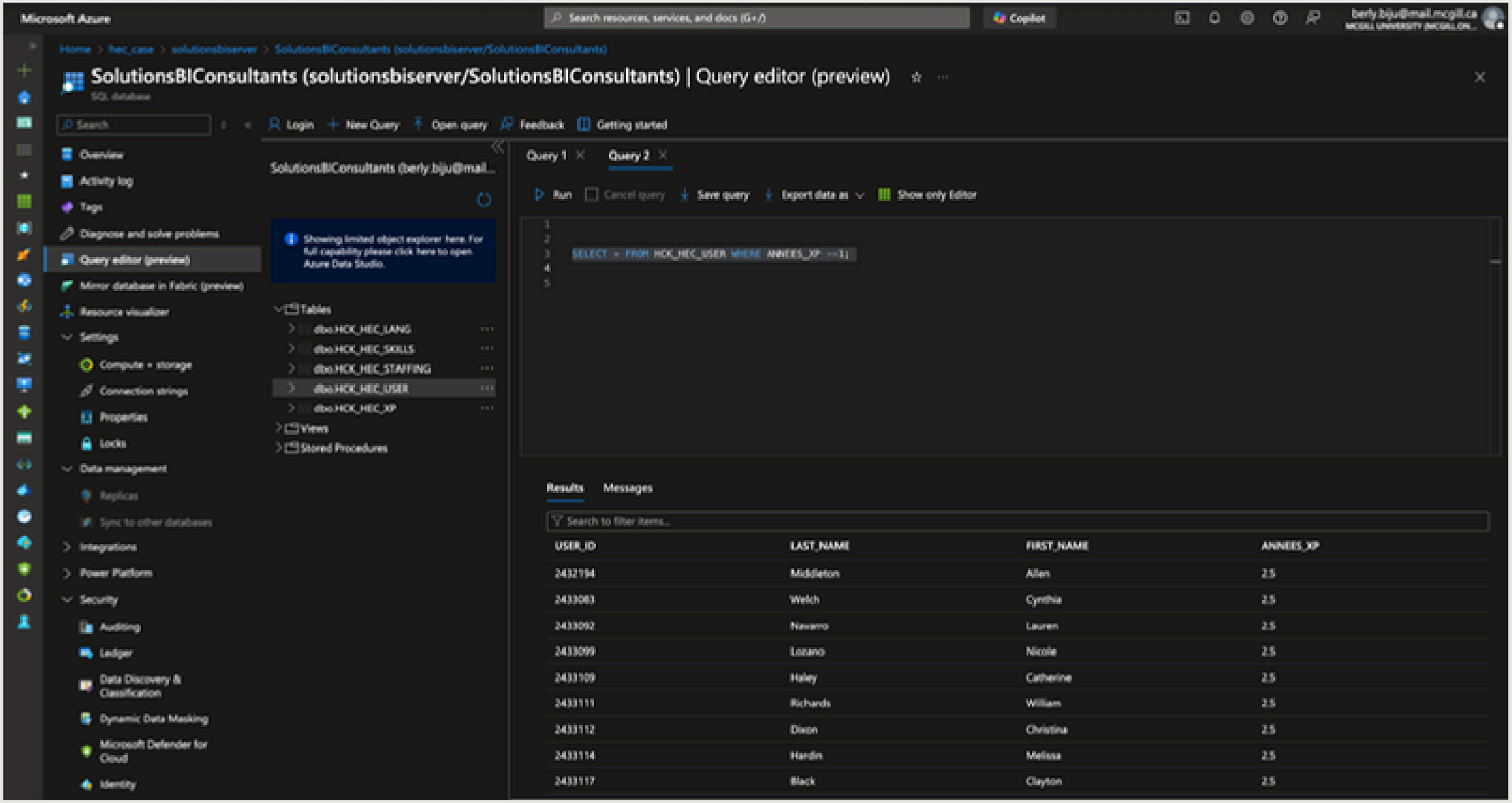


BLOB STORAGE

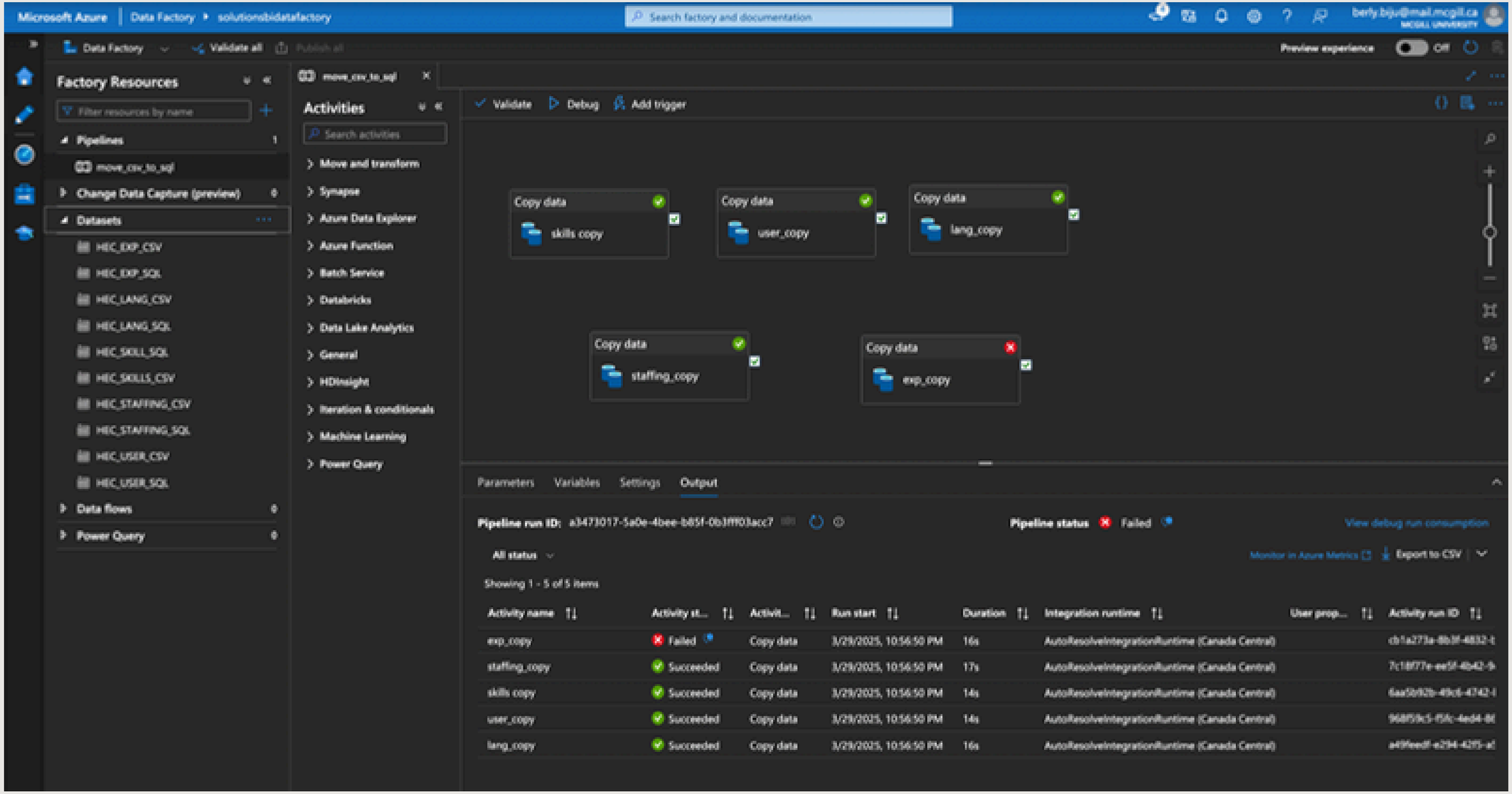


solutionsbiconsultantsdata - site where each input and output file is processed in python notebooks in Azure ML

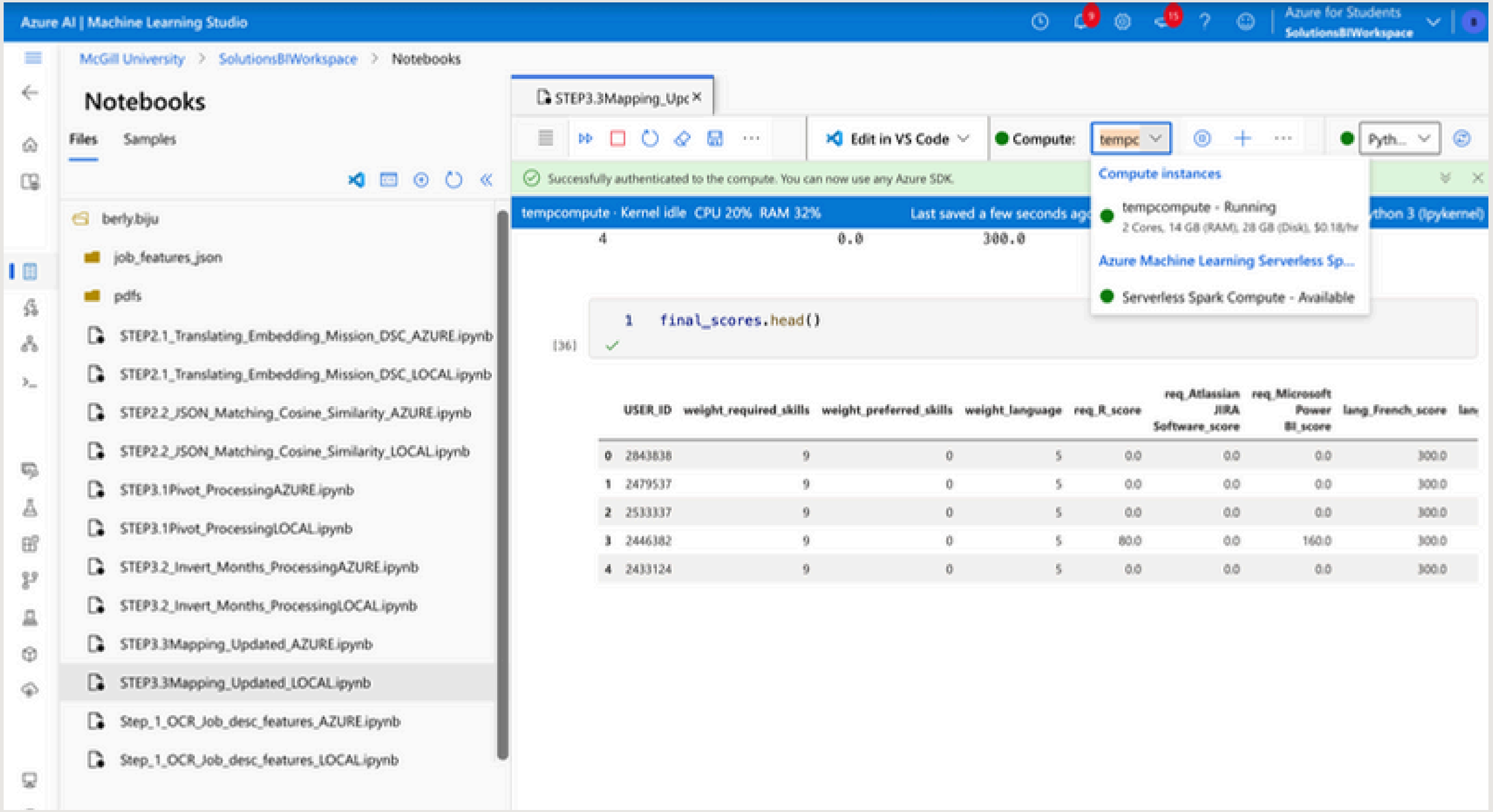
SQL DB


Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > hec_case > solutionsbiserver > SolutionsBIConsultants (solutionsbiserver/SolutionsBIConsultants)
SolutionsBIConsultants (solutionsbiserver/SolutionsBIConsultants) | Query editor (preview)
SQL database
Search
Login
New Query
Open query
Feedback
Getting started
Overview
Activity log
Tags
Diagnose and solve problems
Query editor (preview)
Mirror database in Fabric (preview)
Resource visualizer
Settings
Compute + storage
Connection strings
Properties
Locks
Data management
Replicas
Sync to other databases
Integrations
Power Platform
Security
Auditing
Ledger
Data Discovery & Classification
Dynamic Data Masking
Microsoft Defender for Cloud
Identity
SolutionsBIConsultants (berly.biju@mail...
Showing limited object explorer here. For full capability please click here to open Azure Data Studio.
Tables
dbo.HCK_HEC_LANG
dbo.HCK_HEC_SKILLS
dbo.HCK_HEC_STAFFING
dbo.HCK_HEC_USER
dbo.HCK_HEC_XP
Views
Stored Procedures
Query 1
Query 2
Run
Cancel query
Save query
Export data as
Show only Editor
SELECT * FROM HCK_HEC_USER WHERE ANNEES_XP >=1;
Results
Messages
Search to filter items...
USER_ID
LAST_NAME
FIRST_NAME
ANNEES_XP
2432194 Middleton Allen 2.5
2433083 Welch Cynthia 2.5
2433092 Navarro Lauren 2.5
2433099 Lozano Nicole 2.5
2433109 Haley Catherine 2.5
2433111 Richards William 2.5
2433112 Dixon Christina 2.5
2433114 Hardin Melissa 2.5
2433117 Black Clayton 2.5

Azure Data Factory (movement of data from csv to consultant database)



Azure ML - Site of all our Python notebooks



	USER_ID	weight_required_skills	weight_preferred_skills	weight_language	req_R_score	req_Atlassian JIRA Software_score	req_Microsoft Power BI_score	lang_French_score	lan
0	2843838	9	0	5	0.0	0.0	0.0	300.0	
1	2479537	9	0	5	0.0	0.0	0.0	300.0	
2	2533337	9	0	5	0.0	0.0	0.0	300.0	
3	2446382	9	0	5	80.0	0.0	160.0	300.0	
4	2433124	9	0	5	0.0	0.0	0.0	300.0	