

System Proposal

Hive Systems



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Executive Summary

Hive Systems

Executive Summary

This report contains the system analysis and design proposal for Hive Systems. This report was drafted by a team of Information Systems graduate students of Robert.H. Smith School of Business, University of Maryland, during the spring semester of 2024. This report contains detailed information for three phases of the project- survey phase, analysis phase, system design phase and a plan for implementation.

Summary of Survey Phase

During this phase, our team performed initial research of the client and their industry. Our findings indicate that Hive Systems has made substantial strides in client engagement and service diversification since its inception. However, challenges in scalability and integration with advanced cybersecurity tools are evident. The current systems in place for managing client interactions and service deliveries lack automation, causing inefficiencies and a higher propensity for errors in compliance and security management. Moreover, our industry analysis revealed a significant growth trajectory for cybersecurity services, with an

expected increase in market demand, driven by the rising complexities of cyber threats and regulatory requirements. This landscape presents both a challenge and an opportunity for Hive Systems to enhance its service offerings.

To address these findings, we propose the development of an automated self-assessment tool for cybersecurity compliance. This tool aims to streamline the assessment processes, reduce manual errors, and provide a scalable solution that aligns with both current and future market needs. The planned tool will feature a user-friendly interface and robust backend logic capable of managing comprehensive risk assessments effectively.

Summary of System Analysis Phase

During this phase, we utilized interviews and meetings, brainstorming sessions, and workflow analysis to uncover core issues. We gathered insights directly from the current users of the Excel-based tool and identified key areas that lack automation and present potential risks for data

inaccuracies. We then progressed to define business requirements for the proposed self-assessment tool, which will facilitate various cybersecurity compliance standards. The focus was to develop a user authentication system, logic replication of the current Excel-based tool in digital form, AWS cloud hosting, and no preference over programming languages as per the client's flexibility.

In the data flow diagrams, we distilled the system into a structured entity-relationship model, detailing interactions between the client, assessment system, and criteria evaluation. This ERD allowed us to visualize the flow from client information input to the final assessment feedback.

Summary of System Design Phase

During the design phase, we focused on enhancing the customer experience by automating the assessment process, a shift from the previous management via an Excel-based tool. Our approach centered on transforming this tool into a digital format, integrating Hive Systems' proprietary logic, and adopting a custom solution approach

to tailor-make a web page for cybersecurity level self-assessment that fully meets their needs. The principal design content of this proposal involves: customers with assessment needs will find Hive Systems and provide their email and name, after which the email system will automatically send a link through the customer's email. This link will guide the customers to the web page we have built, which contains all the assessment questions. After the customers complete the questions, the web page will present the assessment results, and finally, the customers can choose to have the system email back the PDF file of the results. Additionally, we plan to use cloud services like AWS to store some data and information.

During this process, we will include the following contents to introduce the detailed proposal design plan, which encompasses the system models of the proposed system, the physical system design, input and output design, and the implementation plan.

Conclusion

We carried out a comprehensive investigation and

analysis of the project, meticulously examining every aspect to ensure alignment with our objectives. Based on the findings, we developed a detailed design proposal that specifically addresses the customer's needs and requirements. This plan was thoroughly reviewed and has received the client's final approval. It is scheduled for implementation in the upcoming semester. Moving forward, we are committed to adhering strictly to the guidelines and specifications outlined in this report. Our approach will involve careful coordination of procurement and construction processes to ensure

that each phase aligns with our strategic goals. Ultimately, we aim to achieve a successful delivery of the final product, meeting or exceeding the client's expectations.

Survey Phase Report

Hive Systems

Client Background

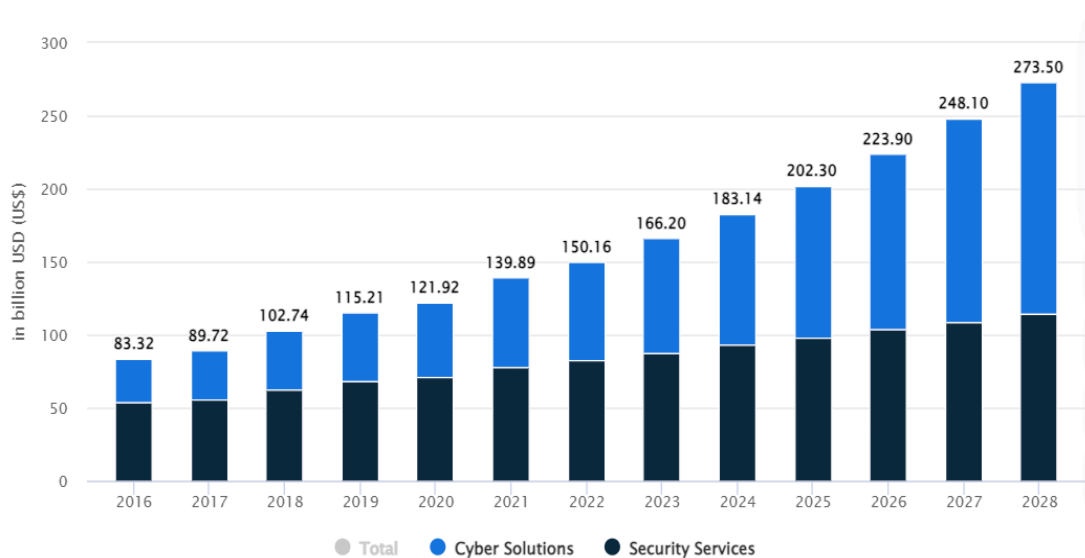
Hive Systems was founded by two Virginia Tech graduates in 2018. As a company in the bootstrap stage, there has been a noteworthy surge in their client base. This growth is a testament to the collective efforts highlighting a burgeoning demand for their products/services in the market. Specializing in data-driven solutions, cybersecurity training, risk assessments, and regulatory compliance, Hive Systems prioritizes understanding each client's unique needs. By tailoring solutions to align with the specific organizational requirements of each client, Hive Systems empowers clients to navigate the evolving cybersecurity landscape confidently. Their commitment to personalized service and impactful strategies positions them as a trusted partner for businesses seeking to bolster their security posture and mitigate risks effectively.



Industry Analysis

The cybersecurity consulting industry is relatively new but one of the fastest growing industries. Businesses today are transitioning to online and cloud based business processes with increasing frequency. This has led to the threat of cyber-attacks increasing in frequency, variety, and effectiveness. The increase in cyber-attacks has led to businesses across all sectors to seek out cybersecurity services so they can be prepared for and mitigate the effect of cyber-attacks. Cybersecurity consultants such as Hive Systems offer clients a diverse range of cyber security services including but not limited to risk assessments, penetration testing, incident response planning, compliance assistance, and security awareness training. As cybersecurity concerns continue to escalate, the demand

for cybersecurity consulting services is expected to soar, driving further innovation and growth within the industry. According to Statista.com, the cybersecurity market is projected to show an annual revenue growth rate of 10.56% between 2024-2028, growing from \$183 billion to \$273 billion.



Problems, Opportunities, and Directives

Performance:

Problem: *Complexity*

Many companies struggle with the intricacy of cybersecurity compliance requirements, finding it difficult to tread through various standards, regulations, and frameworks.

Opportunity: *Automation*

Developing a self-assessment tool will streamline processes, reduce the burden on companies, and make compliance manageable and cost-effective.

Information:**Problem:** *Lack of Automation*

Manual assessment processes are prone to errors and inaccuracies, leading to errors in compliance reporting and increasing the risk of Non-compliance.

Opportunity: *Customization*

A tailored self-assessment tool will allow companies to focus on their specific compliance needs, providing personalized recommendations and solutions.

Economy:**Opportunity:** *Automation*

Developing a self-assessment tool will reduce costs associated with manual assessment processes, making compliance more affordable for companies.

Control:**Directive:** *User-Friendly Interface*

Develop an intuitive and user-friendly UI for the self-assessment tool to ensure the best experience for companies of all sizes and levels.

Directive: *Security*

Ensure that any data processed by the tool is protected and nobody gains unauthorized access.

Efficiency:**Opportunity:** *Automation*

Developing a self-assessment tool will streamline processes, making compliance assessment more efficient for companies.

Service:**Directive:** *User-Friendly Interface*

Develop an intuitive and user-friendly UI for the self-assessment tool to ensure the best experience for companies of all sizes and levels.

Project Scope

Objective:

Within a one semester timeline, our goal is to plan, analyze, and design a comprehensive assessment solution to evaluate clients' security posture. The primary objective is to enhance clients' security posture by conducting a thorough analysis of the current implementation of controls. Success will be measured by the completion of a detailed analysis report of system design of an automated solution as a streamlined process with version control capabilities. This approach ensures time-sensitive focus, aligning with academic constraints while delivering improvements to Hive Systems' existing framework. Following the completion of this planning, analysis, and design during the current semester, we will have one more semester to implement our assessment solution into a tool found on the Hivesystems.com website.



High-level Requirements

- Thoroughly review the structure, categories, questions, and logic of the current Excel-based tool.
- List and understand all the essential data points collected, including respondent answers and scores.
- Convert the content of the Excel tool into a digital questionnaire format. This includes developing a scoring algorithm.
- Develop backend logic for automated scoring.

- Design an intuitive user interface that guides users through the assessment process seamlessly with an input form to collect client emails and other required data for outreach.
- Perform thorough testing for functionality, security, and usability. Gather feedback and iterate on the system to ensure accuracy and user-friendliness.

Constraints

This project is constrained by a two semester timeline, one semester for planning, analysis, and design and one semester for implementation. Additionally, there may be limitations in terms of access to reference resources and advanced cybersecurity tools, which are often required for a comprehensive assessment.

System Analysis Phase Report

Hive Systems

Information Gathering Techniques

Interviews and meetings: Our first technique to gather information and requirements was by conducting interviews with our client(user of the current system) and collecting information about their existing Excel based tool. This was our preferred technique since we were able to communicate clearly what was required by the client and were able to fact-check our understanding. This was convenient as the client was very willing to take part in our session and maintained good and timely communication. They also provided reference websites like DoD scoring methodology and controls required by a business that could be used to help with our understanding of the use of the system. We were also able to gather insights on user requirements and limitations to the current system.

Brainstorming: Our second technique was facilitating sessions with the team to generate ideas to enhance the Excel tool through discussions and online research. This allowed deeper understanding of the requirements and the processes involved. We could clearly understand and define the pain points of the client and came up with a solution to enhance their experience.

Workflow analysis: Our third and very useful technique was to analyze the workflows surrounding the Excel tool, including data inputs, processing steps involved, and outputs helped identify inefficiencies for areas of automation. We were able to narrow down the logic involved which would be useful when designing the solution. We also identified areas where automation could be implemented to enhance data quality, error reduction and to streamline the whole process.

Business Requirements

- A tool where users can perform self-assessment for various cybersecurity compliance standards. The users can be any company who wants to get compliant with government standards.
- A user should be able to authenticate itself when it enters our application using its email. When they first enter our application it will enter its basic information like name and contact details. After which it will be receiving an email with a link and password to access the self-assessment.
- The application should follow the logic that Hive Systems has developed so far in an Excel sheet. We will be digitizing that Excel sheet.
- The self-assessment tool should be hosted in the AWS cloud.
- Self-assessment tool will be performed under the current domain of Hive Systems (hivesystems.com).
- There is no preference from the client side over the language on which tool will be developed. However, we are yet to decide on that part.
- The results of the self-assessment should display the consolidated information of the score and also if the user has passed the assessment or not. It will also generate the steps that the client must take in order to get compliant.

User Requirements

Our tool will be the medium by which the users will perform self-assessment to get a score describing their current standing from the compliance point of view. The self-assessment tool must have a nice intuitive UI enhancing user experience. Our users should be able to download the results of the self-assessment and email them themselves.

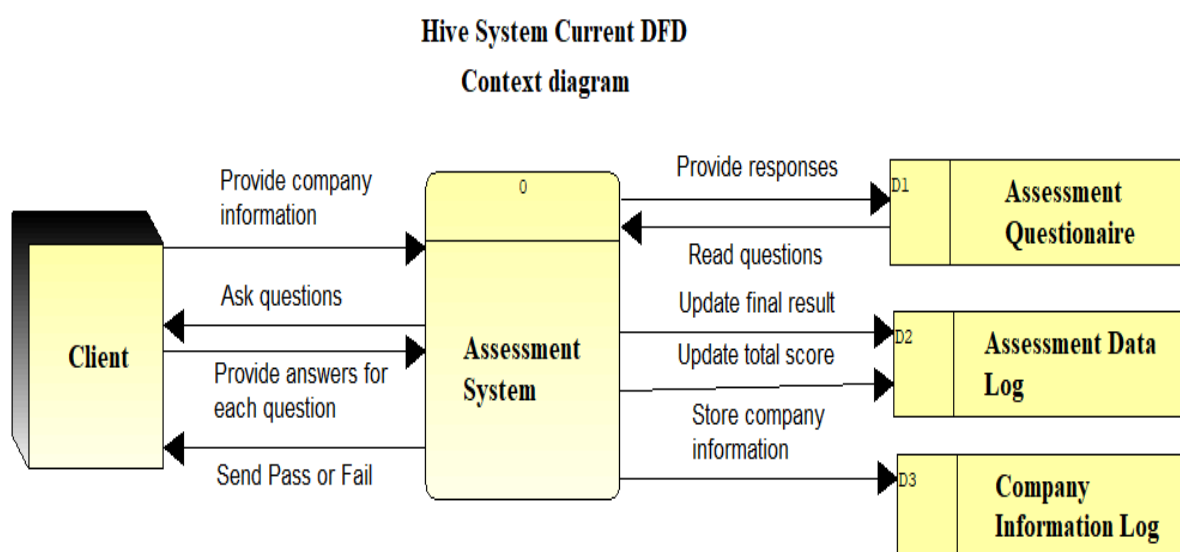
System Models of the Current System

In this section, we present the Data Flow Diagrams (DFDs) for Hive Systems, which illustrate the structured flow of information within the system. DFDs are pivotal in understanding the processes and data throughputs at various levels of the system's architecture. We begin with a Context Diagram to provide an overview of the system, highlighting the external entities interacting with it and the major data exchanges. The diagrams then progressively delve deeper into the system's operations. Each diagram is designed to ensure clarity and provide stakeholders with a comprehensive understanding of how data is handled, processed, and stored within Hive Systems, facilitating effective decision-making and system assessments. The comprehensive analysis in this section will enhance our understanding of further design and implementation phases.

Context Diagram

In the context diagram, we have one external entity that interacts with the current system in Hive Systems.

Visual Analyst - USER72



External Entities:

Client: This entity represents the companies who are seeking guidance from Hive System to bid on contracts with the federal government or to make their environment secure and to meet the CMMC and NIST 800-171 requirements, which often are found very difficult to understand and meet.

Data Stores:

Assessment Questionnaire: Stores all the questions that the client needs to answer one by one, along with their corresponding point values, for reading and recording the client's answers.

Assessment Data Log: Records the final assessment results of the client.

Company Information Log: Records the client's basic information before starting the

assessment, such as contact details, company size, and type of business.

Processes:

Assessment System: This process involves the manual selection of checkboxes within the Excel file to indicate whether each specific NIST 800-171A criterion is met. This assessment process is the core activity within the system, requiring detailed review and judgment by the assessor(s) to accurately reflect the organization's compliance status.

Inputs:

Company Information: The client provides details about their company.

Responses to Questions: The client submits their answers to the questions provided by the Assessment System.

Outputs:

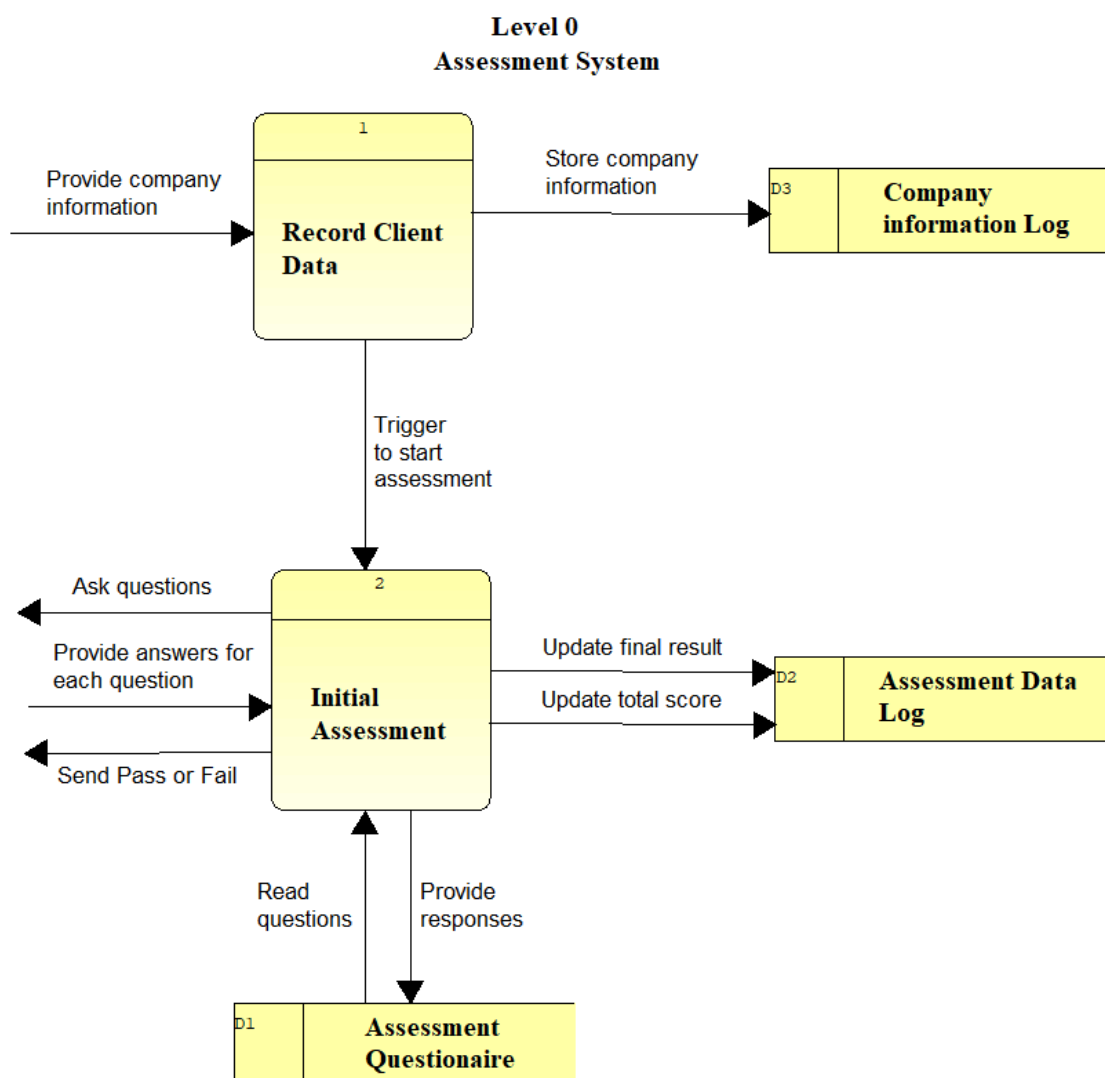
Assessment Results: The Assessment System updates the final results in the Assessment Data Log.

Pass or Fail of assessment : The client is sent a result with the outcome of the assessment.

Company Information Storage: The company information provided by the client is stored in the Company Information Log.

Level 0 Diagram

In this Level One Diagram, we have identified two primary processes, each with its specific roles in handling client interactions and assessment management. These processes are linked to various data stores that record and utilize the information flowing through the system.



Data Stores:

Company Information Log : This data store is maintaining a log of all the information provided by clients about their company(Name, emailID), which can be used as reference for future interactions, assessments, and analyses.

Assessment Data Log : This data store will have all the information generated from initial client assessments. It includes a detailed log of questions asked, client responses, and the results of the assessments

Assessment Questionnaire : This data store has a set of questions designed for clients to get the assessment score. This data store is always referenced during the Assessment process of all clients to ensure consistent and standardized assessment

Processes

1.Record Client Data:

This process forms the gateway for client interactions with Hive Systems, capturing and logging all company details (name, EmailID) provided by clients.

Inputs:

From Client:

Company Information: Clients log in using their credentials and utilize the tool on the website to evaluate their score. In this process, their information is captured.

Outputs:

To Company Information Log :

Client Information Record: The clients details are stored in the data store

To Initial Assessment Process:

Assessment Trigger: Once clients log into the system, they can begin a self-assessment or request assistance from Hive Systems to complete the assessment. This will trigger the subsequent process known as the Initial Assessment Process.

Initial Assessment:

This process is the crux of client evaluation, where a set of questions are given on the tool and based on the responses a result is generated. This helps the user to access their cybersecurity compliance.

Process Inputs:

From Record Client Data Process:

Trigger to Start Assessment:

Receives input from the Record Client Data process to begin the assessment.

From Assessment Questionnaire :

Question List: Accesses a list of questions to be posed in the tool as part of the assessment.

From Client:

Responses to Questions: Collects the answers provided by the client for each question in the assessment.

Process Outputs:

To Assessment Data Log :

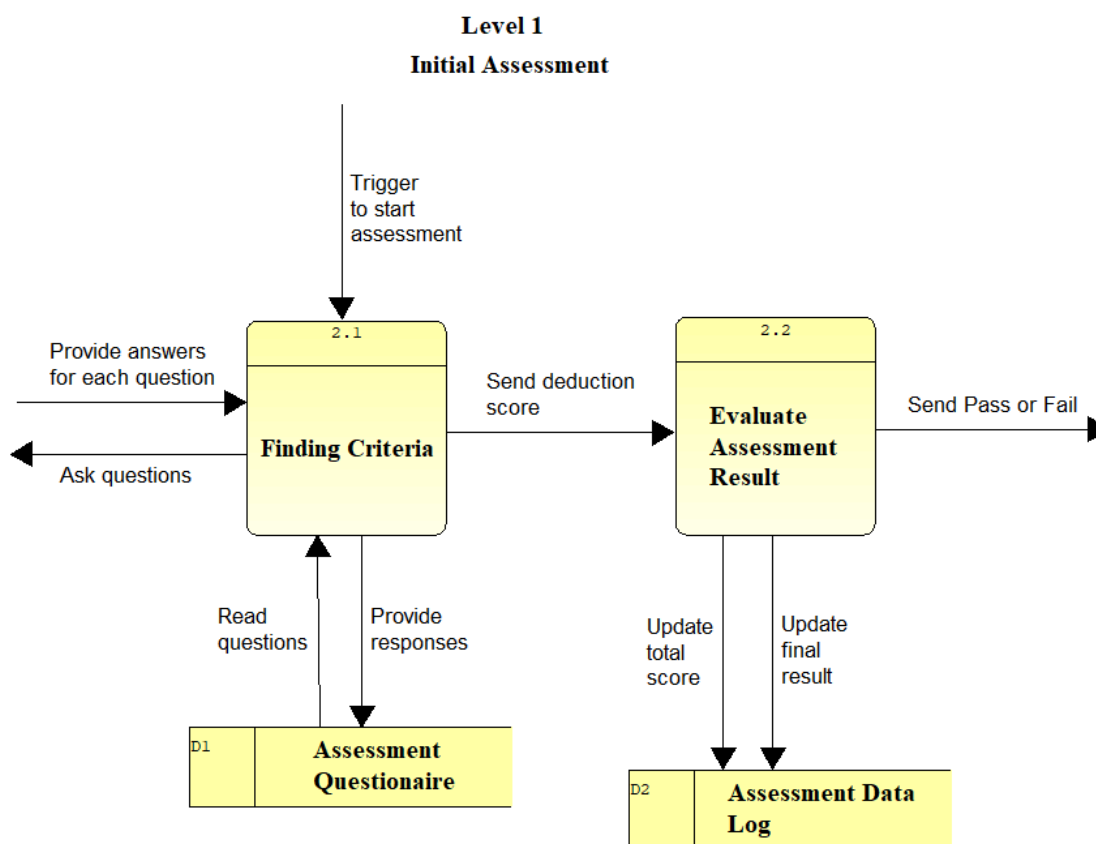
Assessment Results: The outcomes of the assessment, including any scores or qualifications, are updated in the Assessment Data Log.

To Client:

Assessment Feedback: The results of the assessment to the client, indicating whether they have passed or failed is displayed with the option of saving it in PDF format

Level 1 Diagram

In this Level 1 Diagram, we outline two crucial subprocesses: "Finding Criteria" and "Evaluate Assessment Result," essential for the client's cybersecurity compliance assessment. These processes interact with the Assessment Questionnaire and Assessment Data Log, managing data flow and scoring to ensure accurate compliance evaluation.



Process:

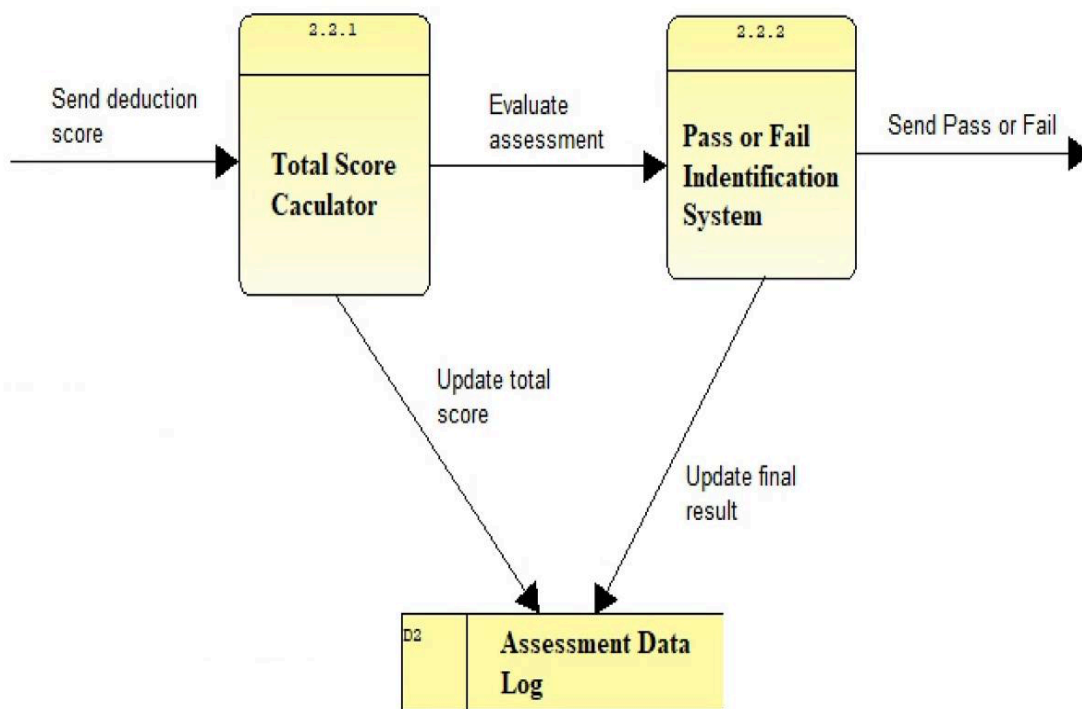
Finding Criteria: Requires the assessment of each criterion for the client and records the results. This includes "met", "not met", and "not applicable."

Evaluate Assessment Result:

Calculates the total score based on the assessment results for each item. A score of 80% or higher is considered a pass, otherwise it is a fail

Level 2.2 Diagram

For the level 2 Diagram, we expand the Evaluate Assessment Result (Process 2.2) which shows more detail about the mechanism of result evaluation.



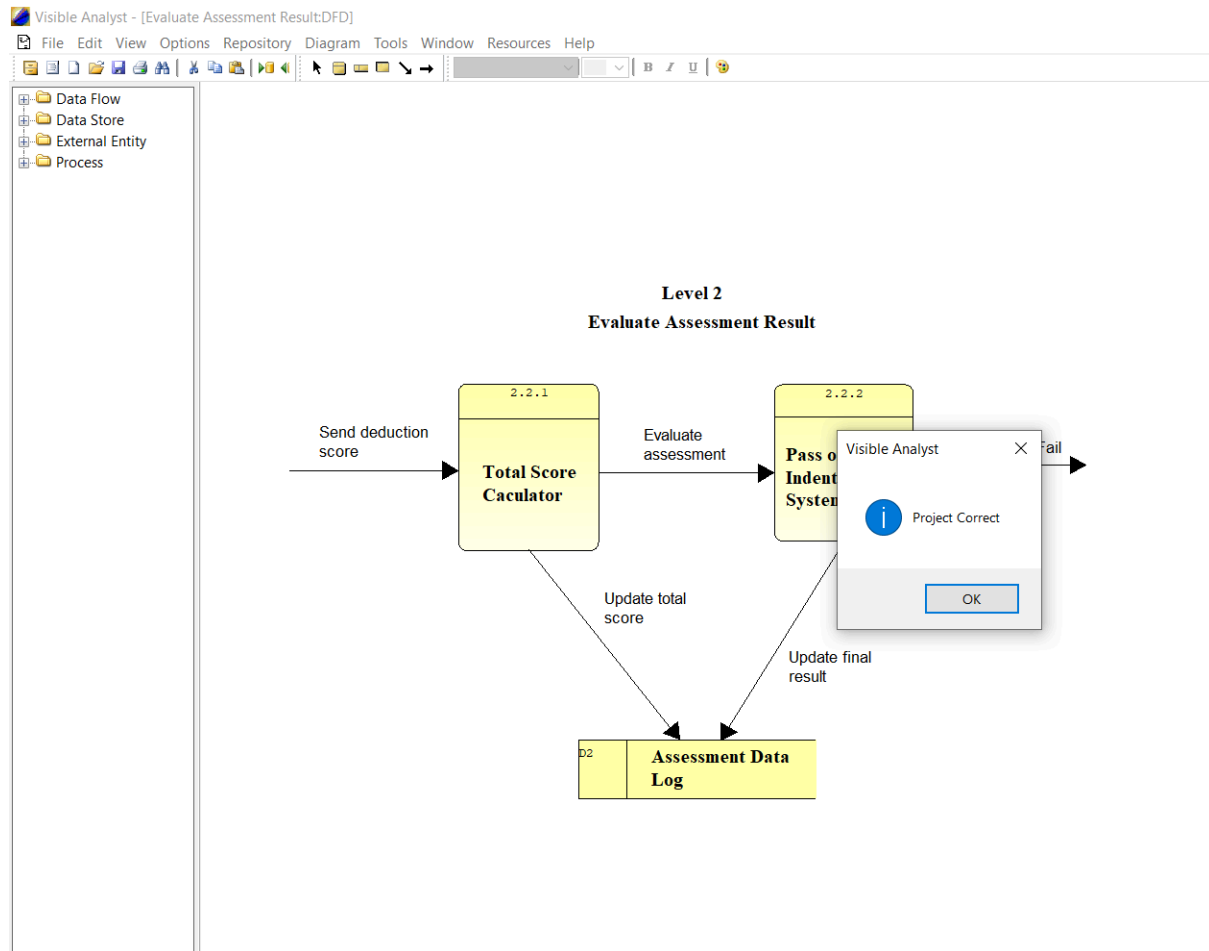
Process:

Total Score Calculator: Subtracts the total deducted points from the full score to arrive at the final total score.

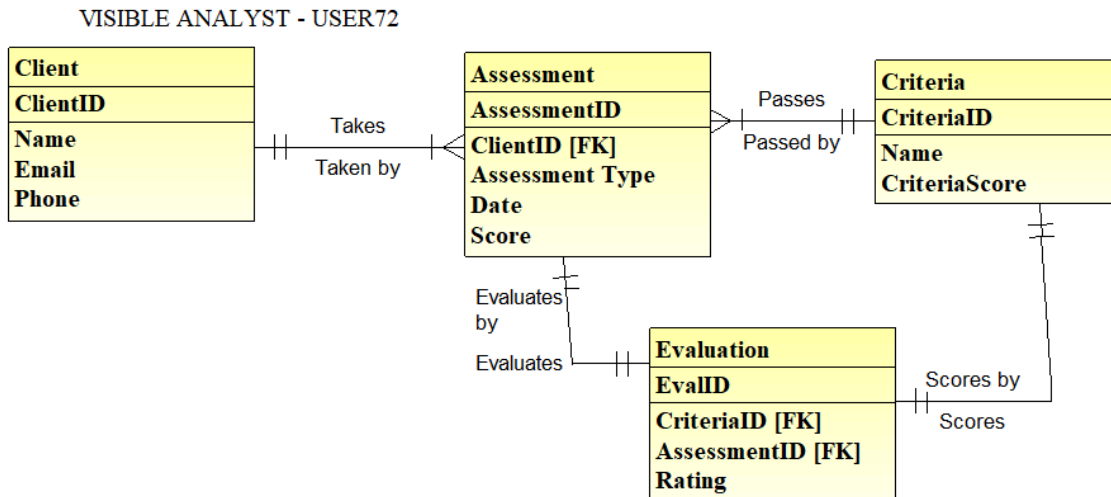
Pass or Fail Identification System:

Determines whether a score of 80% or above is achieved. If yes, then it passes; if not, it fails.

Error Report of Current System Data Flow Diagram



Current System Entity Relationship Diagram



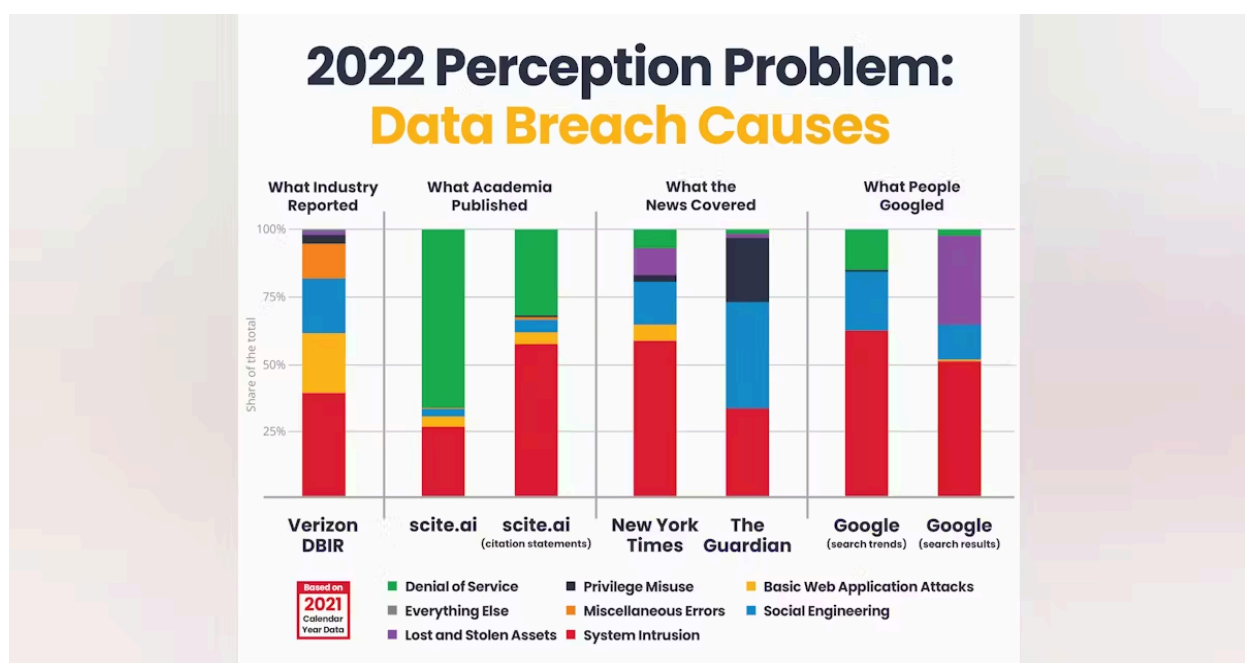
This is the ERD (Entity-Relationship Diagram) for the current system. It depicts the key entities involved, which are - Clients, Assessments, Criteria, and Evaluation, and how they relate to each other. Each Client has to take the Assessment, each Assessment is taken by one or more clients. Each Assessment has to pass one Criterion and each criterion is passed by one or more Assessments. Evaluation is done for each Assessment based on Criteria.

System Design Phase Report

Hive Systems

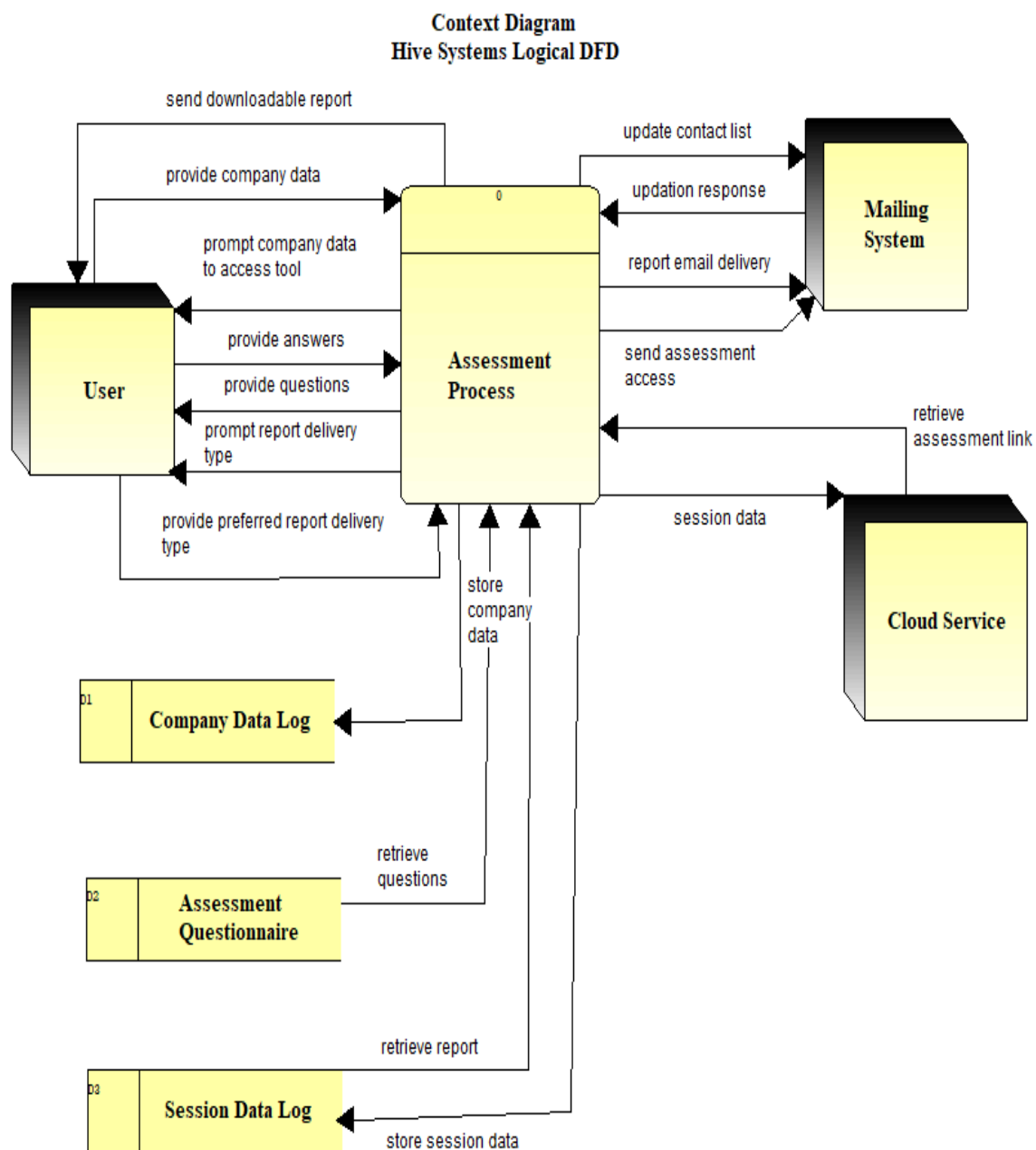
Diagrams for Proposed System

For the proposed system, we have designed a logical data flow diagram which does not contain any information about the technology that will be used and solely represents the flow of data of the system. And a physical data flow diagram which is very similar to the logical DFD but contains data about the technology. These diagrams perform the same process as in the analysis data flow diagram but altered to be part of the website which can then be accessed by anyone with access to the internet. Previously, this assessment was conducted only for clients of Hive Systems, but post implementation, since this tool will be put on the public domain, can be used by anyone after they provide their contact information. The reports generated will be sent to the user after completion and will be deleted from cache and will not be stored anywhere for security reasons. An Entity Relationship Diagram is also designed to represent the data that will be stored and utilized. These diagrams will be a representation of the actual system and can be used as documentation for reference.



Context Diagram

In the Context Diagram, the proposed system for Hive Systems' assessment process consists of a central process that interacts with three external entities and three data stores.



External Entities:

Client: This entity represents the companies who are seeking guidance from Hive System to bid on contracts with the federal government or to make their environment secure and to meet the CMMC and NIST 800-171 requirements, which often are found very difficult to understand and meet.

Mailing System: This entity represents the communication system responsible for updating contact lists, sending out emails with assessment links, and delivering assessment reports.

Cloud Service: This entity represents the cloud infrastructure that facilitates the retrieval of assessment links and the storage of session data.

Processes:

Assessment Process: The central process which prompts and collects data from the user, sends and receives information to and from the Mailing System and the Cloud Service, and retrieves questions and stores reports in the respective data stores.

Data Stores:

Company Data Log: Stores the company data provided by the User.

Assessment Questionnaire: Contains the assessment questions retrieved by the Assessment Process.

Session Data Log: Keeps session-specific data, including the User's report delivery preferences and session interactions.

System Inputs:

From User:

Users provide their basic contact information such as email address and company name.

Users provide answers to all assessment questions.

User provides the preferred report delivery type.

From Mailing system:

Update user's response.

From Cloud Service:

Provide the assessment tool's link to the user.

From Assessment Questionnaire (data store):

Provide the assessment questions from the questionnaire.

From Session Data Log (data store):

Provide the report back to the assessment tool.

System Outputs:

To User:

Provide access to the assessment tool after receiving the user's company information.

Provide assessment questions to users.

Provide a report delivery type for the user to choose.

Send the downloadable report back to the user.

To Mailing system:

Update the company information to the system.

Send assessment access to the system so that it can be sent to the user to answer assessment questions.

Send a final report to the system.

To Cloud Service:

Send session data to save on the cloud.

To Company Data Log (data store):

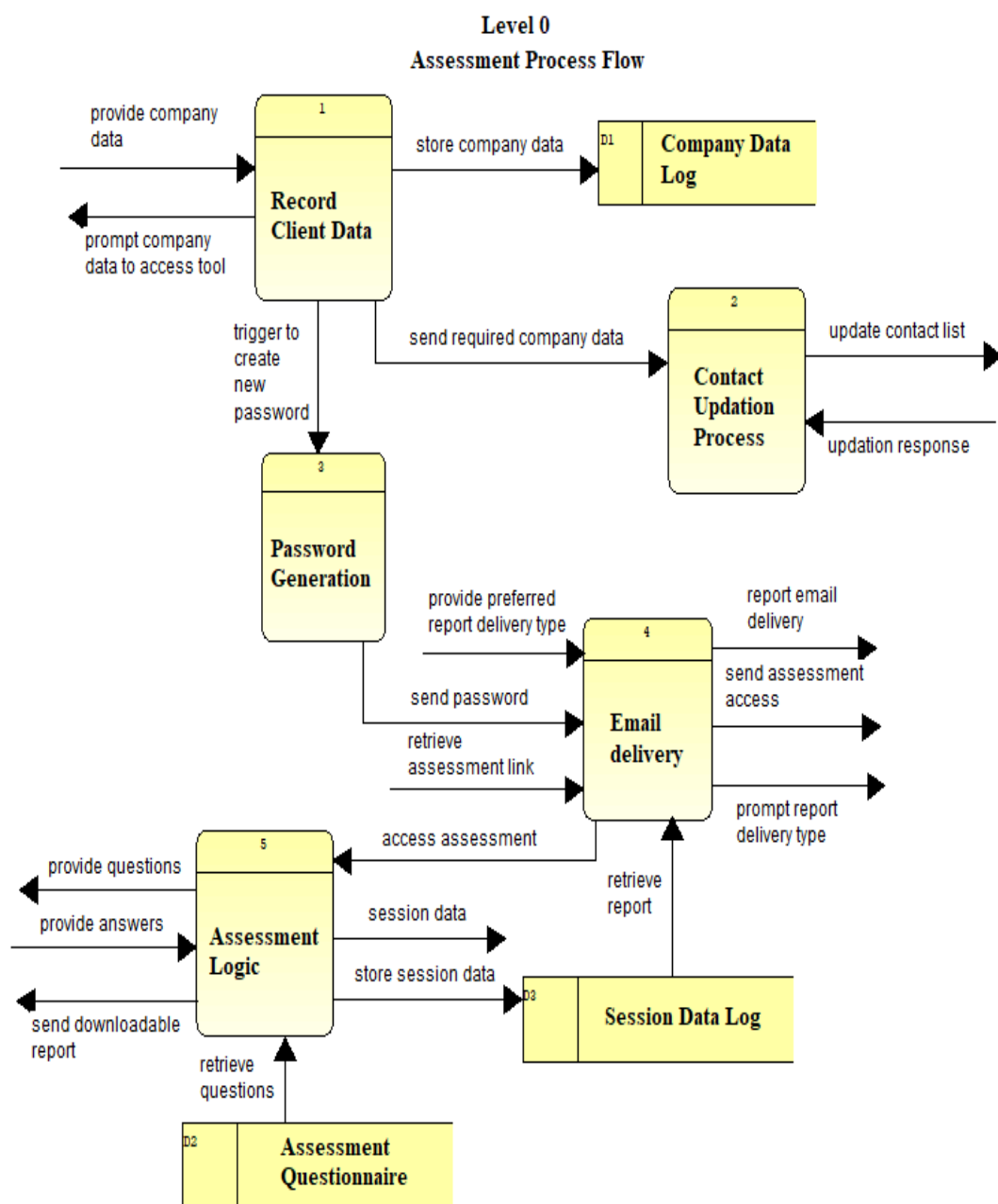
Store user's company information.

To Session Data Log (data store):

Store the session data.

Level 0 Diagram

For Level 1 Diagram, we examine the intricacies of the Hive Systems assessment process flow, highlighting the detailed interactions between the user, processes, and data stores.



Data Stores:

Company Data Log : This data store is maintaining a log of all the information provided by clients about their company(Name, email), which can be used as reference for future interactions, assessments, and analyses.

Session Data Log : This data store will have all the information generated from initial client assessments. It includes a detailed log of questions asked, client responses, and the results of the assessments.

Assessment Questionnaire : This data store has a set of questions designed for clients to get the assessment score. This data store is always referenced during the Assessment process of all clients to ensure consistent and standardized assessment.

Processes:

1. Record Client Data

This process captures and stores user-provided company data to enable access to the assessment tool.

Process Inputs:

Receive and record the company data.

Process Outputs:

Send the company data to process 3 to trigger generating user password.

Send required contact information to process 2 for updating.

2. Contact Updating Process

This process updates contact lists for ongoing communication with the user.

Process Inputs:

Receive required contact information to update.

3. Password Generation

This process generates a password for new users, facilitating access to the assessment tool.

Process Outputs:

Send password that user created to email delivery to access the assessment tool link.

4. Email Delivery

This process sends the password, assessment link, and the downloadable report to the user.

Process Inputs:

Receive the password creation.

Process Outputs:

Trigger to access the assessment tool page.

5. Assessment Logic

This process analyzes user responses to assessment questions and determines the results, which are then formatted into a report for the user.

Process Inputs:

Access the assessment tool page from the email.

Retrieve assessment questions from questionnaire data store.

Receive answers from users.

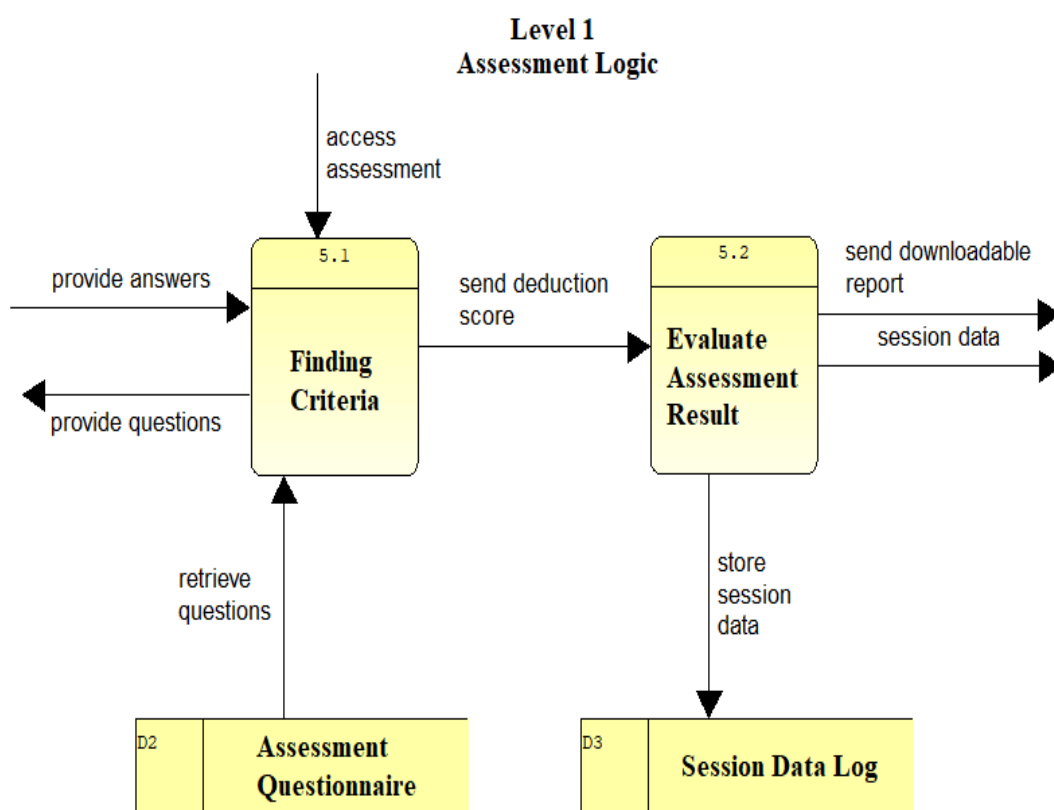
Process Outputs:

Send the session data to the data store.

Send a downloadable report to the user.

Level 1 Diagram

For the Level 1 Diagram, we expand the Assessment Logic (Process 5). We observe a more focused breakdown of the Hive Systems assessment process, which is centered around the core activities of evaluating user responses and generating assessment results.



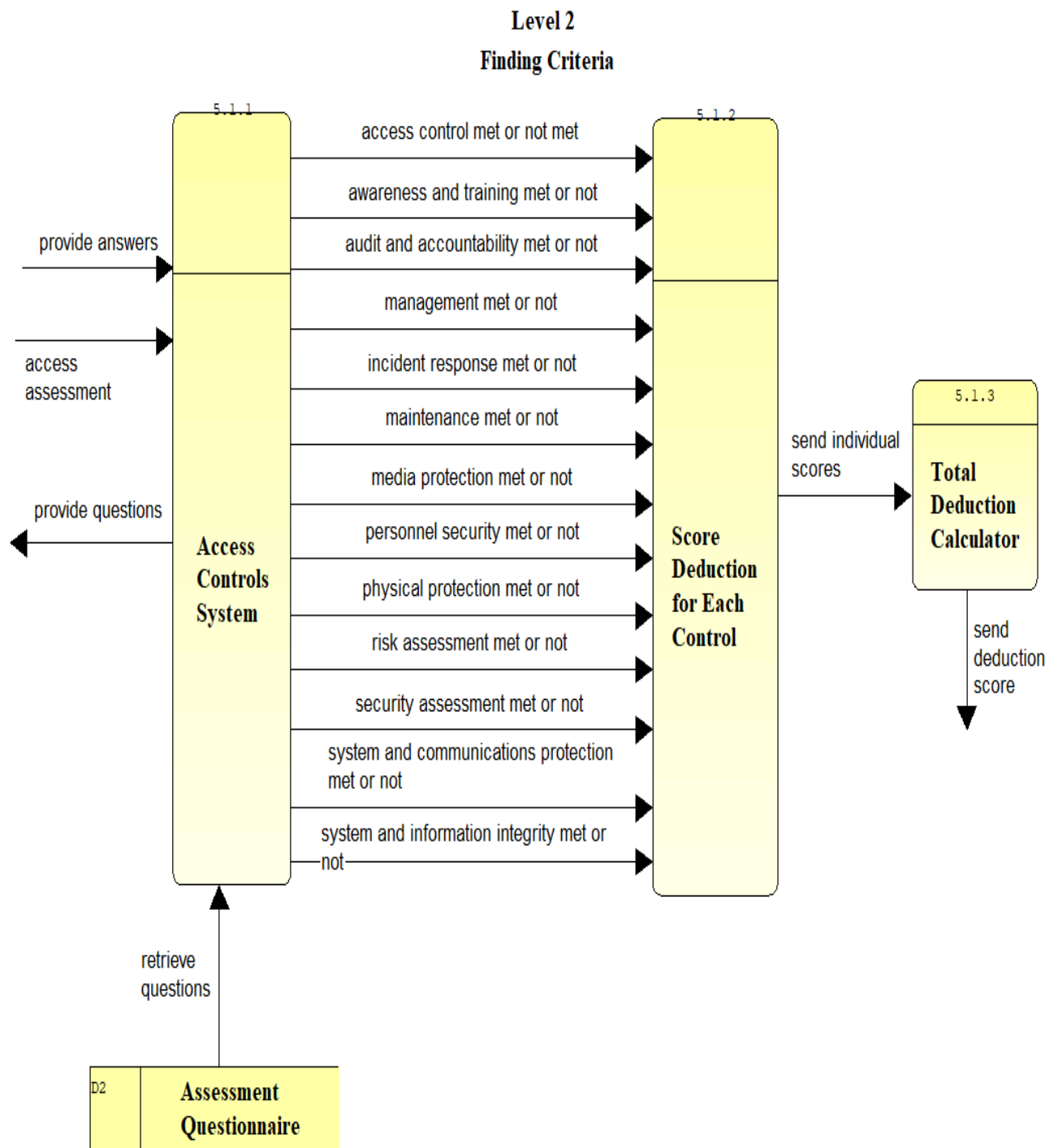
Process:

Finding Criteria: This process requires the assessment of each criterion for the client and records the results. This includes "met", "not met", and "not applicable."

Evaluate Assessment Result: This process calculates the total score based on the assessment results for each item. A score of 80% or higher is considered a pass, otherwise it is a fail

Level 2 Diagram

For the level 2 Diagram, we expand the Finding Criteria (Process 5.1) which shows the specific data flows for each control question.



Process:

Access Controls System: This process reads all criteria under each control ID for assessing the client.

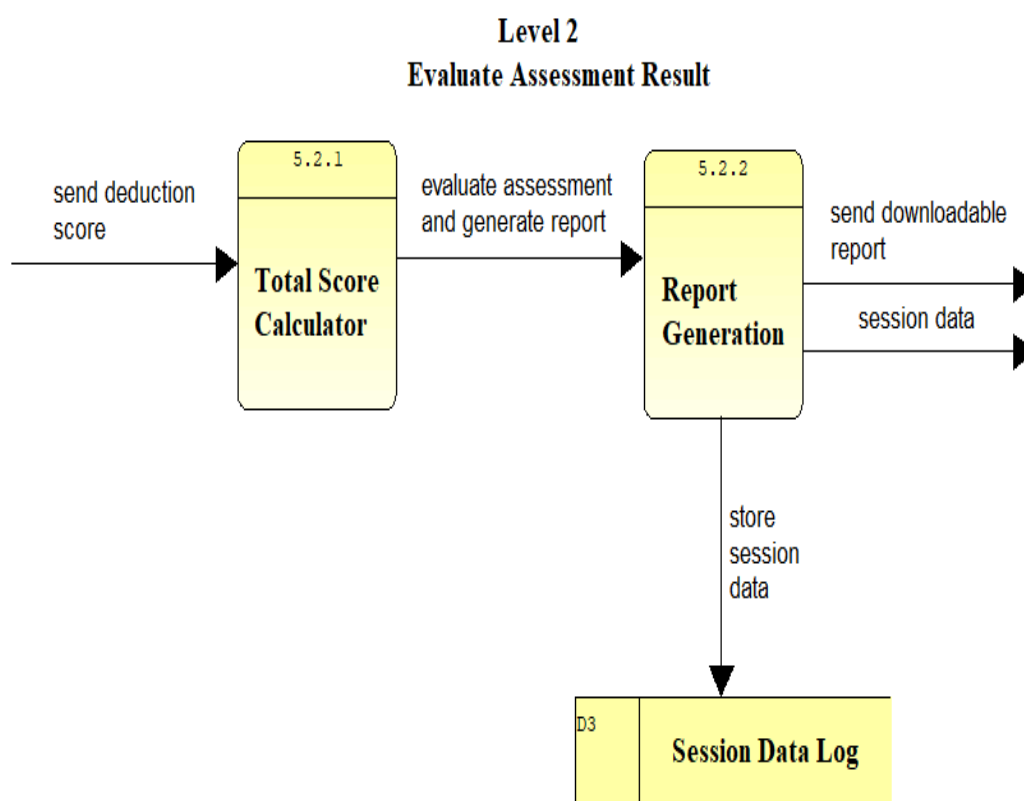
Score Deduction for Each Control: This process deducts the

corresponding points for controls that are not met.

Total Deduction Calculator: This process calculates the total points deducted.

Level 2 Diagram

For the level 2 Diagram, we expand the Evaluate Assessment Result (Process 5.2) which shows more detail about the mechanism of result evaluation.

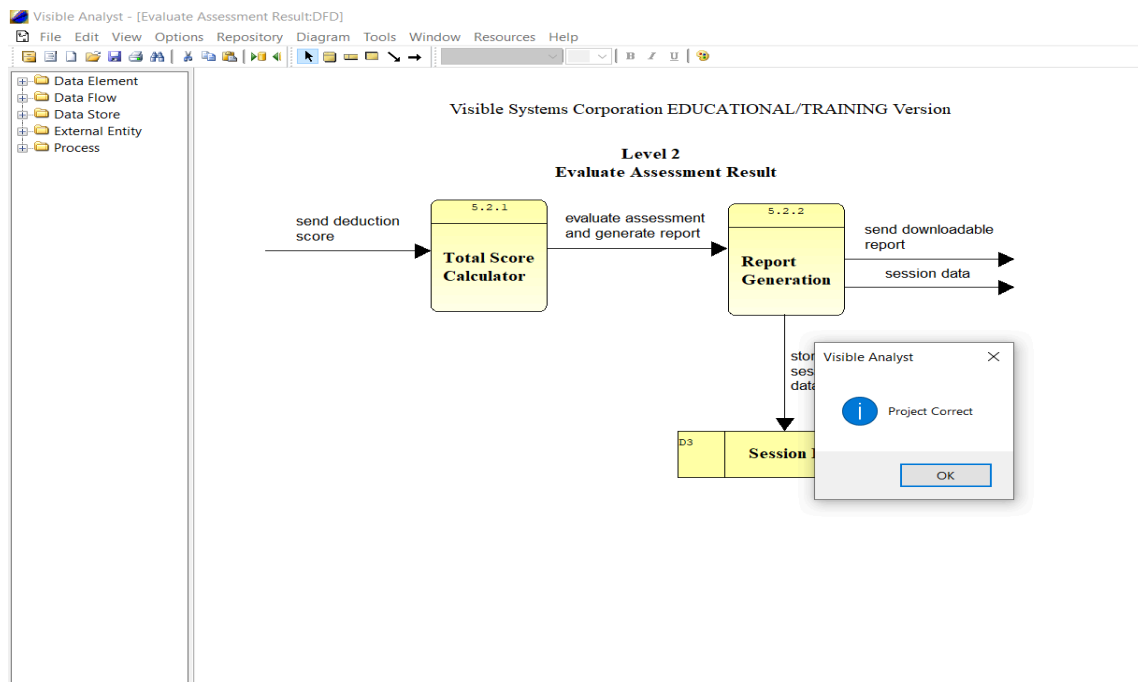


Process:

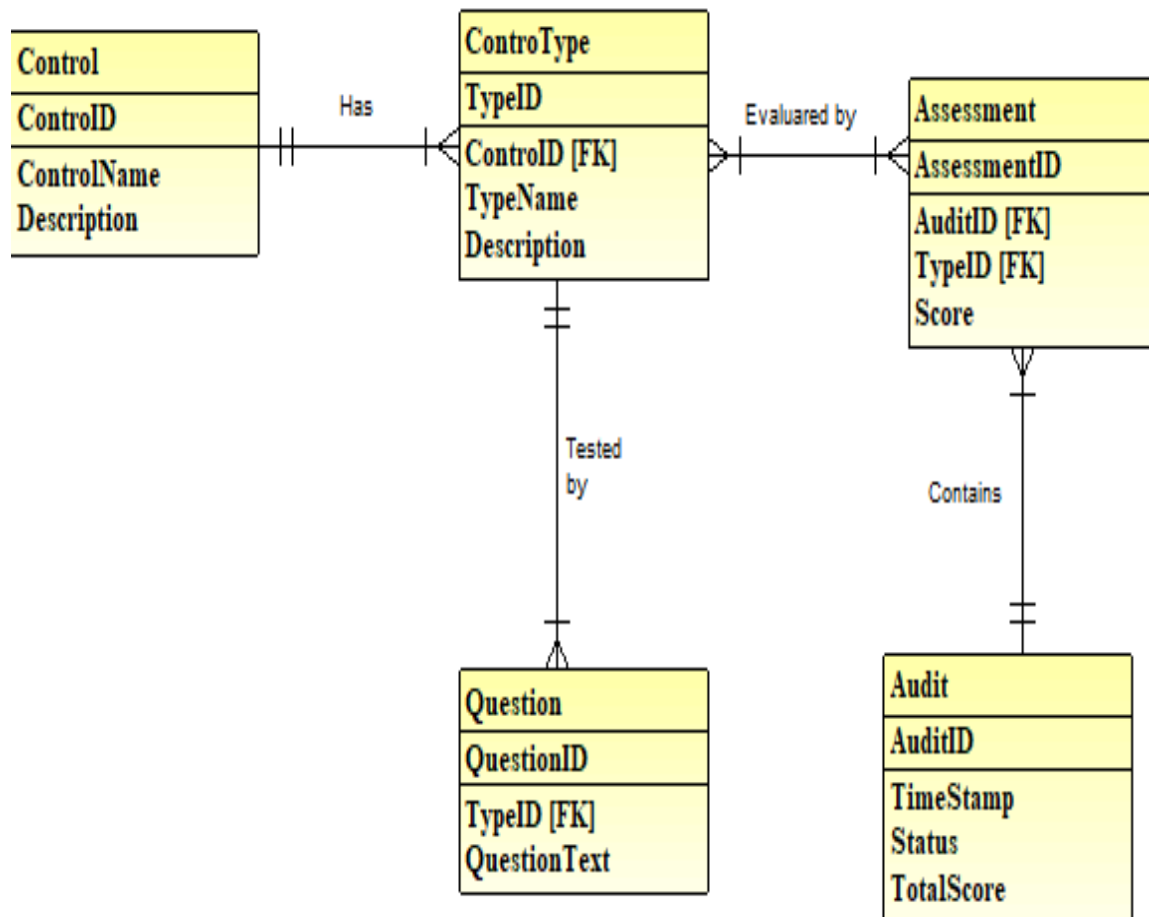
Total Score Calculator: Subtracts the total deducted points from the full score to arrive at the final total score.

Report Generation: This process is responsible for creating a detailed report based on the total score calculated. The report evaluates the assessment results and provides insights into the system's security posture.

Error Report of Proposed System:



Entity Relationship Diagram



Synchronized System Model

Entity Attributes	Record Client Data	Generate Password	Email Delivery Password	Assessment Logic	Finding Criteria	Evaluate Test Results	Access Controls System	Score Deductions	Calculate Score	Generate Reports
Client	C		RD							
ClientID	C		RD							
Name	C		RD							
Email	C		RD							
Password		C	R							
Assessment		CR								
AssessmentID		CR								
AuditID		CR								
TypeID		CR		U		U				
Score		C								
Control			CR	CR		CR				
ControlID			CR	CR		CR				
ControlName			CR	CR		CR				
Description			CR	CR		CR				
ControType			CR	CR		CR				
TypeID			CR	CR		CR				
ControlID			CR	CR		CR				
TypeName			CR	CR		CR				
Description			CR	CR		CR				
Question			CR	CR		CR				
QuestionID			CR	CR		CR				
TypeID			CR	CR		CR				
QuestionText			CRU	CRU		CRU				
Audit			CRU	C	RU		C	U		R
AuditID		CR	R		R					R
TimeStamp			CRU	C	RU		C	U		R
Status			CRU	C	RU		C	U		R
TotalScore			CRU	CRU	RU		CRU	U		R

CRUD models showing when data can be created, read, updated or/and deleted for each entity during every process in the system.

Candidate System Solution

<u>Characteristics</u>	Candidate 1 Developing In-House	Candidate 2 Outsourcing Development	Candidate 3 Software as a Service (SaaS)
Development Process	Internally developed.	Outsourced to an external team.	Ready-to-use solution.
Benefits	Full control, customized solution.	Expertise, potentially faster.	No development effort, immediate access.
Risks	Huge investment in training.	Dependent on third-party reliability and communication.	Dependent on vendors for updates and maintenance.
Development Timeline	longer timeline due to full SDLC.	May be shorter depending on the external team.	No timeline.
Customization	Fully customizable according to the company's specific needs.	Limited customizability due to third party communication.	Limited customization options compared to in-house development.
Maintenance and Support	Initial investment in hiring, training developers, ongoing maintenance costs.	Costs for hiring third-party companies, potential for cost overruns, additional maintenance costs.	Subscription or usage-based fees, potentially cost-effective compared to in-house development or outsourcing.
Cost	Initial investment in hiring, training developers, ongoing maintenance costs.	Costs for hiring third-party companies, potential for cost overruns, additional maintenance costs.	Subscription or usage-based fees, potentially cost-effective compared to in-house development or outsourcing.

Feasibility Analysis Matrix

Feasibility Criteria	Wt.	Candidate 1: Develop In-House (Student Team)	Candidate 2: Outsource development	Candidate 3: Software as a Service (SaaS)
Technical Feasibility: Assessment of the ease of integration, the extent in-house skills are developed, the measure of security risk, and the familiarity with the product for each option.	35%	Developing the application in-house as a student team would benefit the development of in-house skills, provide high familiarity with the product, and introduce no further need for security measures, but would have a harder time building and integrating the app as our student team has less expertise than professional developers or custom solutions. Score: 75 Wt. Score: 26.25	Outsourcing development of the application would provide the easiest development and integration of the application due to the professional experience of developers, but it would provide no in-house skill development, introduce added security risk, and lack of familiarity with the product. Score: 90 Wt. Score: 31.5	Purchasing a custom solution from a SaaS provider would provide easy development and integration due to custom solutions available, but it would provide no in-house skill development, introduce added security risk, and lack of familiarity with the product. Score: 80 Wt. Score: 28

Economic Feasibility: Assessment of the costs associated with each option.	50%	Developing the application in-house as a student team would have no initial costs as our student team is working for free. Score: 100 Wt. Score: 50	Outsourcing development of the application would introduce the costs of paying developers initial fees and future maintenance costs. Score: 50 Wt. Score: 25	Purchasing a SaaS solution to host the application would require both initial and recurring subscription costs. Score: 50 Wt. Score: 25
Operational Feasibility: Assessment of the strategic alignment each option has with Hive Systems and the Student team.	15%	Developing the application in-house aligns perfectly with the strategy of both Hive Systems and our student team. Score: 100 Wt. Score: 15	Outsourcing development of the application would not align with the strategy of our student team as our goal is to gain experience developing ourselves. Score: 50 Wt. Score: 7.5	Purchasing a SaaS solution would not align with the strategy of our student team as our goal is to gain experience developing ourselves. Score: 50 Wt. Score: 7.5
Total Weighted Score	100%	$26.25 + 50 + 15 = 91.25$	$31.5 + 25 + 7.5 = 64$	$28 + 25 + 7.5 = 60.5$

Option selected – Develop In-House (Student Team)

Rationale For Weights:

Economic Feasibility - 50%

This category is rated the highest because this is supposed to be a small, cost-free project for Hive Systems. If the project were to end up requiring monetary investment from us or Hive Systems, we would pivot to a project that can be successfully completed without investment.

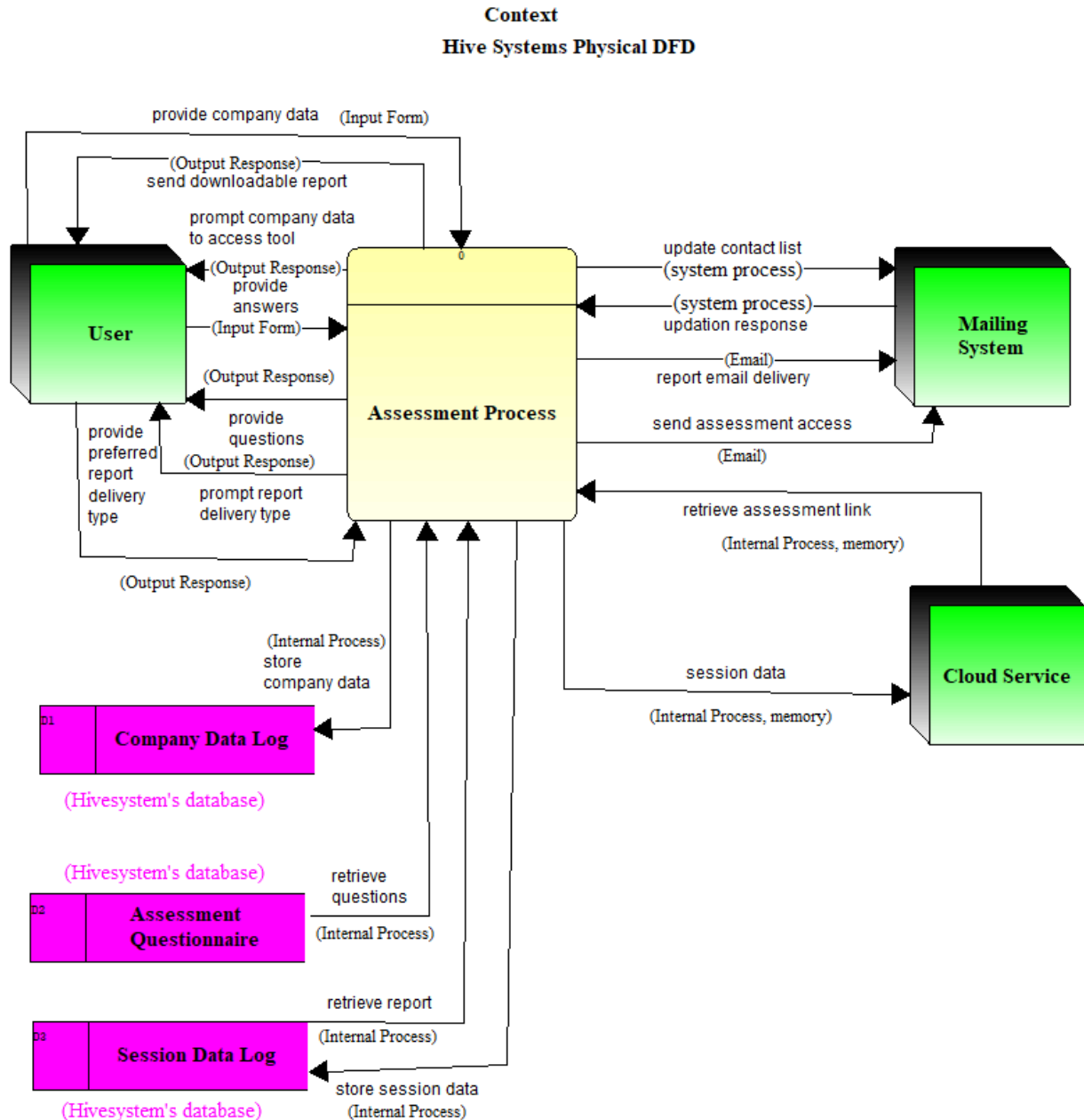
Technical Feasibility - 35%

This category is rated in the middle because outside of the project being cost-free, the most important part of the project is that it can be successfully developed. Ensuring that the selected candidate possesses the technical capabilities to develop this application is almost as important as ensuring the project is cost-free.

Operational Feasibility - 15%

This category is rated the lowest because Hive Systems will benefit the same from the completed development of our application no matter who develops it. The application already has demonstrated usefulness in the market, so if it is successfully developed it will be accepted and integrated into the Hive Systems operating environment.

Physical Data Flow Diagrams

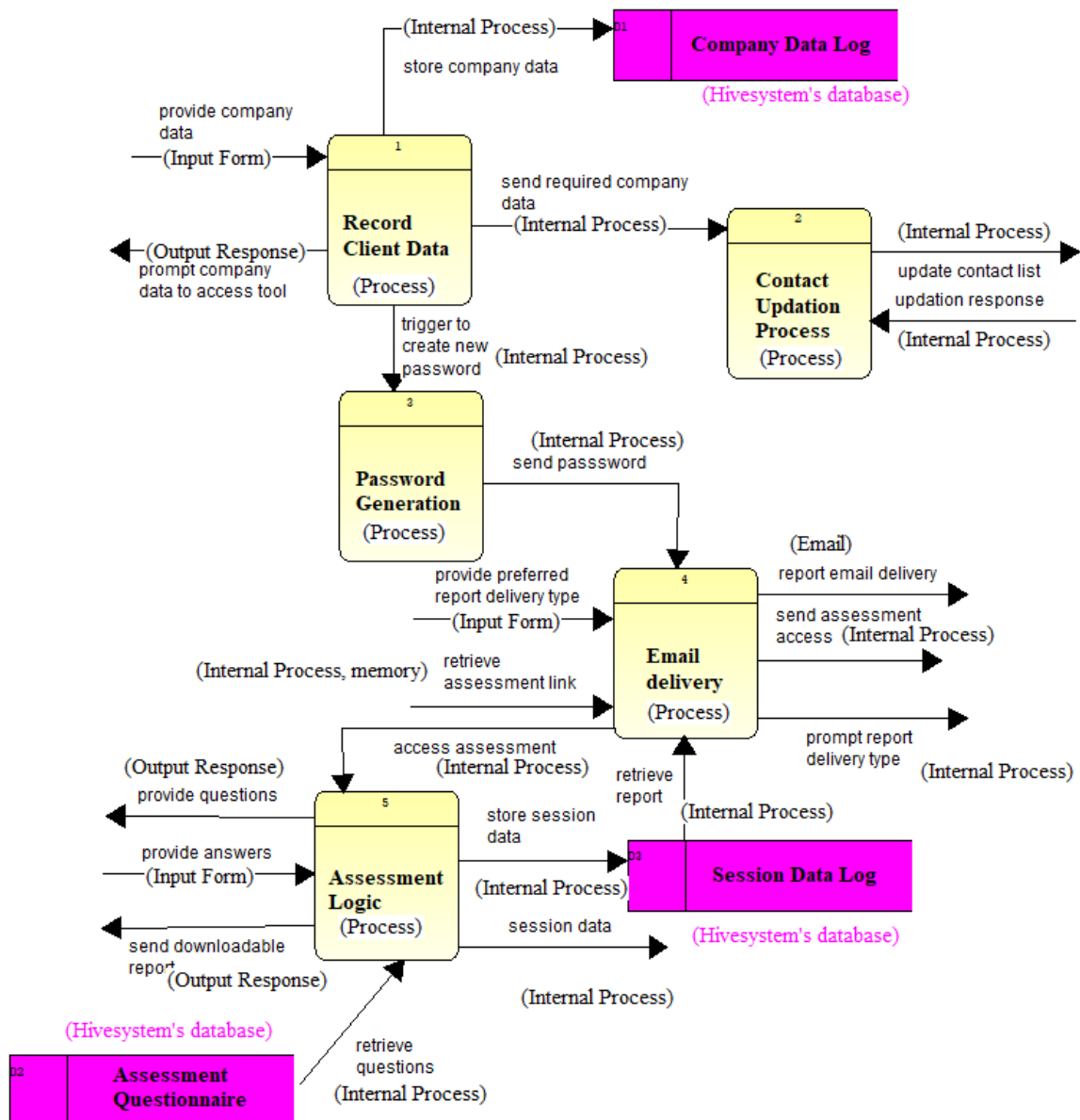


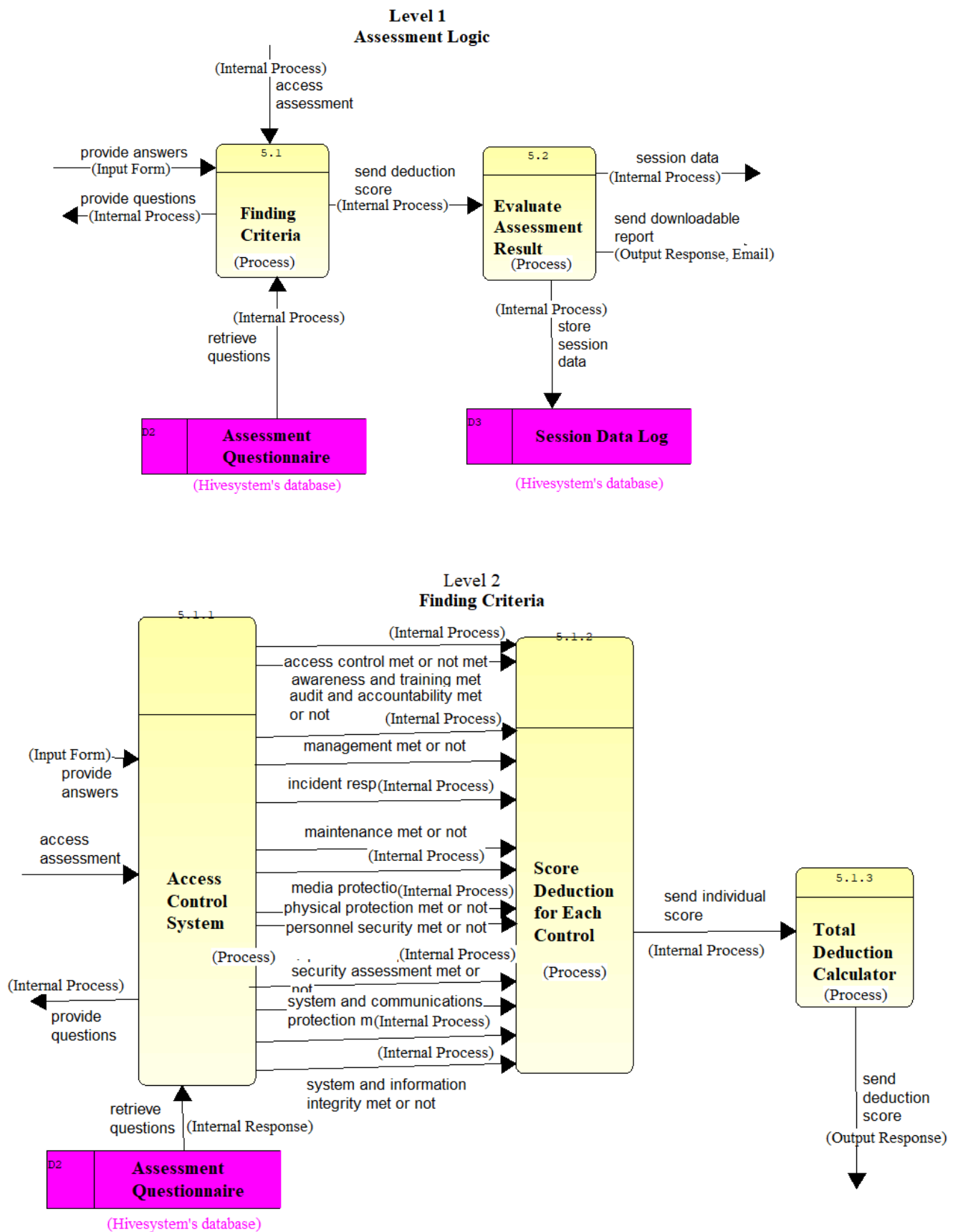
Mailing System - MailChimp

Cloud Service - Amazon Web Services

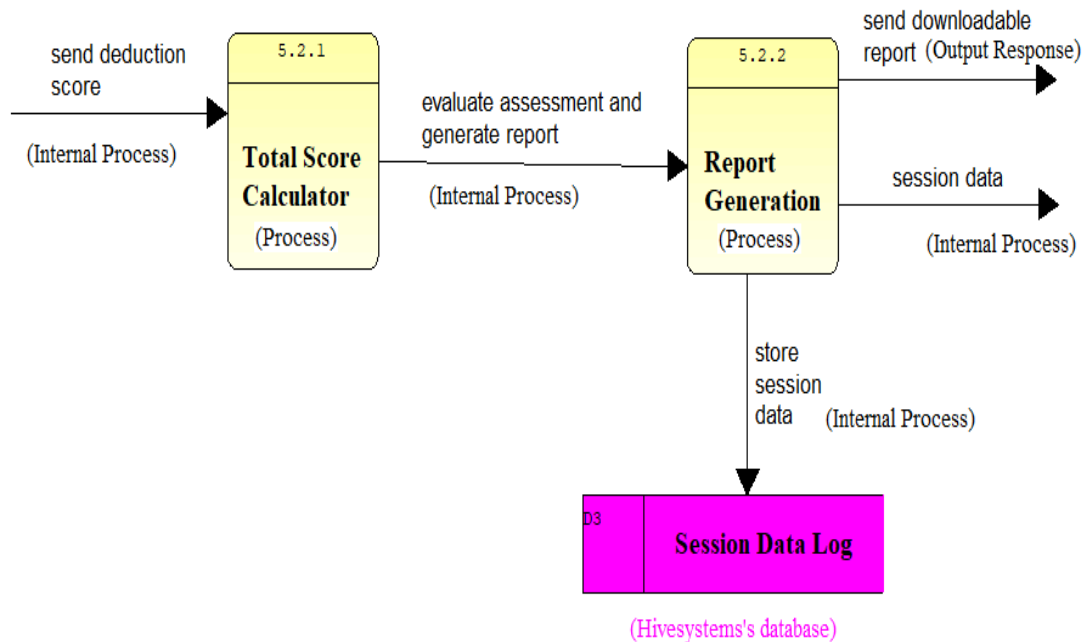
Assessment Process - Python

**Level 0
Assessment Process Flow**

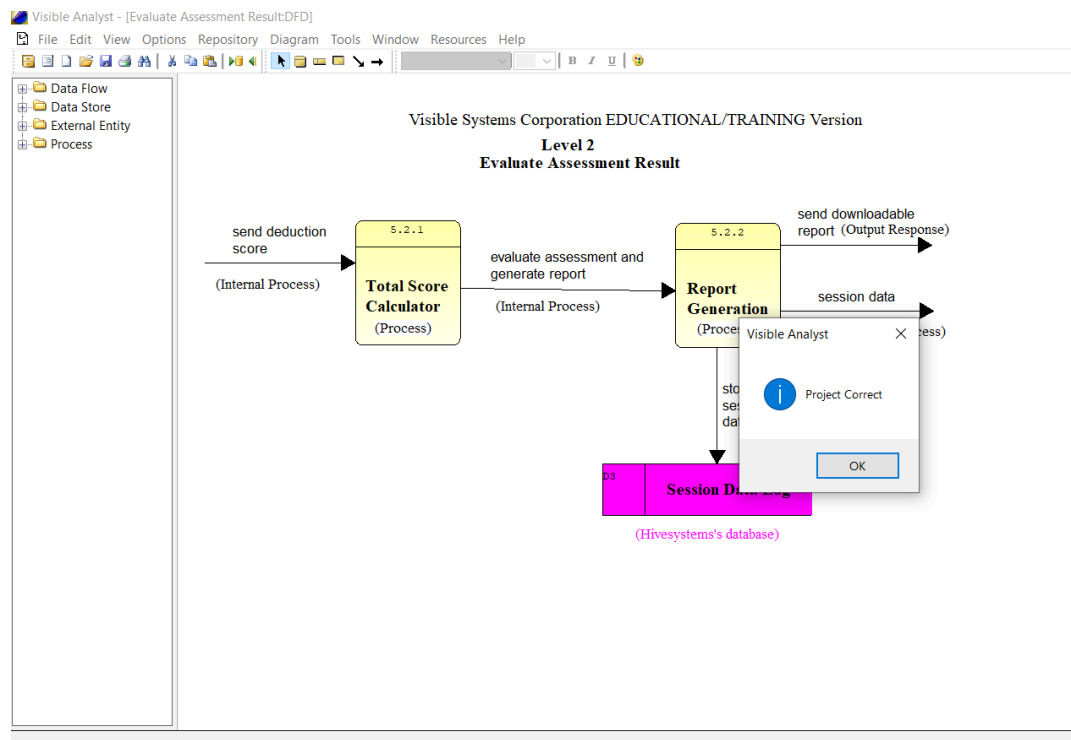




Level 2 Evaluate Assessment Result



Error Report:



Sample Input and Output Design Screens

Inputs:

Welcome to Hive Systems

please sign up to access the CMMC level 2 self assessment tool

Name

First Name

Last Name

Email

example@example.com

Password

example@example.com

Confirm Password

example@example.com

Sign Up



Disclaimer

The assessments and scores generated by this tool are based on the information you provide and are intended for informational purposes only.

Do you wish to complete the cybersecurity assessment on your own, or would you like assistance *

- ☐ Yes
☐ No

Please Select Control Type

Access Control ▼

Control Subtype

- ☐ AC.L1-3.1.2
☒ AC.L1-3.1.20

Do you want to save the PDF report

- ☒ Yes
☐ No
-

Outputs:

Need Assistance?

Please connect with our support team for personalized guidance with your assessment.

Phone: 804 396 4720

Email: information [at] hivesystems.com

Please Select Control Type

Access Control ▼

Control Subtype

☐ AC.L1-3.1.2

☒ AC.L1-3.1.20

The types of transactions and functions that authorized users are permitted to execute are defined

Met ▼

System access is limited to the defined types of transactions and functions for authorized users

Not Met ▼

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Please Select Control Type

Access Control ▼

Control Subtype

- ☐ AC.L1-3.1.2
☒ AC.L1-3.1.20

The types of transactions and functions that authorized users are permitted to execute are defined

Met ▼

System access is limited to the defined types of transactions and functions for authorized users

Not Met ▼

Do you want to save the PDF report

- ☒ Yes
☐ No

Implementation Plan

We intend to use Agile methodology for the implementation process of the proposed system. The current system can still be used by the client internally and serves as a quick way to test the logic of the assessment when any changes in controls and sub controls have to be introduced. Since this tool will be implemented in-house, Agile is our preferred method since it comes with adaptability to changing requirements and due to the collaborative nature of this project. This is also reliable when there are strict time constraints. Keeping the timeline in mind, this is the most logical plan we have come up with.

	WBS	Name	Duration	Start	Finish
1	1	Hive Systems	91 days	09/01/2024 8:00 AM	12/01/2024 5:00 PM
2	1.1	Implementation Planning	4 days	09/01/2024 8:00 AM	09/04/2024 5:00 PM
3	1.1.1	Project Initiation Meeting	2 days	09/01/2024 8:00 AM	09/02/2024 5:00 PM
4	1.1.2	Team selection	2 days	09/01/2024 8:00 AM	09/02/2024 5:00 PM
5	1.1.3	JIRA board and GitHub set-up	2 days	09/02/2024 8:00 AM	09/04/2024 5:00 PM
6	1.1.4	Task identification and delegation	2 days	09/02/2024 8:00 AM	09/04/2024 5:00 PM
7	1.2	Backend development	35 days	09/05/2024 8:00 AM	10/10/2024 5:00 PM
8	1.2.1	Configure server and setup database	7 days	09/05/2024 8:00 AM	09/12/2024 5:00 PM
9	1.2.2	Implement database schema	10 days	09/13/2024 8:00 AM	09/23/2024 5:00 PM
10	1.2.3	Develop backend logic of assessment	15 days	09/24/2024 8:00 AM	10/07/2024 5:00 PM
11	1.2.4	Perform unit testing	2 days	10/08/2024 8:00 AM	10/10/2024 5:00 PM
12	1.3	Frontend development	30 days	10/11/2024 8:00 AM	11/11/2024 5:00 PM
13	1.3.1	Design website layout	10 days	10/11/2024 8:00 AM	10/20/2024 5:00 PM
13	1.3.2	Develop frontend design	15 days	10/21/2024 8:00 AM	11/06/2024 5:00 PM
14	1.3.3	Perform unit testing	5 days	11/07/2024 8:00 AM	11/11/2024 5:00 PM

15	1.4	Integration and Testing	8 days	11/12/2024 8:00 AM	11/20/2024 5:00 PM
16	1.4.1	Perform integration with external system	1 days	11/12/2024 8:00 AM	11/12/2024 5:00 PM
17	1.4.2	Perform system testing	5 days	11/13/2024 8:00 AM	11/17/2024 5:00 PM
18	1.4.3	Perform validation, performance testing	5 days	11/13/2024 8:00 AM	11/17/2024 5:00 PM
19	1.4.4	Perform user testing	5 days	11/13/2024 8:00 AM	11/17/2024 5:00 PM
20	1.4.5	Fix bugs and other issues	2 days	11/18/2024 8:00 AM	11/20/2024 5:00 PM
21	1.4.6	Conduct pre-production testing	2 days	11/18/2024 8:00 AM	11/20/2024 5:00 PM
22	1.5	Deployment	5 days	11/21/2024 8:00 AM	11/25/2024 5:00 PM
23	1.5.1	Deploy the tool to production	1 days	11/21/2024 8:00 AM	11/21/2024 5:00 PM
24	1.5.2	Analyse performance & collect feedback	4 days	11/22/2024 8:00 AM	11/25/2024 5:00 PM
25	1.6	Maintenance and Support	4 days	11/26/2024 8:00 AM	11/29/2024 5:00 PM
26	1.6.1	Provide support and issue updates	4 days	11/26/2024 8:00 AM	11/29/2024 5:00 PM
27	1.7	Project Close-out	2 days	11/30/2024 8:00 AM	12/01/2024 5:00 PM
28	1.7.1	Documentation	2 days	11/30/2024 8:00 AM	12/01/2024 5:00 PM
29	1.7.2	Resource disposition	1 day	12/01/2024 8:00 AM	12/01/2024 5:00 PM
30	1.7.3	Project handover	1 day	12/01/2024 8:00 AM	12/01/2024 5:00 PM

Lessons Learned

Lessons Learned Summary for Hive Systems Project:

- 1. Automation Benefits:** Automating the assessment process proved crucial for reducing manual errors, improving efficiency, and enhancing scalability. This was a significant improvement compared to the previous Excel-based system that was prone to errors and inefficiencies.
- 2. Client Engagement and Feedback:** Continuous engagement with the client throughout all phases was essential. Gathering insights directly from users of the current system helped understand specific needs and pain points, leading to a more customized and effective solution.
- 3. Adaptability and Flexibility:** The flexibility in the choice of development tools and programming languages enabled the team to select the best options based on the project's needs, rather than being constrained to less suitable technologies. This adaptability was crucial for meeting project timelines and functionality goals.
- 4. Scalability and Future Growth:** The project's design not only considered the current requirements but also potential future expansions. This approach ensures that the system can accommodate future business growth for Hive Systems.
- 5. Testing and Iteration:** Thorough testing phases were instrumental in refining the system. Feedback from these tests was used for iterative improvements, highlighting the importance of testing in the development process.
- 6. Project Management and Deadlines:** Adhering to a strict timeline within the academic framework provided the team with valuable experience in project management, including time allocation, prioritization, and contingency planning.
- 7. Educational and Real-World Relevance:** The project connected academic learning with real-world applications, providing the team with practical experience in system analysis, design, and implementation that reflects industry practices.