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**Higher Nationals in Computing**

**UNIT 16**

**CLOUD COMPUTING**

ASSIGNMENT

No.2

Learner’s name: Pham Hoang Long

Assessor name: Nam Lam

Class: GCS0605

Learner’s ID: GCS17521

Subject’s ID: 1644

Assignment due:

Assignment submitted:

**ASSIGNMENT 2 FRONT SHEET**

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| **Qualification** | **BTEC Level 5 HND Diploma in Computing** | | |
| **Unit number and title** | Unit 16: Cloud Computing | | |
| **Submission date** | 6/1/2020 | **Date Received 1st submission** |  |
| **Re-submission Date** |  | **Date Received 2nd submission** |  |
| **Student Name** | Pham Hoang Long | **Student ID** | GCS17521 |
| **Class** | GCS0605 | **Assessor name** | Nam Lam |
| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice. | | | |
|  |  | **Student’s signature** |  |

**Grading grid**

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| P5 | P6 | P7 | P8 | M3 | M4 | D2 | D3 |
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| --- | --- | --- |
| **❒ Summative Feedback: ❒ Resubmission Feedback:** | | |
| **Grade:** | **Assessor Signature:** | **Date:** |
| **Signature & Date:** | | |

**ASSIGNMENT 2 BRIEF**

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| **Qualification** | **BTEC Level 5 HND Diploma in Computing** | | |
| **Unit number** | Unit 9: Cloud Computing | | |
| **Assignment title** | Cloud’s implementation and security threats | | |
| **Academic Year** | 2018 – 2019 | | |
| **Unit Tutor** | Nam Lam | | |
| **Issue date** |  | **Submission date** |  |
| **IV name and date** |  | | |

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| --- |
| **Submission Format:** |
| *Format:* A presentation in Power Point format(about 25 pages)  A security manual(in PDF format)  You must use font *Calibri size 12, set number of the pages and use multiple line spacing at 1.3. Margins must be: left: 1.25 cm; right: 1 cm; top: 1 cm and bottom: 1 cm.* The reference follows Harvard referencing system.  *Submission* Students are compulsory to submit the assignment in due date and in a way requested by the Tutors. The form of submission will be a soft copy posted on <http://cms.greenwich.edu.vn/>  *Note:* The Assignment *must* be your own work, and not copied by or from another student or from  books etc. If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference your sources, using the Harvard style. Make sure that you know how to reference properly, and that understand the guidelines on plagiarism. *If you do not, you definitely get failed* |
| **Unit Learning Outcomes:** |
| **LO3** Develop Cloud Computing solutions using service provider’s frameworks and open source tools.  **LO4** Analyse the technical challenges for cloud applications and assess their risks |
| **Assignment Brief and Guidance:** |
| **Task 1**  Base on the scenario and architecture design in the first assignment provide the implementation. Because of the time constraint of the assignment, the implementation just provides some demo functions of the scenario. The implementation includes two parts:   * A presentation (about 25 pages)   + which shows which functions are implemented   + How to config, deploy and test the services (Web application, Database Server, Source code management, server logs..) using service provider’s frameworks and open source tools.   + Images for the built functions * The source code for the built application   **Task 2**  The table of contents in your security manual (which should be 500–700 words) should be as follows:   1. Analysis of the most common problems of a cloud computing platform. 2. Possible solutions to these problems. 3. Analysis of the most common security issues in the cloud environment. 4. Discussion on how to overcome these issues. 5. Summary. |

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| Learning Outcomes and Assessment Criteria | | |
| Pass | Merit | Distinction |
| **LO3** Develop Cloud Computing solutions using service provider’s frameworks and open source tools | | **D2** Critically discusses how one can overcome these issues and constraints. |
| **P5** Configure a Cloud Computing platform with a cloud service provider’s framework.  **P6** Implement a cloud platform using open source tools. | **M3** Discuss the issues and constraints one can face during the development process. |
| **LO4** Analyse the technical challenges for cloud applications and assess their risks | |  |
| **P7** Analyse the most common problems which arise in a Cloud Computing platform and discuss appropriate solutions to these problems.  **P8** Assess the most common security issues in cloud environments. | **M4** Discuss how to overcome these security issues when building a secure cloud platform. | **D3** Critically discuss how an organisation should protect their data when they migrate to a cloud solution. |

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# Task 1:

To store data on the cloud, we need many steps to deploy and need a lot of applications to support. The following are applications and websites that help me perfect a cloud storage and input system



**Atom**: is a free, open source text editor (and source code editor) that supports Linux, Mac OS, and Windows operating systems, this software was developed by GitHub. Atom is rated as a text editor (and source code) with a modern interface, easy to use and has superior features compared to similar software. Most popular languages are supported by Atom, languages like: C / C ++, HTML, Java, JavaScript, GitHub, PHP, SQL, Python...

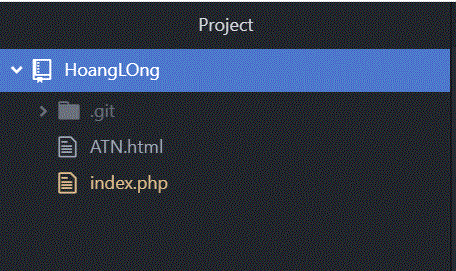
We use the PHP language to write pages to the user interface and the input interface to push data to the cloud

**GitHub Desktop**: GitHub Desktop is a hard to hold private data, just create an account you can use completely easily. It contains data and takes it to another storage location. GitHub Desktop stores all the source code you have written. You can easily backup, store and push data

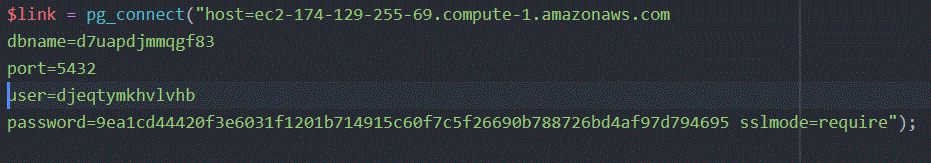
**Heroku:** is a cloud platform that allows developers to build, deploy, manage, and extend applications (PaaS - Platform as a service). It is very flexible and easy to use, providing a simple way to bring products to users.

**PgAdmin**: is the most popular and feature rich Open Source administration and development platform for PostgreSQL, the most advanced Open Source database in the world.

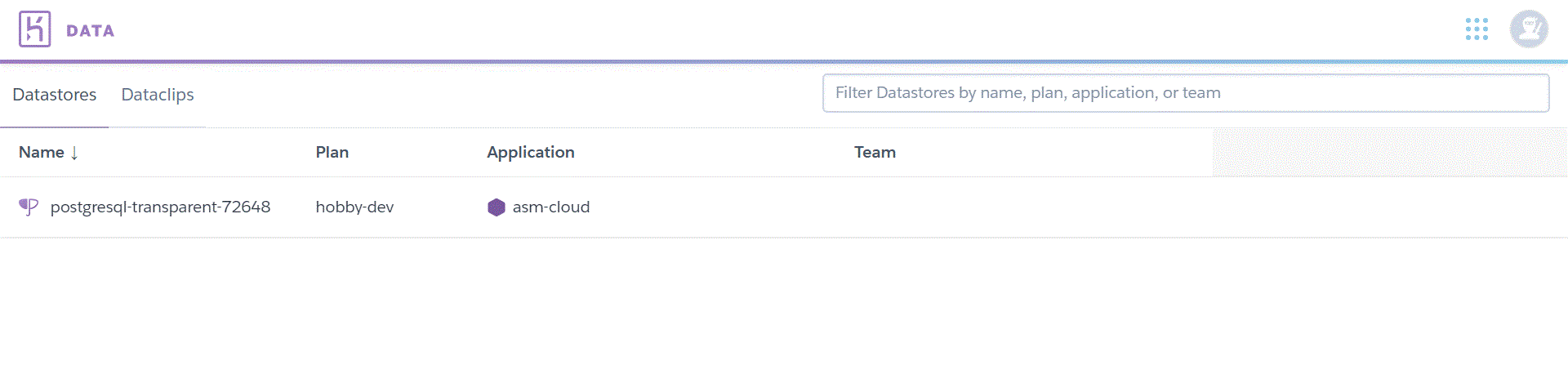
Here are some pictures of the applications deploying data to the cloud



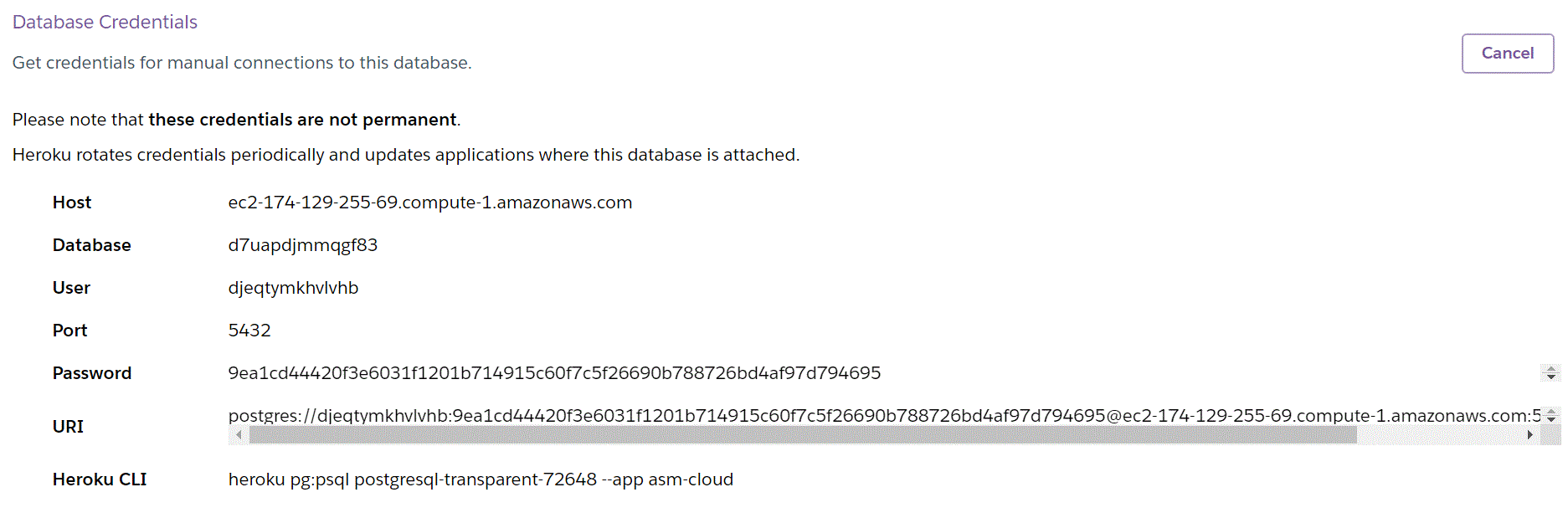
The following is the generated Project. This project consists of two files, the ATN.html file, which I code into an interface that users can see and click on the screen. The purpose of this is to enter and push data into the database. The index.html file is an appropriate configuration of the web for database and Heroku.



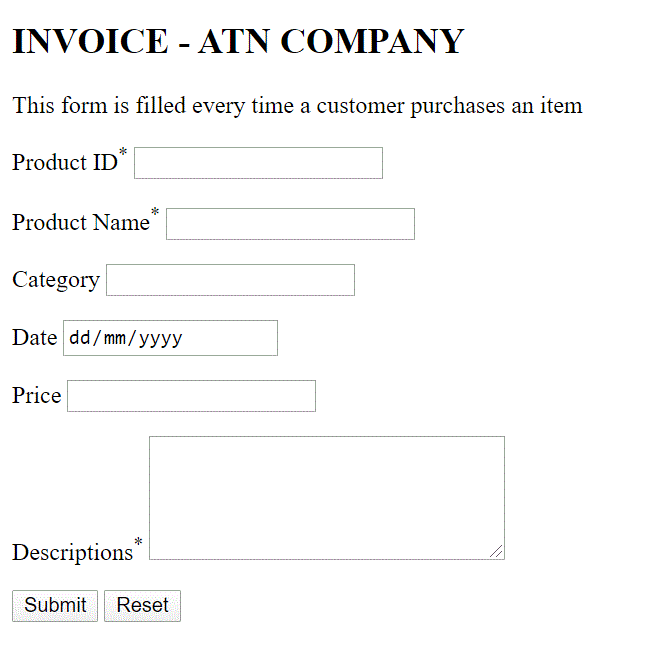
This is the code associated with Heroku's Database Credentials. Host, database, user, port, password must match.



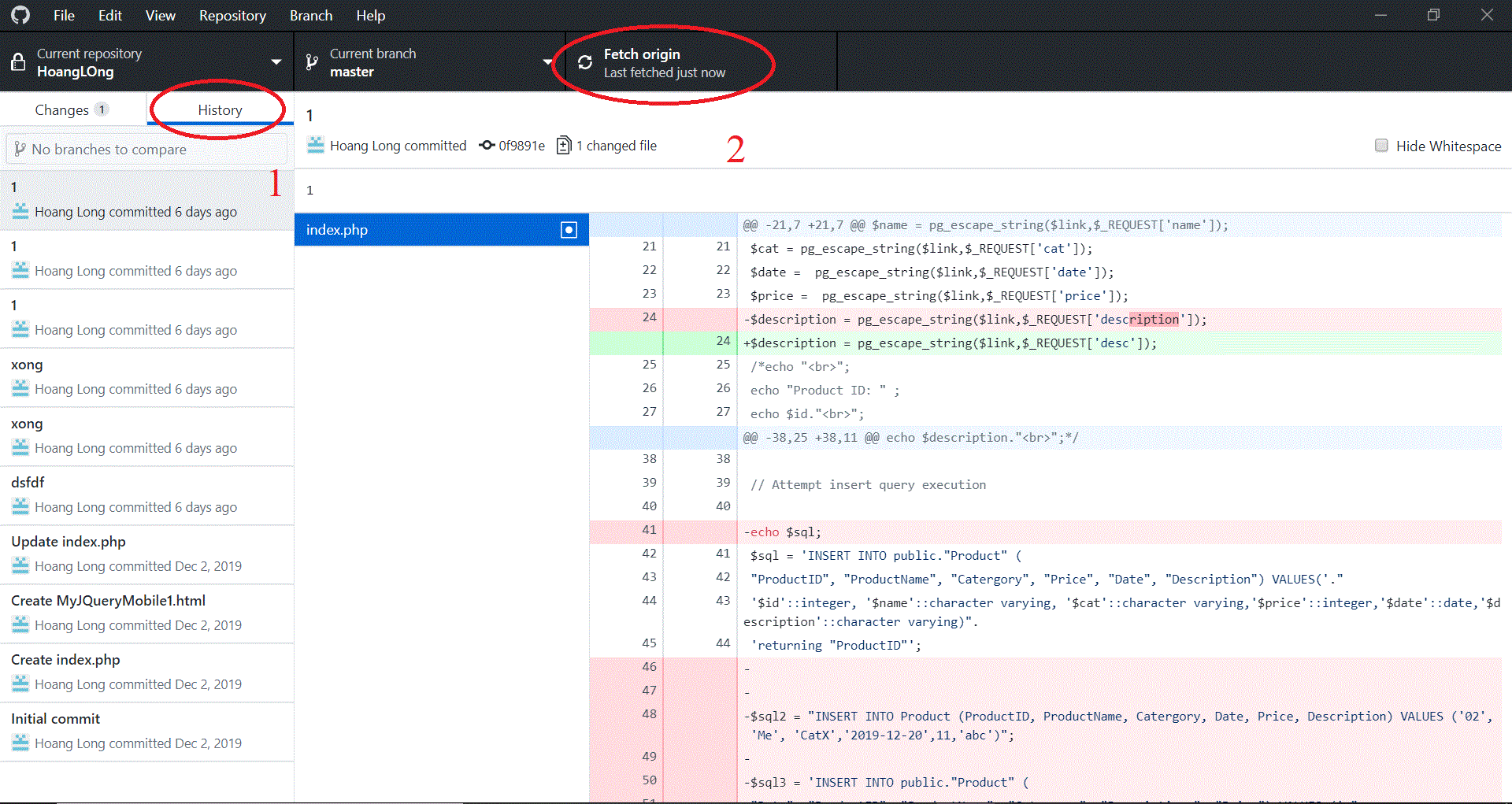
This is an application created on Heroku to create a database system on the cloud.



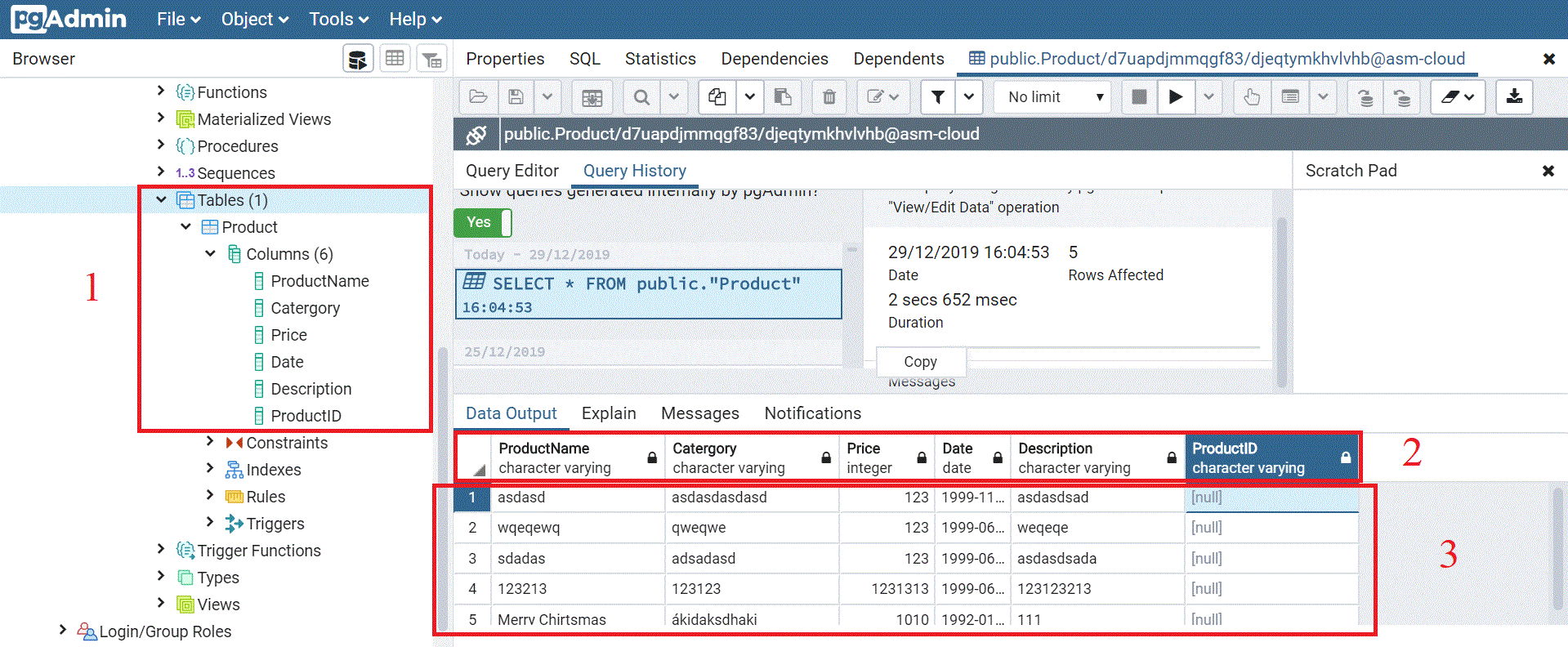
The following is Database Credentials of Heroku, the above information must match the application of writing code, and the system on the database. Host is the address to access the database, each database system has its own unique system. Database is the address that the database we will use to store and export data. The User and Password show the authorization for private access, which is not accessible to any individual.



This is the interface that we have created so that users can input. After entering the blanks, click Submit, the data will be on the database, click Reset, the previously entered data will be deleted.



In position 1 is History records old versions that are posted on GitHub. After writing the code or changing the code as you like, you can go to the address of the folder and the file to push the file onto GitHub. In addition, it stores old versions. In position 2 is the button to bring up GitHub.



Here are the tables and columns we created for archiving. How to declare variables and names of columns. The variable name and type must match the application writing the code. Numeric locations are columns that create to import data to store in the cloud. Position 2 shows the column name and variable type. Must be entered correctly with the variable type to enter. Position 3 is the data that I entered and pushed to the cloud before.

-Source code ATN.html

|  |
| --- |
| <!DOCTYPE html>  <html lang="en">  <head>  <meta charset="UTF-8">  <title>INVOICE</title>  </head>  <body>  <h2>INVOICE - ATN COMPANY</h2>  <p>This form is filled every time a customer purchases an item</p>  <form action="index.php" method="post">  <p>  <label for="productid">Product ID<sup>\*</sup></label>  <input type="text" name="id" id="productid">  </p>  <p>  <label for="productname">Product Name<sup>\*</sup></label>  <input type="text" name="name" id="productname">  </p>  <p>  <label for="productcat">Category</label>  <input type="text" name="cat" id="productcat">  </p>  <p>  <label for="date">Date</label>  <input type="date" name="date" id="date">  </p>  <p>  <label for="price">Price</label>  <input type="text" name="price" id="price">  </p>  <p>  <label for="description">Descriptions<sup>\*</sup></label>  <textarea name="desc" id="description" rows="5" cols="30"></textarea>  </p>  <input type="submit" value="Submit">  <input type="reset" value="Reset">  </form>  </body>  </html> |

-Source code index.php

|  |
| --- |
| <?php  $link = pg\_connect("host=ec2-174-129-255-69.compute-1.amazonaws.com  dbname=d7uapdjmmqgf83  port=5432  user=djeqtymkhvlvhb  password=9ea1cd44420f3e6031f1201b714915c60f7c5f26690b788726bd4af97d794695 sslmode=require");  // Check connection  if($link === false){  die("ERROR: Could not connect. ");  }  else {echo "Connected";}  // Escape user inputs for security  $id = pg\_escape\_string($link,$\_REQUEST['id']);  $name = pg\_escape\_string($link,$\_REQUEST['name']);  $cat = pg\_escape\_string($link,$\_REQUEST['cat']);  $date = pg\_escape\_string($link,$\_REQUEST['date']);  $price = pg\_escape\_string($link,$\_REQUEST['price']);  $description = pg\_escape\_string($link,$\_REQUEST['desc']);  echo $description."<br>";\*/  // Attempt insert query execution  INSERT INTO public."Product" (  "ProductID", "ProductName", "Catergory", "Price", "Date", "Description") VALUES (  '1'::character varying, 'asdasd'::character varying, 'asdasdasdasd'::character varying, '123'::integer, '11/07/1999'::date, 'asdasdsad'::character varying)  returning "ProductID";  $sql = 'INSERT INTO public."Product" (  "ProductID", "ProductName", "Catergory", "Price", "Date", "Description") VALUES('."  '$id'::character varying, '$name'::character varying, '$cat'::character varying,'$price'::integer,'$date'::date,'$description'::character varying)".  'returning "ProductID"';  echo $sql;  $result = pg\_query($link, $sql);  echo $result;  if($result){  echo "Records added successfully.";  } else{  echo "ERROR: Could not able to execute $sql. " . pg\_error($link);  }  // Close connection  pg\_close($link);  ?> |

# Task2:

## Analysis of the most common problems of a cloud computing platform.

**1. Real-time monitoring**

The biggest problems that often occur in large businesses are the need to monitor their systems in real time. It is imperative for their business to continually monitor and maintain their inventory system. A few examples are: The bank must update quickly because the delay in updating information from the cloud will prevent the bank from processing data immediately for customers. This is really a big challenge for cloud service providers.

**2. Data security**

The data security issue of cloud technology is one that many people are most concerned about and ask, but there are a lot of questions that are still not answered perfectly. Many serious threats such as virus attacks and customer website hacking are the biggest cloud data security issues. Entrepreneurs have to think about these issues before applying cloud technology to their businesses. Because you are passing important company details to a third party, it is important to assure you of the cloud management and security system.

**3. Cost barrier**

To work effectively with cloud computing, you have to pay high bandwidth costs. Businesses can cut hardware costs but they have to spend huge amounts of bandwidth. For smaller application costs it is not a big deal but for large and complex applications it is a major concern. To transfer complex and intensive data over a network, it is essential that you have sufficient bandwidth. This is a major obstacle for small organizations, which limits their implementation of cloud technology in their businesses.

**4. Recover lost data**

Cloud services face data loss issues. Providers must establish appropriate infrastructure to effectively deal with server downtime and downtime.

**5. Lack of resources / expertise**

Another risk that businesses face is the lack of resources and / or expertise. As cloud technology is increasingly developing, businesses also need to develop professionally to catch up with modern tools and innovate day by day.

**6. Efficiency**

When an enterprise moves to the cloud, the challenge is to expand on this partnership. Over the past few years, all major cloud users have experienced downtime. Cloud service provider performance goes down. Accessing data stored in the cloud in real time is essential for businesses. If the performance goes down, the access to data stored in the cloud is also less efficient.

**7. Administration / Control**

Proper IT governance must ensure that IT assets are deployed and used according to agreed policies and processes; ensure that these assets are properly controlled and maintained, and ensure that they are supporting your organization's business and strategic goals. IT does not always have complete control over the supply, cancellation and provision of infrastructure.

## Possible solutions to these problems.

Solution (1): There is no perfect solution for this problem because this problem is in a stance. The most appropriate solution is that businesses need to learn a suitable cloud model and spend more money on a cloud model with instant data processing speed. Or that enterprise will have to install a server to store data separately and locally.

Solution (2): To solve the data security problem, we need to back up the data. Store data in another tool. Ensure data storage tools are accessed by important people in the company. Sign data security contracts when renting cloud contracts, so that third parties can ensure data security for businesses.

Solution (3): The cloud computing platform has a trial mode, to cut costs effectively. We need to try out the models to see which one is appropriate. Then rent to match the cost. In addition, optimize costs by conducting better financial analysis and reporting, automating policies for managing or maintaining management reporting practices, to reduce these issues in cloud computing.

Solution (4): We have to set up the server where appropriate arrangements are needed to back up all data in at least two different locations. It is best to manage a hot backup and a cold backup site.

Solution (5): This risk can be mitigated through additional IT and development staff training. For small businesses, it is impossible to hire IT engineers, so small companies turn to DevOps tools, such as Chef and Puppet, to perform tasks such as monitoring resource usage patterns and backups automatically at predefined intervals. These tools optimize cost, administration and security.

Solution (6): Required solution that the organization must consider while selecting the right partner.

Solution (7): To minimize the various risks and uncertainties when moving to the cloud, Traditional IT control and control processes must be adjusted. Centralized IT groups in the cloud have been developed over the past few years. Together with business units, central IT is increasingly playing a role in the selection, brokerage, and management of cloud services. On top of these third-party management / cloud providers are gradually providing best practice and governance support.

## Analysis of the most common security issues in the cloud environment.

**1. Distributed-Denial-of-Service Attacks (DDoS)**

One of the most common cloud computing securities is the DDoS attacks. A distributed denial of service (DDoS) attack is a malicious attempt to disrupt normal traffic of a targeted server, service, or network by overwhelming targets or infrastructure. Around floors with Internet traffic. DDoS attacks are effective by using multiple compromised computer systems as a source of attack traffic.

**2. Shared Cloud Computing Services**

This problem may occur on the client side. Many cloud solutions do not provide the necessary security between clients, resulting in shared resources, applications, and systems. Threats can originate from other customers with cloud services and threats targeting one customer may also have an impact on other customers.

**3. Employee Negligence**

Employee negligence and employee mistakes remain one of the biggest security issues for all systems, but the threat is particularly dangerous with cloud solutions. Modern employees may log into cloud solutions from their mobile phones, home tablets, and home desktop PCs, potentially leaving the system vulnerable to many outside threats.

**4. Data Loss and Inadequate Data Backups**

Inadequate data backups and improper data syncing is what has made many businesses vulnerable to ransomware, a specific type of cloud security threat. Ransomware "locks" away a company's data in encrypted files, only allowing them to access the data once a ransom has been paid.

**5. System Vulnerabilities**

Cloud computing systems can still contain system vulnerabilities, especially in networks that have complex infrastructures and multiple third-party platforms. Once a vulnerability becomes known with a popular third-party system, this vulnerability can be easily used against organizations.

## Discussion on how to overcome these issues.

**(1):** To avoid this problem, we need to choose reliable and safe service providers. Avoid choosing new cloud providers and get low quality service rating.

**(2):** Choose reliable cloud providers with high security to rent and use

**(3):** Remind employees to limit the use of devices that access cloud service systems with personal devices. Also configure 2-layer password for better protection.

**(4):** Data loss is crucial in controlling and managing data in a large company. To overcome this we need to back up data immediately and regularly every day. Also, back up the data at a server owned by the company.

**(5**): To know the vulnerabilities of cloud computing system. We need to use it a lot and cyclic testing to ensure safety. Then use the network monitoring and error correction methods.

# Summary

Cloud computing is the first choice in the modern business trend. The benefits of cloud computing are enormous. While risks and challenges of cloud computing still exist, there is no perfect fix, but if there is a correct solution, these 10 issues will not affect too much in the business of the enterprise. Karma. To get the most out of and fix the problems, you should adopt a strategic iterative approach to implement, explore hybrid cloud solutions, involving business and IT teams, invest in CIO and choose the right BI SaaS partner. All of this will ensure that the benefits of cloud-based business intelligence will go beyond challenges.

# References:

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