

# **REQUEST FOR EXPRESSION OF INTEREST**

**REol # GovTech/Tender/25-26/26**

*Review and strengthen existing  
data warehouse architecture.*

*Government Technology Agency*

*Hiring of Data Engineering Expert*

## INVITATION FOR EXPRESSION OF INTEREST

GovTech/Tender/25-26/26

19<sup>th</sup> September 2025

The **Government Technology Agency** invites expression of interest to provide the following consulting services: **Data Engineering Expert to assess, optimize, and modernize our existing data warehouse architecture. This engagement will be for 6 Months.** More details on the services are provided in the Terms of Reference.

An Individual Consultant will be selected as per the procedures described in this REoI, in accordance with Procurement Rules and Regulations in force of the Royal Government of Bhutan

The EoIs are to be submitted at the latest by **3rd October 2025**.

The procedural requirements for responding to this invitation are provided in the complete REoI document, which includes the following:

**Section 1: Instructions to Consultants**

**Section 2: Standard Forms**

**Section 3: Terms of Reference**

Address for response/ Address of Procuring Agency:

*GovTech Agency, Royal Government of Bhutan  
Thori Lam, Upper Chubachu,  
Thimphu, Bhutan.  
Tel: +975-02-323215  
Fax: +975-02-328440  
Post box : 482*

Yours sincerely,



1. Tshering Cheki, Asst. Procurement Officer, GovTech Agency. [tcheiki@plantech.gov.bt](mailto:tcheiki@plantech.gov.bt)

2. Suresh Nepal, Dy. Chief ICT Officer, Data Science and AI Division (DSAID), GovTech Agency.  
[Snepal@plantech.gov.bt](mailto:Snepal@plantech.gov.bt)

## SECTION 1: INSTRUCTIONS TO CONSULTANT

- |  |  |
|--|--|
| <b>1. Scope of assignment</b>              | 1.1 The Employer has received a budget from <b>RGoB</b> and intends to select an Individual Consultant for the specific assignment as specified in the Terms of Reference in Section 4.  |
| <b>2. Qualifications of the Consultant</b> | 2.1 Prospective Individuals shall demonstrate in their Eol that they meet the required qualifications and experiences and are fully capable of carrying out the assignment.  |
| <b>3. Conflict of Interest</b>             | 3.1 The Consultant shall hold the Procuring Agency's interests paramount, without any consideration for future work, and strictly avoid conflict with other assignments or its own corporate interests. For this purpose, the provisions of the Procurement Rules and Regulations on Conflict of Interest shall apply.   |
| <b>4. Unfair Advantage</b>                 | 4.1 If a Consultant could derive a competitive advantage from having provided Consulting Services related to the assignment in question, the Procuring Agency shall make available to all Consultants together with this REol all information that would in that respect give such Consultant any competitive advantage over competing Consultants.  |
| <b>5. Fraud and Corruption</b>             | 5.1 It is RGoB policy to require that Consultants, observe the highest standards of ethics during the procurement and execution of contracts. <sup>1</sup> In addition, as a condition of admission to eligibility, the Consultant shall execute and attach to their Proposals an Integrity Pact Statement in the form provided in <b>Form 4 of Section 3</b> .  |
| <b>6. Preparation of Eol</b>               | 6.1 Eol shall be typed or written in indelible ink in English language and shall be signed by the Consultant. Consultants are required to complete the following Forms:<br>(a) Form 1: Submission of Expression of Interest;<br>(b) Form 2: CV of the Consultant; and<br>(c) Form 3: Integrity Pact  |
| <b>7. Submission of Eol</b>                | 7.1 The prospective Consultant can deliver their Eol by email only at <a href="mailto:tcheki@plantech.gov.bt">tcheki@plantech.gov.bt</a> and <a href="mailto:snepal@plantech.gov.bt">snepal@plantech.gov.bt</a> .<br><br>7.2 Eol shall be submitted in two folders (Technical proposal and financial proposal). The financial proposal shall be password protected.<br><br>7.3 The closing date for submission of Eol is 3rd October 2025 up to 5:00PM. Eol must be submitted within this deadline. Any Eol received after the deadline for submission of Eol shall be declared late, and returned unopened to the Consultant. |

<sup>1</sup> In this context, any action taken by a consultant to influence the procurement process or contract execution for undue advantage is improper.

- 7.4 EoI may be modified or substituted before the deadline for Submission.
- 7.5 The Procuring Agency may at its sole discretion, extend the deadline for submission of EoI.
- 7.6 At any time prior to the deadline for submission of EoI the Procuring Agency for any reason or on its own initiative may revise the REoI Document by issuing an Addendum which shall form an integral part of the Document.

## 8. Evaluation of EoI

- 8.1 Suitability of the Consultants shall be evaluated on the basis of criteria specified in the sub clause 8.2

- 8.2 The points to be given under each of the evaluation Criteria are:

*[Procuring Agency may apply the following criteria as appropriate and allocate points accordingly. The points may be further broken down for each criteria/sub criteria]*

Criteria	Points
• Educational Qualification	20 points
• Relevant Working Experience and its adequacy for the assignment	30 points
• Suitability of skill (such as training, computer skills, proficiency in English and others).	50 points
<b>Total points:</b>	<b>100 points</b>

- 8.3 Immediately after the closing date and time for submission the Procuring Agency shall open all EoI documents, including any substitutions accompanied by a properly authorized substitution notice.
- 8.4 Following the opening of the EoI, and until the Contract is signed, no Consultant shall make any unsolicited communication to the Procuring Agency. Such an attempt to influence the Procuring Agency in its decisions on the examination, evaluation, and comparison of either the EoI or Contract award may result in the rejection of the EoI.
- 8.5 After the evaluation, the highest-ranked Consultant shall be asked to submit a financial proposal, which shall be subject to negotiation. The financial proposal shall be submitted as per the Form 3 provided in Section 3. **(Not Applicable)**

## **9. Negotiations**

- 9.1 The first-ranked Consultant shall then be invited for negotiations. If negotiations fail; the Procuring Agency shall inform the Consultant in writing of the reasons for termination of the negotiations and then shall invite the Consultant who's EoI was ranked second to negotiate a Contract. Once negotiations commence with the second ranked Consultant the Procuring Agency shall not reopen the earlier negotiations.
- 9.2 During negotiations, the Procuring Agency and the Consultant shall finalize the "Terms of Reference", work schedule, logistics and reporting schedule etc. These documents shall then be incorporated into the Contract as Description of Services"
- 9.3 The Financial negotiations will involve the remuneration and other reimbursable cost to be paid to the Consultant.
- 9.4 Negotiations will conclude with a review of the draft Contract. To complete negotiations, the Procuring Agency and the Consultant will finalize the agreed Contract.

## **10. Award of Contract**

- 10.1 The Procuring Agency shall award the Contract to the selected Consultant, and:
- (a) as soon as possible notify unsuccessful Consultants, and
  - (b) publish a notification of award on the Employer's website.
- 10.2 The notifications to all unsuccessful Consultants, and the notification on the Employer's website, shall include the following information:
- (a) the assignment reference number;
  - (b) the name of the winning Consultant and total price it offered; and
  - (c) the date of the award decision.
- 10.3 Following the decision to award the Contract to the selected Consultant, the parties shall enter into a written Contract binding on both parties. The Contract shall be compatible with the Applicable Laws of Bhutan. The Contract shall be signed by the duly authorized representatives of the parties and shall bear the date of signature.
- 10.4 Where both the parties do not sign the Contract simultaneously,
- (a) The Procuring Agency shall send to the selected Consultant two original copies of (1) the full agreed Contract and (2) the letter of acceptance (notification of award), each signed by its duly authorized representative together with the date of signature;
  - (b) The letter of acceptance shall indicate the deadline by which it must be accepted, which shall not be more than 15 days from the date of its receipt by the Consultant;

- (c) The Consultant, if he agrees to conclude the Contract, shall sign and date all original copies of the Contract and the letter of acceptance and return one copy of each to the Procuring Agency before the expiry of the deadline indicated in the letter of acceptance;
- (d) In case the selected Consultant fails to sign the Contract agreement within the deadline specified in the letter of acceptance the Procuring Agency may negotiate with the second ranked Consultant.

10.5 The Consultant is expected to commence the assignment on **1<sup>st</sup> December 2025** at Thimphu, Bhutan. The duration of the contract shall be 6 Months from the date of commencement.

## SECTION 2: STANDARD FORMS

*[Comments in brackets [ ] provide guidance to the Consultants for the preparation of their Expression of Interest Document; they should not appear on the EoI to be submitted.]*

FORM-1 Expression of Interest Submission Form

FORM-2 Consultant's Curriculum Vitae

FORM-3 Remuneration and Reimbursable

FORM-4 Integrity Pact

## Form 1A: Expression of Interest Submission Form

Date:

To:

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*[Address of Procuring Agency]*

Dear Sir/Madam:

I, hereby submit my Eol to provide the consulting Services for [Insert title of assignment] in strict accordance with your Request for Eol dated [dd/mm/yy].

I declare that I was not associated, nor have been associated in the past, directly or indirectly, with a Consultant or any other entity that has prepared the design, specifications and others documents in accordance with Clause 3.

I have not been declared ineligible by the Royal Government of Bhutan on charges of engaging in corrupt, fraudulent, collusive or coercive practices in accordance with Clause 5.

If selected, I undertake to commence the consulting Services for the assignment not later than the date indicated in Clause 10.5.

I understand that the Procuring Agency reserves the right to accept or reject any Eol at any time prior to contract award.

Yours Sincerely,

Signature

Name:

Address:

Tel:

Attachment: *[List attachments]*

## Form 1B- Consultant's Information Sheet

### A. Consulting Services Data

Name of the consulting services	
Assignment (Brief Description)	

### B. Consultant Data

* Name	
* Country of Nationality	
* Address of consultant	
* E-mail and contact No. of consultant	

### C. Assignment Specific Qualifications and Experience

* Assignment Specific Experience (Provide information demonstrating your ability, skills and experience to undertake advertised assignment and deliver inputs/ outputs required under the TOR-add additional sheet if required)
* Please provide summary of your qualifications and attach your Curriculum Vitae (CV)***

#### **D. Eligibility Declaration**

I, the undersigned, certify to the best of my knowledge and belief

- » The CV I attached correctly describes my qualifications and my experience
- » I am not part of the team who wrote the terms of reference for this consulting services assignment.
- » I have not been convicted of an offense or crime related to theft, corruption or fraud.
- » I understand that it is my obligation to notify Procuring Agency should I become ineligible to work with.
- » I understand that it is my obligation to notify Procuring Agency, or should I be convicted of an offense related to theft, corruption or fraud.

» Completed by (Name)	
Date (dd/mm/yyyy)	

## Form 2- Curriculum Vitae (CV) of the Consultant

1. Name [*Insert full name*]: \_\_\_\_\_
2. Date of Birth: \_\_\_\_\_ Nationality: \_\_\_\_\_
3. Education [*Indicate college/university and other specialized education of staff member, giving names of institutions, degrees obtained, and dates of obtainment*]: \_\_\_\_\_  
\_\_\_\_\_
4. Membership of Professional Associations: \_\_\_\_\_  
\_\_\_\_\_
5. Other Training [*Indicate professional training relevant to the project* ]: \_\_\_\_\_
6. Countries of Work: [*List countries where staff has worked in the last ten years*]: \_\_\_\_\_  
\_\_\_\_\_
7. Languages [*For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing*]: \_\_\_\_\_  
\_\_\_\_\_
8. Employment Record [*Starting with present position, list in reverse order every employment held by staff member since graduation, giving for each employment (see format here below): dates of employment, name of employing organization, positions held.*]:  
From [Year]: \_\_\_\_\_ To [Year]: \_\_\_\_\_  
Employer: \_\_\_\_\_  
Positions held: \_\_\_\_\_

9. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned

*[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]*

Name of assignment or project: \_\_\_\_\_

Year: \_\_\_\_\_

Location: \_\_\_\_\_

Procuring Agency or Procuring Agency: \_\_\_\_\_

Main project features: \_\_\_\_\_

Positions held: \_\_\_\_\_

Activities performed: \_\_\_\_\_

Note: Attach the work experience certificate

10. Declaration :

I, the undersigned, declare that to the best of my knowledge and belief, this CV correctly describes me, my qualifications and my experience. I understand that any willful misstatement herein may lead to my disqualification or dismissal, if engaged.

\_\_\_\_\_  
*[Name & Signature of the consultant]*

Date: \_\_\_\_\_  
*Day/Month/Year*

### Form 3- Remuneration and Reimbursable

The highest ranked Consultant's financial proposal shall be after the evaluation of the EoI. After negotiations, Remuneration & Reimbursable will be part of the total cost as per agreed deliverables in the contract.

#### (1) Remuneration

Rate (per month/ per day)	Time spent (person-months)	Total
		Sub-Total (1)

#### (2) Reimbursable

Item	Unit	Qty	Rate	Total
(a) Per Diem				
(b) Travel cost				
(c) Visas, resident permits, airport taxes and incidental travel costs (at cost)				
				Sub-Total (2)

Total Cost: Sub-Total (1) + Sub-Total (2)

### Consultants' Representations Regarding Costs and Charges

I, hereby confirm that the basic salary indicated in the contract are taken from my payroll records and reflect the current salary rate **exempt taxes** and which have not been raised other than within the normal annual salary increase anticipated due to inflation, etc. If required I can provide the relevant copies of the latest contract papers upon which the rates are based.

(Name, Signature and date)

## Form 4- Integrity Pact

### INTEGRITY PACT

#### 1. General:

Whereas (Name of head of the procuring agency or his/her authorized representative, with power of attorney) representing the GovTech Agency, Royal Government of Bhutan, hereinafter referred to as the “**Employer**” on one part, and (Name of bidder or his/her authorized representative, with power of attorney) representing M/s. (Name of firm), hereinafter referred to as the “**Bidder**” on the other part hereby execute this agreement as follows:

This agreement shall be a part of the standard bidding document which shall be signed by the bidder during the bid submission and employer shall sign during the bid opening time. on both the parties from This IP is applicable only to “**large**” scale works, goods and services, the threshold of which will be announced by the government from time to time. The signing of the IP shall not apply to framework contracting such as annual office supplies etc.

#### 2. Objectives:

Whereas, the Employer and the Bidder agree to enter into this agreement, hereinafter referred to as IP, to avoid all forms of corruption or deceptive practice by following a system that is fair, transparent and free from any influence/unprejudiced dealings in the **bidding process**<sup>2</sup> and **contract administration**<sup>3</sup>, with a view to:

- 2.1 Enabling the Employer to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works or goods or services; and
- 2.2 Enabling bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices.

#### 3. Scope:

The validity of this IP shall cover the bidding process and contract administration period.

#### 4. Commitments of the Employer:

The Employer Commits itself to the following:-

- 4.1 The Employer hereby undertakes that no officials of the Employer, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favor or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process and contract administration.
- 4.2 The Employer further confirms that its officials shall not favor any prospective bidder in any form that could afford an undue advantage to that particular bidder in the bidding process and contract administration and will treat all Bidders alike.

<sup>2</sup> Bidding process, for the purpose of this IP, shall mean the procedures covering tendering process starting from bid preparation, bid submission, bid processing, and bid evaluation.

<sup>3</sup> Contract administration, for the purpose of this IP, shall mean contract award, contract implementation, un-authorized sub-contracting and contract handing/taking over.

- 4.3 Officials of the Employer, who may have observed or noticed or have reasonable suspicion shall report to the head of the employing agency or an appropriate government office any violation or attempted violation of clauses 4.1 and 4.2.
- 4.4 Following report on violation of clauses 4.1 and 4.2 by official (s), through any source, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings shall be initiated by the Employer and such a person shall be debarred from further dealings related to the bidding process and contract administration.

## **5. Commitments of Bidders**

The Bidder commits himself/herself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of the bidding process and contract administration in order to secure the contract or in furtherance to secure it and in particular commits himself/herself to the following :-

- 5.1 The Bidder shall not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favor, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Employer, connected directly or indirectly with the bidding process and contract administration, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding process and contract administration.
- 5.2 The Bidder shall not collude with other parties interested in the contract to manipulate in whatsoever form or manner, the bidding process and contract administration.
- 5.3 If the bidder(s) have observed or noticed or have reasonable suspicion that the provisions of the IP have been violated by the procuring agency or other bidders, the bidder shall report such violations to the head of the procuring agency.

## **6. Sanctions for Violation:**

The breach of any of the aforesaid provisions shall result in administrative charges or penal actions as per the relevant rules and laws.

- 6.1 The breach of the IP or commission of any offence (forgery, providing false information, misrepresentation, providing false/fake documents, bid rigging, bid steering or coercion) by the Bidder, or any one employed by him, or acting on his/her behalf (whether with or without the knowledge of the Bidder), shall be dealt with as per the terms and conditions of the contract and other provisions of the relevant laws, including De-barment Rules.
- 6.2 The breach of the IP or commission of any offence by the officials of the procuring agency shall be dealt with as per the rules and laws of the land in vogue.

## **7. Monitoring and Administration:**

- 7.1 The respective procuring agency shall be responsible for administration and monitoring of the IP as per the relevant laws.
- 7.2 The bidder shall have the right to appeal as per the arbitration mechanism contained in the relevant rules.

We, hereby declare that we have read and understood the clauses of this agreement and shall abide by it.

The parties hereby sign this Integrity Pact at (place) \_\_\_\_\_ on (date) \_\_\_\_\_



EMPLOYER

CID : 


Witness:\_\_\_\_\_

Name:

CID : 




BIDDER/REPRESENTATIVE

Witness:\_\_\_\_\_

Name:

## SECTION 3: TERMS OF REFERENCE

### 1. Introduction

We are seeking a highly skilled and experienced Data Engineering Expert to assess, optimize, and modernize our existing data warehouse architecture. The ideal candidate will possess deep practical knowledge of on-premises infrastructure setup, advanced ETL/ELT/automation processes, and proficiency in big data technologies. This role involves comprehensive analysis, strategic architectural recommendations, hands-on implementation, and knowledge transfer to our internal teams.

### 2. Objectives

The primary objectives for this engagement are to:

- Evaluate the current data warehouse architecture, tools, and processes.
- Identify shortcomings, performance bottlenecks, tool-related issues, and skill gaps within our current data engineering landscape.
- Propose and design a robust, scalable, and high-performance future-state data architecture.
- Implement the new end-to-end architecture and tools (data lakehouse/warehouse), ensuring seamless integration and data reliability.
- Provide comprehensive training and mentorship to relevant internal officials to foster self-sufficiency.
- Document all phases of the project, including architecture, implementation details, and operational procedures.

### 3. Scope of Work

The Data Engineering Expert will be responsible for the following key activities:

#### 3.1. Assessment and Analysis

- **Study As-Is Data Warehouse Architecture:** Conduct a thorough review of the existing data warehouse architecture, including data sources, data models, ETL/ELT pipelines, reporting mechanisms, and underlying infrastructure (storage, compute, networking).
- **Current State Report:** Prepare a detailed report outlining the current data engineering architecture's shortcomings, performance issues, limitations of existing tools, and identify skill gaps within the operational team. This report should include actionable recommendations for immediate improvements.

#### 3.2. Architecture Design and Proposal

- **New Architecture Proposal:** Based on the assessment, propose a new, optimized, and scalable data architecture. This proposal should consider:
  - **Data Storage:** Recommendations for optimal storage solutions for all structured, unstructured and semi structured data (e.g., Data Lake, Data Warehouse, Lakehouse paradigms).
  - **Data Processing:** Efficient ETL/ELT strategies using tools like Apache Hop or NiFi.
  - **Orchestration:** Workflow automation using Apache Airflow, including integration with Apache Hop Server for job execution.
  - **Data Streaming:** Integration of Apache Kafka for real-time data ingestion and processing where applicable.
  - **Big Data Concepts:** Leveraging big data tools and concepts such as Apache Spark for distributed processing, with emphasis on Python and GUI tools for data manipulation and analysis.
  - **File Formats:** Recommendations for efficient big data file formats (e.g., Parquet, Avro, ORC) for storage and processing.

- **Distributed Computing:** Design considerations for distributed compute environments to ensure scalability and performance.
- **Change Data Capture Strategy and Implementation:** Design and implement robust CDC pipeline. This includes exploring various CDC approaches and narrowing down to the best suited one. The expert should demonstrate and implement no-code/low-code tools for CDC.
- **Data Lineage:** implement state-of-the-art data lineage tools for understanding, recording, and visualizing the flow of data from its source to its consumption. The tool should be able to create a complete audit trail or "life cycle" of a data asset.
- **Tooling and Infrastructure Recommendations:** Provide specific recommendations for tools and infrastructure (on-premises) necessary for the proposed architecture, detailing setup, configuration, and maintenance considerations for each.

### 3.3. Implementation and Deployment

- **Hands-on Implementation:** Lead and execute the hands-on implementation and deployment of the proposed data architecture and tools. This includes:
  - Setting up and configuring on-premises infrastructure components.
  - Installation, configuration, and optimization of data engineering tools (Apache Hop, NiFi, Apache Airflow, Apache Kafka, Apache Spark, etc.).
  - Designing, developing, and deploying efficient ETL/ELT pipelines.
  - Deploy and configure Apache Airflow for ETL pipeline automation.
  - Implement and execute selective (1 or 2) end-to-end pipeline using the new architecture.
  - Creating a logical representation of data and its relationships (modelling) to support analytical processing and business intelligence (BI).
  - Deploy, configure and run data lineage tool/s for understanding the life cycle of a data asset.
  - Set up, install and run tools on the infrastructure/VMs provisioned at the Government Data Center (**the VMs will be running Linux/Ubuntu 24.04**).
  - Working collaboratively with internal teams throughout the implementation process.

### 3.4. Training and Knowledge Transfer

- **Official Training:** Develop and deliver comprehensive training programs for relevant officials on the new data architecture, tools, best practices, and operational procedures. Training should cover:
  - Principles of data warehousing and data lakes/lakehouses.
  - Deep dive into Apache Hop, NiFi, Apache Airflow, and Kafka.
  - Big data concepts, Spark programming with Python, and efficient file formats.
  - Distributed computing and infrastructure setup.
  - Troubleshooting and maintenance of the implemented systems.
  - Various data lakehouse/warehouse architecture & modeling.
- **Mentorship and Support:** Provide ongoing mentorship and support to internal teams during and after the implementation phase to ensure a smooth transition and capability building.

### 3.5. Documentation and Reporting

- **Project Documentation:** Prepare and submit a comprehensive project document covering all aspects of the engagement, including:
  - As-is architecture documentation.
  - Detailed proposed architecture design.
  - Implementation guides and configuration details.
  - Data pipeline specifications and ETL/ELT logic.
  - Scheduling and orchestration setup.
  - Operational runbooks and troubleshooting guides.
  - Training materials.

- **Milestone Presentations:** Make regular presentations to the relevant division after each significant project milestone to report on progress, discuss findings, and gather feedback.

#### 4. Required Qualifications and Expertise

The Data Engineering Expert must possess the following qualifications and demonstrated expertise:

- Bachelors Degree or higher in relevant fields.
- Having appropriate certifications will be an added advantage.
- **Extensive Data Engineering Experience:** Proven track record (minimum 5 years) in designing, building, and optimizing modern data architectures, including Data Warehouses and Data Lakehouses.
- **On-Premises Infrastructure:** Deep hands-on experience with on-premises infrastructure setup, including:
  - Compute resources (server provisioning, virtualization).
  - Networking configurations and security considerations for large-scale data systems.
  - Tool installation, configuration, and maintenance on Linux/Unix environments.
  - Containerization and orchestration using appropriate tools.
- **ETL/ELT Proficiency:** Expert-level knowledge and practical experience in designing, developing, and optimizing complex ETL/ELT processes.
- **Data Integration Tools:**
  - **Apache Hop:** Deep understanding and practical experience with Apache Hop for data integration, transformation, and workflow design, including setting up and managing Apache Hop Server.
  - **Apache NiFi:** Hands-on experience with Apache NiFi for data ingestion, routing, and processing, particularly for flow-based programming.
- **Workflow Orchestration:** Expert-level proficiency in Apache Airflow for scheduling, monitoring, and managing data pipelines. Ability to design robust and fault-tolerant DAGs.
- **Data Streaming:** Practical experience with Apache Kafka for building real-time data streaming pipelines.
- **Big Data Ecosystem:**
  - Strong understanding of Big Data concepts and distributed computing principles.
  - Proficiency in Apache Spark for data processing and analysis.
  - Strong programming skills in Python/SQL for data engineering tasks.
  - Knowledge of efficient file formats for big data (e.g., Parquet, ORC, Avro).
- **Deployment and Operations:** Demonstrated ability to implement and deploy data engineering tools and solutions in production environments, ensuring performance, scalability, and maintainability.
- **Documentation and Communication:** Excellent technical writing and presentation skills. Ability to clearly articulate complex technical concepts to both technical and non-technical audiences.
- **Training and Mentorship:** Proven experience in providing technical training and mentoring to junior and mid-level data professionals.

#### 5. Deliverables

The following deliverables are expected from the Data Engineering Expert:

- As-Is Data Warehouse Architecture Assessment Report (including shortcomings, tool issues, and skill gaps).
- Proposed Future-State Data Architecture Design Document (including infrastructure, tools, and technology stack recommendations).
- Implemented and fully functional Data Warehouse/Lakehouse environment based on the approved architecture.
- Developed and optimized ETL/ELT pipelines.
- Operational Apache Airflow DAGs for pipeline orchestration.
- Intensive Project Documentation (detailed architecture, implementation guides, operational runbooks).

- Training materials and conducted training sessions for relevant officials.
- Regular progress reports and milestone presentations.

## **6. Project Timeline**

The project timeline will be for six months after the signing of the contract and project kick-off.

## **7. Reporting and Communication**

The Data Engineering Expert will report directly to the Data Science and AI Division(DSAID), GovTech Agency. Regular communication, including stand-ups, progress meetings, and milestone reviews, will be established.

## **8. Selection Criteria**

The selection of candidates will be guided by the criteria outlined in the Request for Expression of Interest (REoI). All submissions will be evaluated based on their alignment with requirements, including relevant qualifications, experience, and demonstrated capacity to deliver on the scope of work.

Applicants will undergo a virtual interview to assess the suitability of their skills, competencies, and contextual understanding. The interview will serve as a qualitative measure to complement the initial document-based evaluation and ensure alignment with project needs.

## **9. Payment terms**

The Data Engineering Expert will receive a monthly lump-sum payment, covering all fees (interest, principal, service charges, tax etc.).

Payments are released on a monthly basis and are contingent upon the completion of agreed deliverables and satisfactory performance as assessed by the Data Science and AI Division, GovTech Agency.

The agency will bear the logistic cost for any travel around the country and no travel allowance will be provide.

