



MODULE NAME:	MODULE CODE:
CLOUD DEVELOPMENT B	CLDV6212

ASSESSMENT TYPE: POE (PAPER)

TOTAL MARK ALLOCATION: 100 MARKS

TOTAL HOURS: A minimum of 15 HOURS is suggested to complete this assessment

By submitting this assignment, you acknowledge that you have read and understood all the rules as per the terms in the registration contract, in particular the assignment and assessment rules in The IIE Assessment Strategy and Policy (IIE009), the intellectual integrity and plagiarism rules in the Intellectual Integrity Policy (IIE023), as well as any rules and regulations published in the student portal.

INSTRUCTIONS:

1. *No material may be copied from original sources, even if referenced correctly, unless it is a direct quote indicated with quotation marks. No more than 10% of the assignment may consist of direct quotes.*
2. *Make a copy of your assignment before handing it in.*
3. *Assignments must be typed unless otherwise specified.*
4. *Begin each section on a new page.*
5. *Follow all instructions on the PoE cover sheet.*
6. *This is an individual assignment.*

Referencing Rubric

Providing evidence based on valid and referenced academic sources is a fundamental educational principle and the cornerstone of high-quality academic work. Hence, The IIE considers it essential to develop the referencing skills of our students in our commitment to achieve high academic standards. Part of achieving these high standards is referencing in a way that is consistent, technically correct and congruent. This is not plagiarism, which is handled differently.

Poor quality formatting in your referencing will result in a penalty **of a maximum of ten percent being deducted from the percentage awarded**, according to the following guidelines. Please note, however, that **evidence of plagiarism in the form of copied or uncited work (not referenced), absent reference lists, or exceptionally poor referencing, may result in action being taken in accordance with The IIE's Intellectual Integrity Policy (0023).**

Markers are required to provide feedback to students by indicating **(circling/underlining) the information that best describes the student's work.**

Minor technical referencing errors: 5% deduction from the overall percentage – the student's work contains **five or more errors** listed in the minor errors column in the table below.

Major technical referencing errors: 10% deduction from the overall percentage – the student's work contains **five or more errors** listed in the major errors column in the table below.

If both minor and major errors are indicated, then 10% only (and not 5% or 15%) is deducted from the overall percentage. The examples provided below are not exhaustive but are provided to illustrate the error

Required: Technically correct referencing style	Minor errors in technical correctness of referencing style Deduct 5% from percentage awarded	Major errors in technical correctness of referencing style Deduct 10% from percentage awarded
<u>Consistency</u> <ul style="list-style-type: none"> The same referencing format has been used for all in-text references and in the bibliography/reference list. 	Minor inconsistencies. <ul style="list-style-type: none"> The referencing style is generally consistent, but there are one or two changes in the format of in-text referencing and/or in the bibliography. For example, page numbers for direct quotes (in-text) have been provided for one source, but not in another instance. Two book chapters (bibliography) have been referenced in the bibliography in two different formats. 	Major inconsistencies. <ul style="list-style-type: none"> Poor and inconsistent referencing style used in-text and/or in the bibliography/ reference list. Multiple formats for the same type of referencing have been used. For example, the format for direct quotes (in-text) and/or book chapters (bibliography/ reference list) is different across multiple instances.
<u>Technical correctness</u> Referencing format is technically correct throughout the submission. Position of the reference: a reference is directly associated with every concept or idea. For example, quotation marks, page numbers, years, etc. are applied correctly, sources in the bibliography/reference list are correctly presented.	Generally, technically correct with some minor errors. <ul style="list-style-type: none"> The correct referencing format has been consistently used, but there are one or two errors. Concepts and ideas are typically referenced, but a reference is missing from one small section of the work. Position of the references: references are only given at the beginning or end of every paragraph. For example, the student has incorrectly presented direct quotes (in-text) and/or book chapters (bibliography/reference list). 	Technically incorrect. <ul style="list-style-type: none"> The referencing format is incorrect. Concepts and ideas are typically referenced, but a reference is missing from small sections of the work. Position of the references: references are only given at the beginning or end of large sections of work. For example, incorrect author information is provided, no year of publication is provided, quotation marks and/or page numbers for direct quotes missing, page numbers are provided for paraphrased material, the incorrect punctuation is used (in-text); the bibliography/reference list is not in alphabetical order, the incorrect format for a book chapter/journal article is used, information is missing e.g. no place of publication had been provided (bibliography); repeated sources on the reference list.
Congruence between in-text referencing and bibliography/ reference list <ul style="list-style-type: none"> All sources are accurately reflected and are all accurately included in the bibliography/ reference list. 	Generally, congruence between the in-text referencing and the bibliography/ reference list with one or two errors. <ul style="list-style-type: none"> There is largely a match between the sources presented in-text and the bibliography. For example, a source appears in the text, but not in the bibliography/ reference list or vice versa. 	A lack of congruence between the in-text referencing and the bibliography. <ul style="list-style-type: none"> No relationship/several incongruencies between the in-text referencing and the bibliography/reference list. For example, sources are included in-text, but not in the bibliography and vice versa, a link, rather than the actual reference is provided in the bibliography.
In summary: the recording of references is accurate and complete.	In summary, at least 80% of the sources are correctly reflected and included in a reference list.	In summary, at least 60% of the sources are incorrectly reflected and/or not included in reference list.

Overall Feedback about the consistency, technical correctness and congruence between in-text referencing and bibliography:

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Background

Aweh Productions is a local South African entrepreneurial company specializing in producing smaller musical events at various venues. They are responsible for hosting the event, ticket sales and access control.

As part of their security procedures at the venue entrance, they need to complete a vaccination status check using either a website or a mobile app. They have contracted you to write a prototype that they can trial at an upcoming event to prove that it works.

They are most interested in the back-end solution which must run in the cloud. That is, how the numerous vaccination providers will get vaccination details into the central data storage. Their primary requirements are:

- Retrieval of vaccination information should take seconds;
- Be able to store the different data formats provided by different data manufacturers; and
- Keep the operational costs of running the solution as low as possible.

Instructions

The Portfolio of Evidence (POE) requires you to create the Azure compute and data storage components for Aweh Productions. These will be progressively developed through Part 1 and Part 2 that build on each other to create a final solution for CLDV6212.

- Students must have access to an Azure account with available credit. This access would have been arranged for the first semester course CLDV6211 which precedes this semester.
- Use Microsoft Visual Studio for your coding.
- Each part of the POE should be submitted as a single Microsoft Word document.

In general, follow the instructions provided in each part below carefully.

Summary Sheet:

ITEM	DESCRIPTION
Summary of Activities	The student needs to submit all deliverables on MS Teams (or on another platform as directed by their campus). <i>NB. Please supply the URL of the Web App module developed.</i>
Tools and Resources	<ul style="list-style-type: none"> • MS Teams (to submit the tasks and PoE); • Microsoft Visual Studio; • Microsoft Word or other word processing software; • Windows Azure Portal; • Windows Azure subscription with Microsoft Azure Storage.

POE Part 1 — Differentiate between on-premises and cloud solutions; and deploy a compute service **(Marks: 50)**

Learning Units: 1 – 3

Assessment:

Assessment/ deliverable	Marks	Weight	Duration
Part 1	50	25%	15 hrs.

A. Contrast how traditional and cloud applications differ by examining the following table

Traditional on-premises	Modern cloud
Monolithic Designed for predictable scalability Relational database Synchronized processing Design to avoid failures (MTBF) Occasional large updates Manual management Snowflake servers	Decomposed Designed for elastic scale Polyglot persistence (mix of storage technologies) Asynchronous processing Design for failure (MTTR) Frequent small updates Automated self-management Immutable infrastructure

Docs.microsoft.com. 2022. Azure application architecture fundamentals. [Online]. Available at: <https://docs.microsoft.com/en-us/azure/architecture/guide/> [Accessed 14 July 2022].

Conduct your own research online, and then answer the following questions.

- Briefly **explain the difference** between the two items in **every line** in the table above;
- Provide an **example** of each item.

Provide your answer in a **table with 4 columns** with the following headings:

- On-premises definition
- On-premises example
- Cloud definition
- Cloud example

E.g., For the first line in the table above, explain the difference between **Monolithic vs Decomposed**, with an example of each. Then do the same for **all the other lines** in the table.

Traditional On-Premises		Modern Cloud	
On-premises definition	On-premises example	Cloud definition	Cloud example
Monolithic: <i>Add your explanation here</i>	Monolithic: <i>Add your example here</i>	Decomposed: <i>Add your explanation here</i>	Decomposed: <i>Add your example here</i>
Designed for predictable scalability: <i>Add your explanation here</i>	Designed for predictable scalability: <i>Add your example here</i>	Designed for elastic scale: <i>Add your explanation here</i>	Designed for elastic scale: <i>Add your example here</i>
Etc.			

(Note: Remember to cite your references accurately in your explanations, and to include your references in your reference list)

B. Deploy an Azure Function compute service to the cloud

Write an Azure Function that is invoked by an HTTP trigger.

The URL should look like this:

http://<APP_NAME>.azurewebsites.net/api/id/xxxxxxxxxxxxxx

This will run a vaccination status query against a South African ID or a passport number, where:

- **xxxxxxxxxxxxxx** is the ID or passport number.
- **<APP_NAME>** is your student number.

Hard code some valid ID numbers into your function and **return** some dummy vaccination data if the number **xxxxxxxxxxxxxx** provided as part of the URL is found.

Deploy the function to Azure.

In a single Microsoft Word document (below your answers for question A) provide screenshots of the following as your answer for question B:

- The function code;
- The function working in a web browser with the URL clearly visible (which must start with your student number); and
- The steps you took to deploy the function (there must be several steps).

NB. Remember to supply all relevant URL(s) in your Word document.

RUBRIC 1 (for POE Part 1)	Levels of Achievement				Comments
In order to be awarded full marks for these elements, students need to have:	Excellent	Good	Developing	Poor	
	Score Ranges Per Level				
Contrast how traditional and cloud applications differ. <ul style="list-style-type: none">Answers are given in a table with four columns.Students conducted own research to complete all 8 rows in the table with relevant descriptions showing the differences between the traditional and modern approaches.	16 - 20	11 - 15	6 - 10	0 - 5	
Write an Azure function that is invoked by an HTTP trigger. <ul style="list-style-type: none">Code listing of the function is providedSpecific URL format is catered forVaccination data is returned for valid id numbers demonstrated using screenshots	16 - 20	11 - 15	6 - 10	0 - 5	
Deploy Azure function to the cloud. <ul style="list-style-type: none">Screenshots of the Azure deployment process are providedURL is provided and accessible in a web browser	9 - 10	7 - 8	3 - 5	0 - 2	
POE PART 1 SUBTOTAL					/50

POE Part 2 — Apply different types of cloud storage**(Marks: 50)**

Learning Units: 1 – 5

Assessment:

Assessment/ deliverable	Marks	Weight	Duration
Part 2	50	30%	15 hrs

A. Write a .NET core console application to put messages into a data storage queue

Create a new .Net core console application, which will allow messages to be added to a data storage queue. If the queue doesn't exist – create it.

Insert some messages into the queue, as per the example message shown below.

Example messages (Id = South African ID or any passport number)

- Id:VaccinationCenter:VaccinationDate:VaccineSerialNumber
- VaccineBarcode:VaccinationDate:VaccinationCenter:Id

NB. Note the different data formats!

The console application for question A must **run on your local machine**.

B. Change the Azure function in POE Part 1 from using an HTTP trigger to a Queue trigger

For POE Part 1 you created an Azure function to query vaccine status, which was invoked by an HTTP trigger. You must now change your Azure function so that the function is invoked by a Queue trigger instead.

- When a message is placed in the associated queue, the function should place the contents of that message into an Azure SQL Database table.

All components for question B must be **deployed to and run in Azure**.

Submit your answers to POE Part 2 question A and question B in a single Word doc. You must provide screenshots of:

- The function code;
- The console application code;
- At least five messages in the queue in Azure portal; and
- The corresponding messages in the Azure SQL database.

NB. Remember to supply all relevant URL(s) in your Word document.

RUBRIC 2 (for POE Part 2)	Levels of Achievement				Comments
In order to be awarded full marks for these elements, students need to have:	Excellent	Good	Developing	Poor	
	Score Ranges Per Level				
Write a .NET core console application to put messages into a data storage queue. <ul style="list-style-type: none">Code listing of the console application is provided.Storage queue is created in Azure.Screenshots of 5 messages in Azure storage queue from Azure portal.	16 - 20	11 - 15	6 - 10	0 - 5	
Write an Azure function that is invoked by a queue trigger. <ul style="list-style-type: none">Code listing of function is provided.Azure function is triggered when message is placed in queue	16 - 20	11 - 15	6 - 10	0 - 5	
Insert queue messages into Azure SQL Database. <ul style="list-style-type: none">Code listing of function includes code to insert into databaseScreenshots of 5 database entries corresponding to storage queue	9 - 10	7 - 8	3 - 5	0 - 2	
POE PART 2 SUBTOTAL					/50

POE Part 3 — Analyse scenario and provide appropriate cloud solution (Marks: 50)

Learning Units: 1-6

Assessment:

Assessment/ deliverable	Marks	Weight	Duration
POE Task 3	50	45%	15 hrs.

Background

In Part 1 of this POE, you created an Azure function based on a HTTP trigger. In Part 2 you changed this function to be triggered by placing an entry into a message queue. You also extended the function to insert a corresponding entry into an Azure SQL database table when triggered. The final part of the POE builds on this to consider Aweh Productions' primary requirements:

- Retrieval of vaccination information should take seconds.
- Be able to store the different data formats provided by different data manufacturers; and
- Keep the operational costs of running the solution as low as possible.

You must use your knowledge of the different Azure storage services e.g., blobs, queues to accommodate these into your solution.

A. List the Azure components utilised thus far in the POE

Provide your list of components in a **table with the three columns** listed below:

- Component e.g., Azure SQL database
- Technology choice – either compute or data storage
- Hosting model e.g., PAAS

B. Motivation for needed change

Given the scenario initially presented, motivate which component should be changed to meet the primary requirements.

HINT: Consider the different kinds of Azure storage services

C. Implement the necessary changes to Part 2

Given your motivation provided in question B above, you must now make changes/improvements to your Azure function completed for POE Part 2, so that your Azure function meets the primary requirements that were given.

In a single Word doc (below your answers for questions A and B) provide **screenshots** of:

- The function code;
- At least five messages in the queue in Azure portal; and
- The corresponding messages in the changed component.

NB. Remember to supply all relevant URL(s) in your Word document.

D. Testing

Test your final solution by running the **console application** developed in Part 2 of the POE.

Provide **screenshots** of the console application running.

Ensure you include **different message formats for five messages**.

RUBRIC 3 (for POE Part 3)	Levels of Achievement				Comments
In order to be awarded full marks for these elements, students need to have:	Excellent	Good	Developing	Poor	
	Score Ranges Per Level				
List of Azure components <ul style="list-style-type: none">Answers are given in a table with three columnsStudents provide a different component per table row	9 - 10	7 - 8	3 - 5	0 - 2	
Motivate which Azure cloud component should be changed to meet the primary requirements. <ul style="list-style-type: none">Cloud component is providedClear and logical motivation provided in student's own words	9 - 10	7 - 8	3 - 5	0 - 2	
Implement the changed component. <ul style="list-style-type: none">Code listing of the changed function is providedThe changed component is created in Azure	16 - 20	11 - 15	6 - 10	0 - 5	

<p>Adequate testing of the solution is provided.</p> <ul style="list-style-type: none"> • Screenshots of the console application running for five different messages are provided • For each message show a screenshot of <ul style="list-style-type: none"> ○ The message in the queue in Azure portal ○ The message in the changed component 	9 - 10	7 - 8	3 - 5	0 - 2	
POE PART 3 SUBTOTAL					/50

[TOTAL MARKS: 100]