SIT226 Cloud Automation Technologies

Distinction Task 6.3D

Implement Database Replication

Background

This task follows on from Task 6.2C which examined the support for replication provided by various databases. In this task, you are required to demonstrate that you can combine knowledge developed in your study of the unit with the information you discovered on database replication to demonstrate deploying a replicated database using Kubernetes.

Note: you will require your own installation of Ubuntu and Kubernetes to attempt this exercise.

Get Prepared

After completing Task 6.2C, review the information on how to deploy and configure the database in a replicated configuration. Consider the resources that are available to you in Kubernetes and how these would relate to your chosen database. Deployments, StatefulSets, Services, PersistentVolumes, PersistentVolumeClaims, and other objects may all be relevant in deploying the application. You may wish to review and experiment with these mechanisms before completing this task (if you haven't already).

In completing the work for this task, note that the purpose is to demonstrate getting the replicated database working in the Kubernetes environment. You do not need to be concerned about whether your demonstration is realistic. For example, in a realistic deployment, you would need to select a storage class that would allow the database/replica to be instantiated on any node, but in this case hostPath storage would be adequate for demonstrating database replication. You would also need to be keenly focused on the security and encryption of data in a realistic deployment, which is outside the scope of our studies.

Note 1: You can change which database you implement replication for after Task 6.2C, however you will need to include an explanation for this change in Part 1, below.

Note 2: It is not important that you get every step working 100%. If you encounter an error, try to implement a workaround the error as best you can, and include these steps and outcomes in your appendices – you are demonstrating that you can apply the knowledge you have on a new problem in the Kubernetes space, not that you can complete the task flawlessly. The appendices represents a journal of your activities, not an attempt at a perfect answer to an assignment question. Encountering and overcoming errors/problems is a natural part of the work involved.

Complete the Task

Page Limit: 1 page of text formatted reasonably, e.g., 2cm margins, 11 or 12 point font, appropriate headings/spacing, etc.
Note that the appendices requirement is not included in the above page limit.

Prepare a short journal describing your activities that satisfies the following requirements:

1. Identify the database you will be implementing replication for and briefly describe its replication features (approximately 0.2 page). If you have changed your selection since Task 6.2C, briefly explain why in your answer.
2. Summarise the major steps you completed to deploy the application in Kubernetes, noting any challenges you encountered and how you overcame those challenges (approximately 0.25 page).
3. Explain how you have tested that the replication is functioning correctly, discussing any problems you encountered and how you overcame those challenges, and any key observations on the actual testing (approximately 0.25 page).
4. A brief discussion of what you learned in completing this activity (approximately 0.25 page). Issues you may wish to consider include
    - Did everything go as expected?
    - What are the advantages/disadvantage of deploying database replication application in this manner?
    - Did you find it difficult learning how to work with the replicated database concepts or how to adapt them to the Kubernetes environment?
    - What were the key Kubernetes technologies you employed to ensure that the database replication would work correctly in a live application deployment?
    - Is Kubernetes a suitable/ideal platform for deploying your chosen database with replication?
5. Appendices - provide step-by-step instructions for how to prepare the database and deploy it using Kubernetes according to the work you've completed (not counted in page limit). Note that you must include relevant screenshots to demonstrate the work you have completed and any configuration you have used (database configuration files, Kubernetes YAML files, etc.).

Reminder: This work must be your own. Although you may refer to online tutorials and instructions in learning how to do this task, your journal must reflect only the work you completed for this task.
Paraphrasing online tutorials and/or the use of screenshots from such tutorials will not be accepted (screenshots must be actual output from your screen). Use of Helm Charts, Kubernetes Operators, and other pre-packaged solutions will also not be accepted. Remember this is a distinction task and you must demonstrate that level of achievement.

Submit Your Task

Prepare your submission using the word processor of your choice and submit a PDF to OnTrack.

Citations and Referencing

When completing any work for assessment it is necessary to acknowledge any content created by others that your work has relied upon through the use of citations and references. Failing to correctly identify the work of others is known as plagiarism and is considered an issue of Academic Integrity.

If your submission to this task has involved the work of others, you must include citations and references where appropriate. Deakin provides a web site that explains how to use citations and references, and includes explanations of various referencing styles:

https://www.deakin.edu.au/students/studying/study-support/referencing

You may select any style for your citations/references, however you must be consistent in applying that style in this task (you can use other styles in other tasks if you wish).

Note that any bibliography/list of references is not included in page limits.