**Databases 2 & 3, Azure Migration Summary**

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**Azure Infrastructure & Student Access**

Azure Infrastructure access & permissions required to create resources within the Resource Group will restricted to Rob & Krissi.

Students will be able to access their work remotely, regardless of DB2 or DB3. This will be via Putty and assigned logins. Their access for MariaDB databases will be limited to that which start with their username. I.E ARMSFA1-Database

**Backups**

***DB3***

Azure SQL Databases automatically create full back-ups weekly. Back-ups have their timing determined by the SQL Database in order to balance system workload, this cannot be changed. Back-ups can be stored for 1-35 days; however, you are able to specify a back-up and have it stored with Azure for up to ten years.

***DB2***

MariaDB creates server backups by default. These can be stored for 1-35 days and are encrypted using 256-bit encryption. The rate at which back-ups are created is based on the size of the server. Aside from adjusting the retention period to the full 35 days, no extra work is required here.

**Security**

Virtual Machines themselves will be protected by authentication, meaning a login. Users are forced to change their password initially and are subject to time bound restrictions and various role restrictions as the only users with access to a majority of services will be Krissi and Rob. Students will have Global Reader privileges, meaning that they’re unable to access resource groups. NSG’s will be used to manage traffic, in addition to OS firewalls. Alternatively, Azure Defender and Microsoft Defender Security Centre are both alternatives.

**Scripting**

Scripts that have previously been used for similar tasks to automate the creation and population of Databases as well as granting them appropriate privileges has been found. The intention is to replace this script with a modern, appropriately commented version. Additional scripts may be required in regards to adding late registrations.

**Architecture**

***DB3***

We mimicked the current set up in both DevTest labs and standalone VM’s, but found that a standalone VM was the best option to meet our needs. This is because the way networking is set up, we were unable to successfully set up port forwarding to connect to SMSS using DevTest labs. DB3 should have its own resource group. The SQL Server runs within a Docker Container on the standalone VM.

***DB2***

Because there is no need to connect to SMSS in DB2 we recommend using DevTest labs. This would be particularly useful for spinning up the temporary security server used for one week of the semester.

**Networking**

***DB3***

Networking is an important aspect to take into consideration as students will need to connect SMSS to the SQL container both on and off campus. I was unsuccessful in connecting DevTest lab VM’s to SMSS, but was able to connect my standalone VM using port forwarding. To achieve this I had to add a rule to my NSG allowing incoming traffic on 1433. Because the server is hosted on Azure students will not be required to pivot through Kate when off campus.

***DB2***

MariaDB is a lot simpler to work with for students. A single MariaDB server is hosted on Azure, students are then able to Putty into the server locally or remotely, sign in with credentials given to them and then access their Databases. As this is moving to Azure next year, students will no longer need to pivot through Kate when working remotely.

**Alternate Solutions**

Azure Functions could be used to create a serverless architecture which could potentially save on resources and the cost of storage. We are currently waiting on access to this service.  Additionally, MariaDB, which is currently used in DB2, has been suggested as an option for DB3, however this will need to be investigated further.

Costs

***VM***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **VM size** | **CPU** | **RAM(GB)** | **Data Disk** | **Cost / Month ($)** |
| **B1ls** | **1** | **0.5** | **2** | **7.28** |
| **B1s** | **1** | **1** | **2** | **14.57** |
| **B1ms** | **1** | **2** | **2** | **29.14** |
| **B2s** | **2** | **4** | **4** | **58.28** |
| **DS1\_v2** | **1** | **3.5** | **4** | **92.71** |

**Storage**

|  |  |  |
| --- | --- | --- |
|  | **Disk Size (GB)** | **Price Per Month ($)** |
| **P1** | **4** | **1.28** |
| **P2** | **8** | **2.55** |
| **P3** | **16** | **5.09** |
| **P4** | **32** | **7.99** |
| **P6** | **64** | **15.44** |
| **P10** | **128** | **29.81** |
| **P15** | **256** | **57.48** |

**Backups**

|  |  |  |  |
| --- | --- | --- | --- |
| **Size** | | **Azure Backup Price per month** | |
| **Instance < or = 50GB** | | **$ 7.5598 + storage consumed** | |
| **Instance is > 50GB but < or = 500GB** | | **$ 15.1195 + storage consumed** | |
|  | **LRS( local redundant)** | **GRS (geo-redundant)** | **RA-GRS (read/access)** |
| **Storage in GB/ Month** | **$0.0372** | **$0.0746** | **$0.0947** |
|  |  |  |  |