IST 615

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Final Project Report: iSlice- The Course Selection App

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Project Objectives

The main inspiration for this project was to build a user-friendly, scalable, and maintainable platform for iSchool students to register for courses and for iSchool faculty to approve registrations. The goal was to build a cloud application on Azure. Without having to worry about any servers, the cloud-based application enables us to concentrate on application logic. Specifically, an application that hosts a third-party service. The software is created with high availability and fault tolerance, so there are no servers to maintain, programs to manage, or hardware to update. One of the objectives of this project was to create a functional PowerApp. Power Apps is a collection of apps, services, connectors, and a data platform that offers a quick development environment for creating unique apps for your company's requirements. You can easily create unique business apps with PowerApps that connect to your data housed in the Microsoft Dataverse underpinning data platform or in various online and on-premises data sources (such as SharePoint, Microsoft 365, Dynamics 365, SQL Server, and so on). PowerApps is used to create data-driven mobile apps for business easily. In this project, our group used SQL server to pull data into the PowerApp created. Within PowerApps, there is a list of students from a particular school, in this case we used a demo of the iSchool, students use this application to browse and submit a subject request. An administrator has a login to approve subject requests of students. Below is a list of the sections, or screens, within the PowerApp. In order to create the PowerApps, other services were used. These include Azure Data Studio, Azure Storage Accounts, and Azure SQL Database. Using Azure Data Studio, SQL was used to create tables that contained all of the data used in PowerApps. Azure Data Studio is a cross-platform database tool for data professionals using on-premises and cloud data platforms. From here, the goal was to use Azure SQL Database. Azure SQL Database is a managed cloud database offered as part of

Microsoft Azure, which is accessible as a service and ran on a cloud computing platform. The scalability, backup, and high availability of the database are handled by managed database services.

1. **Student Directory**

   List of students with their details

2. **Submit New Request**

   This button will help students to submit a new subject selection request, where they can put in their details and select the term.

3. **Subject Selection Requests**

   This button will show us all the requests submitted by students, where we as an admin can see the requests submitted by students and approve them, and get a list of all the approved requests.

Configuration of the Cloud Services

In total we used four Azure resources in which two of the resources were cloud-based. The two cloud-based resources were Azure SQL Databases and Azure Storage Accounts. The other two resources pulled the data we needed from these cloud-based resources. Azure Data Studio created the actual data tables using SQL, from here, we integrated this data into the cloud using SQL Databases, where we stored the data. This platform stored data in the cloud to be accessible by PowerApps. In PowerApps, there are data fields for each screen that import the data. To use the data, we must choose the correct table appropriate for that screen or use. In this project, we had a total of five tables, all of which were created in ADS.

Multiuser root access to the SQL database server was created. The dataset is managed and secured in the cloud using Azure SQL Database. GUI was built on Power Apps. Sharepoint was used as a backend logging-in for students and admins. The dataset was built within Azure Data Studio. Azure Storage Account resource was used for storing all of our data to ensure redundancy and recovery. A Virtual Machine was created at the Azure portal for the Azure Storage Account.

Tasks Completed

The group was successfully able to complete a data-driven mobile app using PowerApps. Our project used data created in Azure Data Studio and stored in the cloud using Azure SQL Databases. This is what was used to make the data accessible in the application. For high redundancy and availability of the data in the event of a disaster, the group used Azure Storage Accounts to create this data backup. We also were required to create a virtual machine so that the Storage Account was able to function. After the virtual machine was created, only then could we create a storage account, and to do so, we needed to input files into the container. An SAS token was created to provide restricted access to the container. After, we configured the VM to access Azure storage resources. The group then proceeded to install an azcopy utility into the VM by using commands such as wget, tar, and sudo cp. Upon completion of these tasks, our group was able to offer a list of advantages:

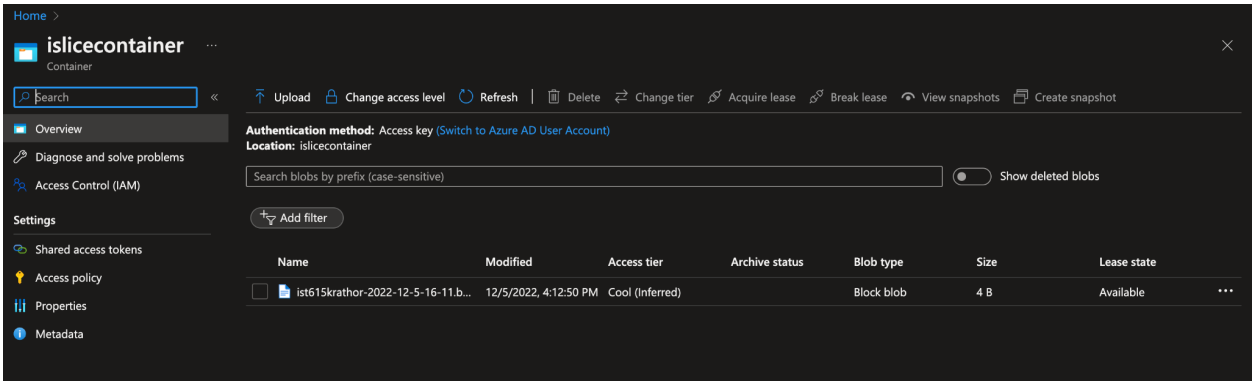
- No servers to maintain
- Serverless apps can scale automatically, and scaling is simple and effective.
- High availability embedded within the server application.
- Users only pay for what they use.
- It decreases the requirement for DevOps, which allows for a quicker time to market.

After completion of the PowerApps, we used Quicktime Player to record a video of the working GUI from the perspective of an administrator. Sharepoint was used to list the credentials of all of the students and all of the administrators within the application. Here, students use their designated SUID as their username and their last name as the password. While this is not a secure password, we recognize the scope of this work to be solely a demo.

Issues Encountered and Lessons Learned

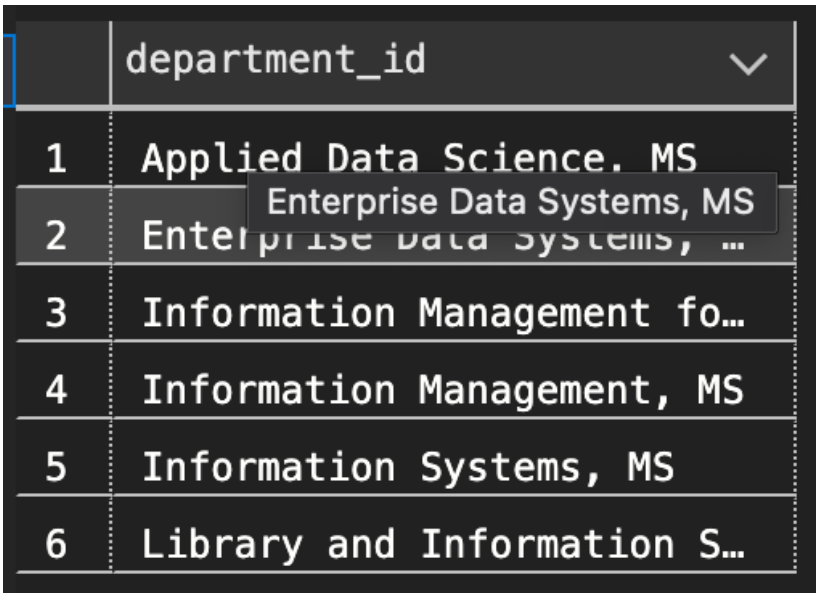
The first challenge we faced was Multi-User root access to the SQL database server. To overcome this challenge, we needed to reach out to the University. The University granted us administrator permissions, so a group member was able to assign other group members permissions to collaborate using the same cloud services. Assigning roles instead of user privileges, we created a resource group for our team and assigned the owner role access to a resource group.

Another issue the group encountered was backing up the SQL databases into the storage account. Since we now had multiuser access, it was essential to back up the databases to secure our users' information. Since we used a student azure account, we could not back up that information in the storage container and instead needed special permissions. Fortunately, we had time to gain that permission. However, we learned that if we had created the databases on our VSE subscription, we could've saved time and given access to that data much quicker.



Appendix

Department Lookup Table



Subject Lookup Table

	subject_id
1	ACC 652 – Accounting Anal…
2	IST 615 – Cloud Management
3	IST 618 – Information Pol…
4	IST 623 – Introduction to…
5	IST 644 – Managing Data S…
6	IST 652 – Scripting for D…
7	IST 659 – Data Administra…
8	IST 664 – Natural Languag…
9	IST 687 – Introduction to…
10	IST 707 – Applied Machine…
11	IST 718 – Big Data Analyt…
12	IST 719 – Information Vis…
13	IST 722 – Data Warehouse
14	IST 736 – Text Mining
15	IST 769 – Advanced Big Da…
16	IST 772 – Quantitative Re…
17	IST 782 – Applied Data Sc…
18	IST 974 – Internship in A…
19	MAR 653 – Marketing Analy…
20	MAS 766 – Linear Statisti…
21	MAS 777 – Time Series Mod…
22	MBC 638 – Data Analysis a…
23	SCM 651 – Business Analyt…
24	SCM 702 – Principles of M…

Admission Term Lookup Table

	student_admission_term
1	Fall 2022
2	Spring 2022
3	Summer 2022

iSchool Students Table

	student_id	student_suid	student_lastname	student_firstname	student_admission_term	student_department
1	1	111220001	Photo	Arial	Fall 2022	Information Management fo…
2	2	111220002	Ladd	Sal	Fall 2022	Information Management fo…
3	3	111220003	Dawind	Dustin	Fall 2022	Information Management, MS
4	4	111220004	Shores	Sandi	Fall 2022	Information Management, MS
5	5	111220005	Gunnering	Isabelle	Summer 2022	Information Management fo…
6	6	111220006	Hvmeehom	Lee	Summer 2022	Information Management, MS
7	7	111220007	Wrench	Allan	Fall 2022	Information Systems, MS
8	8	111220008	Gator	Ally	Fall 2022	Library and Information S…
9	9	111220009	Frienzergon	Alma	Fall 2022	Information Systems, MS
10	10	111220010	Choke	Artie	Fall 2022	Information Management, MS
11	11	111220011	Alott	Bette	Fall 2022	Library and Information S…
12	12	111220012	Melator	Bill	Fall 2022	Library and Information S…
13	13	111220013	Enweave	Bob	Fall 2022	Library and Information S…
14	14	111220014	Nugget	Chris P.	Spring 2022	Information Management fo…
15	15	111220015	Itupp	Chuck	Spring 2022	Library and Information S…
16	16	111220016	Erin	Detyers	Spring 2022	Information Management, MS
17	17	111220017	Tan	Kurt	Spring 2022	Applied Data Science, MS
18	18	111220018	Case	Justin	Spring 2022	Applied Data Science, MS
19	19	111220019	Belevit	Kent	Spring 2022	Applied Data Science, MS
20	20	111220020	Mi	Mary	Summer 2022	Applied Data Science, MS
21	21	111220021	Mumm	Maxi	Spring 2022	Information Management fo…
22	22	111220022	Rophone	Mike	Spring 2022	Information Systems, MS
23	23	111220023	Tural	Nat	Spring 2022	Library and Information S…
24	24	111220024	Moni	Otto	Summer 2022	Information Systems, MS
25	25	111220025	O'Furniture	Patty	Spring 2022	Information Systems, MS
26	26	111220026	Moss	Pete	Spring 2022	Library and Information S…
27	27	111220027	Docktur-Indahaus	Sara	Summer 2022	Library and Information S…
28	28	111220028	Isnomor	Sara	Spring 2022	Applied Data Science, MS
29	29	111220029	Ofewe	Seymour	Spring 2022	Enterprise Data Systems, …
30	30	111220030	Shores	Sonny	Spring 2022	Enterprise Data Systems, …
31	31	111220031	Itupp	Tally	Summer 2022	Enterprise Data Systems, …
32	32	111220032	Androll	Tuck	Summer 2022	Enterprise Data Systems, …
33	33	111220033	Rathor	Kishan	Fall 2022	Applied Data Science, MS

Request Approved Table

	request_id	request_student_id	request_student_suid	requested_subject	request_approved_student_id	request_approved_date
1	1	33	111220033	IST 707 – Applied Machine…	*NULL*	*NULL*
2	2	32	111220032	IST 772 – Quantitative Re…	*NULL*	*NULL*

Power Apps Video Link

https://youtu.be/8UEWaB6lwzQ