IDB

WORLD ECONOMIC FORUM

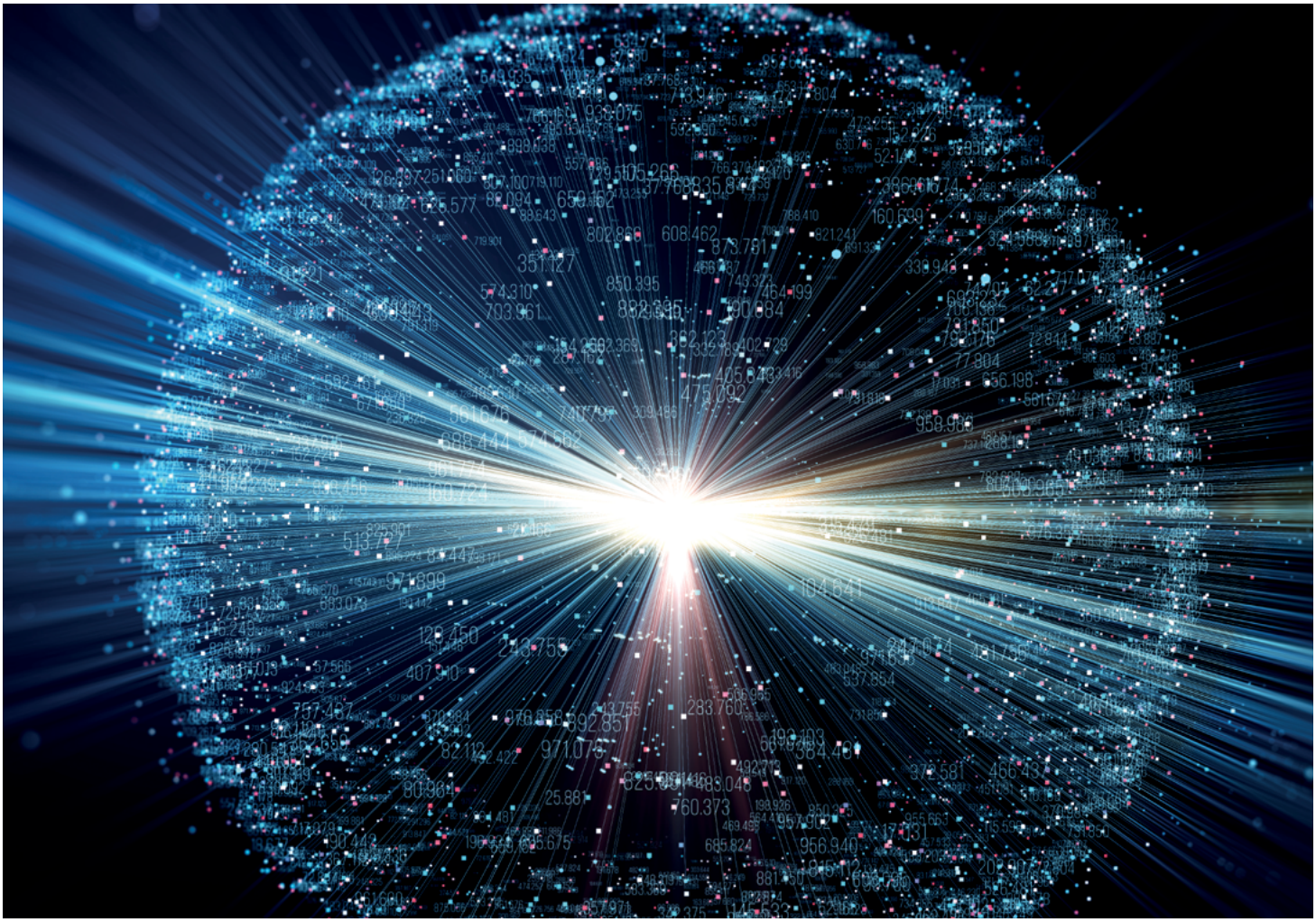
COMMITTED TO IMPROVING THE STATE OF THE WORLD

Model Request for Proposal Report

Exploring Blockchain Technology for Government Transparency:

Blockchain-Based Public Procurement to Reduce Corruption

June 2020



World Economic Forum
91-93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland
Tel.: +41 (0)22 869 1212
Fax: +41 (0)22 786 2744
Email: contact@weforum.org
www.weforum.org

Contents

Introduction

This document serves as an addendum to the report *Exploring Blockchain Technology for Government Transparency: Blockchain-Based Public Procurement to Reduce Corruption*. All authors, contributors and acknowledgements are listed in that report.

The model Request for Proposal (RFP) provided in this document intends to aid governments and other institutions that are designing their own RFPs, Requests for Information and Terms of Reference for the development of a blockchain-based public procurement solution. It can serve as a template for those institutions. For this purpose, an editable version of this document is also available.

This model RFP's appendix further provides information for software developers and technical researchers seeking to learn more about the design and architecture of a blockchain-based e-procurement system. It includes a process flow chart, solution requirements, and software functionality specifications and guidelines. These sections accompany the technical guidelines provided in the main report for this publication. As with those guidelines, they were used to inform the proof-of-concept (PoC) for the *Unlocking Government Transparency with Blockchain Technology* project (hereafter, the *Transparency Project*).

Importantly, this document merely seeks to provide inspiration and guidance; any technology implementations and their corresponding RFPs or other documentation should be customized to the specific requirements and interests of the issuing institution and project.

[Country or Institution Name]
[Tendering Department or Office]

[Project Heading]

[Additional Information]

TERMS OF REFERENCE (TOR)

[Date]
[Project Title]

Table of contents

1. BACKGROUND

This section should present background information about the tendering department or office. It should also introduce the motivation for initiating the blockchain project for public procurement, linking the institutional mandate, mission or objectives with the motivation and goals for the blockchain project or deployment.

As an example, this section could include the following elements, in addition to other information:

- General information about the sponsoring institution and its mandate
- Strategic plans or initiatives that correspond with enhancing integrity or governance in the public sector, or related activities
- Discussion of the institutional view of emerging technologies such as blockchain technology that motivates the project
- Key partner organizations related to the project

2. PRIOR CONSIDERATIONS

This section should describe the prior considerations and additional institutional background information relevant to explaining the purpose of the contract and the contract's key motivations and goals.

As an example, this section could include the following elements, in addition to other information:

- The role of the sponsoring institution in the country and its mandate related to the scope of the project
- Additional information related to key partner organizations and institutions supporting and involved with the project
- The relationship between citizens and the sponsoring institution
- The role of citizens and the public in supporting the monitoring activity of corruption in public procurement
- Information about procurement processes or jurisdictions where the solution may be deployed

3. PURPOSE

This section should briefly describe the key purposes of the contract and project. It may state that the purpose of the project is to conduct a software proof-of-concept (PoC) or pilot. Or the stated purpose could be implementation using blockchain technology of a public procurement system in a certain region and/or of a certain good or service in order to improve transparency, auditability and accountability in the procurement process.

As an example, this section could include the following elements, in addition to other information:

- The primary goals and purpose of the project
- The region where the software system will be deployed
- The good or service for which the solution is designed (e.g. the procurement of public-school meals in a certain region)
- The project's secondary goals (e.g. the project may also aim to promote a greater understanding of blockchain technology in the public sector, including the trade-offs and value-add of various use cases and implementations)

4. SCOPE

This section should provide the contract's scope, indicating key goals, criteria and boundaries for the software development team to create the desired solution.

An example of some text that could be appropriate for this section follows:

Public procurement presents significant challenges related to public-sector corruption in _____. There is need for institutions such as _____ and greater public engagement to better track and monitor procurement processes. The solution aims to create a highly transparent procurement process where citizens, journalists and transparency organizations can monitor vendor procurement in real time and support _____ in investigating or preventing suspicious behaviour.

The solution is designed to create censorship-resistant, permanent records of all tender offers, bid offers and bid evaluation decisions from the moment they are entered into the system, reducing reliance on any party to maintain accurate records. Additionally, it includes a set of simple automated functionalities designed to support a high-integrity procurement process. These include automatic open/close and public comment periods, automatic "red flags" and a degree of automatic evaluation scoring.

The contractor (the software development team) shall design, implement and execute a pilot that performs a public procurement auction for _____ in the specific department of _____ in _____. The pilot will operate using blockchain technology and smart contracts, and it will integrate with the existing e-procurement website front-end user interface and back-end database (if relevant).

The contract's scope includes the following:

- Development of smart contract-based software that operates a fully compliant public vendor procurement process
- Use of new capabilities such as automated alerts and evaluation scoring, and public participation in highlighting risky activity
- Integration with the existing domestic e-procurement system website front end (if relevant)
- Development of a new user interface (potentially integrated with the existing e-procurement website) for public query and the tracking of procurement auctions
- Integration with the domestic e-procurement system back-end database and vendor registration database (if relevant)
- A new potential bidder confidentiality and registration scheme
- The development of a "procurement client" that implements all non-blockchain functionalities required for the successful deployment of the pilot

The software development team's main role is to build the software solution according to the guidelines in this document. The team should cooperate with _____, technical advisers and _____ as appropriate to facilitate these aspects of the project.

5. PRINCIPAL ACTIVITIES

This section should inform, in broad terms, the principal activities of the software development team to generate the solution. If integrating the solution with an existing or new system or database is required, such as with an existing e-procurement database, then this requirement should be clarified.

An example of some text that could be appropriate for this section follows:

The contractor will develop the software product employed for the procurement auction for _____ in _____ during _____.

1. The software development of a new blockchain-based solution for vendor procurement as described in this document

2. All integrations, key features and functionalities related to the solution outlined in this document that support successful deployment aiming to increase data access and transparency, and ultimately reduce corruption in the vendor bidding, evaluation and selection processes

3. A written explanation of the design choices involved in blockchain-network selection and the key design features of the solution

4. Collaboration with _____, _____ and _____ towards the design, development and effective deployment of the software within the timeline and scope indicated in this document, in order to support successful and timely deployment in _____.

6. METHODOLOGY

Methodology is one of the criteria against which competing software development teams can be evaluated. This section should indicate how competing bidders (software development teams) can describe their project methodology and approach. This methodology should include a broad overview of the proposed technical architecture and blockchain networks the team would select to develop the project.

An example of some text that could be appropriate for this section follows:

Contractors should detail their overall project approach and methodology for developing the pilot solution. The methodology should be consistent with the project structure and Work Plan. It should include all methods, procedures and strategies for achieving the deliverables and project goals, described in detail with logical processes to be followed.

Importantly, contractors should indicate the blockchain network, architecture and permissioning configurations they would pursue in the development of the blockchain-based public procurement solution indicated in this Request for Proposal.

Bidders should consider the technical guidelines in the annexes of this document. They should independently consider which blockchain network, architecture and configurations are optimal in their view for the project's goals, requirements and challenges.

Contractors must document their decision process, including their reasoning for preferring their selected network, architecture and configuration in light of the relevant factors and trade-offs. They should further articulate how they plan to address technology challenges within their proposed configurations.

7. PROJECT STRUCTURE AND DELIVERABLES

This section should indicate the tendering institution's guidelines for the project structure and deliverables. Attention should be paid to the project management approach; a "waterfall" approach with sequential steps is likely prone to more challenges and risks than an interactive approach where multiple aspects of the project are progressed in tandem.

An example of some text that could be appropriate for this section follows:

Phase 1 – Project planning

- In this stage, the contractor presents the project plan to the tendering institution, including a timeline, resource planning and a project management approach.

- The contractor must also present updated documentation regarding the planned technology network choices, architecture and configuration, and receive approval for these choices.

Phase 2 – Information gathering and requirements

- In this stage, all necessary information is gathered, including information related to background research and solution requirements.

Phase 3 – Detailed design of the solution and plan of action

- In this phase, the results of the analysis are consolidated, the pilot project is designed, the proposed solutions are evaluated and the most appropriate solution is identified.

Phase 4 – Software development, implementation and testing

- During this phase, the software solution is developed, implemented and tested. During development, teams should be in contact at least once every two weeks with _____ related to project milestones, key design decisions and key technology decisions.

- The solution should be tested during and after the development process.

- After software development and testing, the solution is implemented and integrated where appropriate. Acceptance tests and procedures should be run to ensure system requirements are met.

Phase 5 – Documentation and recommendations

- The contractor completes the creation and transfer of the software solution, documents and other information to _____.

- Knowledge transfer to key in-country technology personnel and users is performed where appropriate.

- Any next steps and recommendations are also identified.

8. WORK PLAN

Within the Work Plan section, the competing software development teams should provide detailed information about how they will carry out the various stages and deliverables of the project. This information must be sufficiently detailed, describing the activities and tasks to be performed to achieve the expected deliverables. It should present the project schedule and deliverables in a manner that corresponds with the methodology, project structure and deliverables outlined in prior sections.

An example of some text that could be appropriate for this section follows:

Phase 1 – Project planning

– [Detailed information about how the software development team will carry out Phase 1 activities and deliverables]

Phase 2 – Information gathering and requirements

– [Detailed information about how the software development team will carry out Phase 2 activities and deliverables]

Phase 3 – Detailed design of the solution and plan of action

– [Detailed information about how the software development team will carry out Phase 3 activities and deliverables]

Phase 4 – Software development, implementation and testing

– [Detailed information about how the software development team will carry out Phase 4 activities and deliverables]

Phase 5 – Documentation and recommendations

– [Detailed information about how the software development team will carry out Phase 5 activities and deliverables]

9. DURATION

This section should indicate the project duration and time frame.

An example of some text that could be appropriate for this section follows:

The anticipated deadline for performance of the consultancy services is ___ months from the signing of the contract. In any case, the contractual period may not exceed _____.

10. CONTRACT VALUE AND PAYMENT

This section should indicate any appropriate information related to the contract value that the tendering entity will pay to the software development team. It may indicate payment according to a certain schedule.

An example of some text that could be appropriate for this section follows:

The total value of the contract is a maximum of _____.

The contracting institution will pay the value of the contract as follows:

PAYMENT METHOD	DELIVERABLES
___% of the total amount of the contract	
___% of the total amount of the contract	
___% of the total amount of the contract	

Note 1: The final payment to make up the total value of the contract is only payable once all the activities listed in the Terms of Reference have been performed, all the stated deliverables have been delivered and the appointed supervisor(s) has/have certified that all this has been done to satisfaction.

Note 2: To receive any given payment, the contractor must submit the required documentation to the contracting party, in accordance with the procedures and guidelines established by the contractor and _____ law.

11. ECONOMIC PROPOSAL

This section should indicate how the competing software development teams should submit their economic proposal.

An example of some text that could be appropriate for this section follows:

_____ is offering a maximum price of ____ for this project. This price is benchmarked from _____ and _____. Additional reference benchmarks include _____. The solution asks for several sophisticated functionalities that exceed those of the benchmark projects, justifying a higher price. Additional functionalities include:

- A graphical user interface and explorer for the public to engage in easy monitoring, searching and alert-raising for auctions within the system
- Integration with the domestic e-procurement system front-end graphical user interface, back-end database and the national vendor database
- A privacy scheme preserving the confidentiality of bidders until the auction closes
- Use of blockchain-based data storage component (e.g. InterPlanetary File System (IPFS) for Ethereum)
- Multiple automated smart contract functionalities

12. DETAILS OF THE CONTRACTING SERVICE

This section should indicate any other relevant information for the contract.

An example of some text that could be appropriate for this section follows:

- Type and form of consultancy: international, companies/corporate procurement, universities
- Contract term: _____
- Cost of service: _____

Payment and conditions: [information related to payment and conditions]

Diversity statement: [information related to criteria for diversity within the software development team]

Consanguinity statement: [information related to policies against hiring family members or close relations for the contract]

13. MINIMUM PROJECT TEAM, QUALIFICATIONS AND EXPERIENCE

This section should describe the minimum project team criteria, as well as guidelines or requirements for the qualifications and experience of the competing software development teams. It may be preferable to remove minimum work experience or academic background requirements, or to set low requirements, as these elements may be used to favour certain vendors and conduct "bid tailoring" or to reduce competition. Instead, the tenderer may wish to award extra or "bonus" points to bidders with many years of work experience and certain academic backgrounds.

An example of some text that could be appropriate for this section follows:

The following details describe the minimum project team for the contract:

a. Project Manager

– Academic background: professional qualification as a systems engineer, software engineer or related or equivalent profession, and valid international certification in project management

– General experience: minimum of (_) years in IT projects

– Specific experience: minimum of (_) years in blockchain projects

b. Blockchain Developer

– General experience: minimum of (_) years in software engineering or related fields

– Specific experience: minimum of (_) years in software engineering related to blockchain technology; must also be able to prove having performed this role in at least one other project

– Preferred: academic background: professional qualification as a systems engineer, software engineer or related or equivalent profession

c. Front-end Engineer

– General experience: minimum of (_) years in front-end engineering or related fields

– Specific experience: minimum of (_) years in front-end engineering; must also be able to prove having performed this role in at least one other project

– Preferred: academic background: professional qualification as a systems engineer, software engineer or related or equivalent profession

d. Back-end Engineer

– General experience: minimum of (_) years in back-end engineering or related fields

– Specific experience: minimum of (_) years in back-end engineering; must also be able to prove having performed this role in at least one other project

– Preferred: academic background: professional qualification as a systems engineer, software engineer or related or equivalent profession

e. User-interface Designer

– General experience: minimum of (_) years in front-end design or related fields

- Specific experience: minimum of (_) years in front-end design; must also be able to prove having performed this role in at least one other project

- Preferred: academic background: professional qualification as a systems engineer, software engineer, user-interface designer or related or equivalent profession

For each member of the team, the relevant experience must be clearly defined, i.e. the start date (day, month, year) and end date (day, month, year) for each role/project must be provided in chronological order, starting with the most recent role.

Qualifications and experience

The team should have experience with the development of innovative technology solutions in the government sector. It should have a minimum experience of completing at least one project related to digital government with the use of blockchain technology. It should also have knowledge and experience of developing technology projects in general or in the region in question.

The company should provide a written description of:

- At least one project related to the use of blockchain technology for digital government services:
  - At least two client or user references for each project
  - The names of the team members who participated in the(se) project(s)
  - Dates when the project(s) was/were conducted and completed

14. TRAVEL REQUIREMENTS

This section should describe the software development team's travel requirements that may be necessary for onsite visits in-country, as well as guidelines or requirements for the qualifications and experience of the competing software development teams.

An example of some text that could be appropriate for this section follows:

If the contractor is located outside _____, two people from the company must be willing and able to travel onsite to _____ for approximately ___ weeks during the project's life cycle to work with groups in _____ related to the project, such as _____, _____ and _____. This helps ensure successful project implementation.

The costs of this trip will be funded by _____, not the contractor itself. The contractor will be reimbursed for _____, _____ and up to __ per day per person in food expenses. Any other incidental expenses incurred for the trip (e.g. ground transportation) will also be reimbursed where appropriate.

15. CRITERIA AND SUB-CRITERIA FOR EVALUATING TECHNICAL PROPOSALS

This section should describe the evaluation criteria and sub-criteria for the competing software development teams. A specific formula and weightings for various criteria may need to be developed to support the objective determination of the winning vendor.

An example of some text that could be appropriate for this section follows:

The criteria and sub-criteria, as well as the points system, used to evaluate technical proposals are as follows:

CRITERION	SCORE
Methodology and Work Plan	
Key staff	
Price	
Inclusion of minorities or people with disabilities	
TOTAL SCORE	**100 POINTS**

Methodology and Work Plan (__ points):

	Score for this criterion
Methodology	
Work Plan	
TOTAL FOR THIS CRITERION	

The evaluation of this criterion considers: the general content of the proposal, alignment with the request, consistency and appropriateness of scheduled outputs compared to expected outputs, clarity in the approach to planning the aforementioned elements, and the feasibility of delivering the contract within the proposed time frame.

Proposed methodology (__ points): Consistency in its description of the structured approach or method that will be used to achieve the objectives; considers methods, procedures and strategies, all of which must be described in detail with a logical set of processes to be followed, and the strategies or approaches that will be used to ensure obligations are fulfilled.

Scoring criteria	Score	Scoring guidelines
Inadequate:	_ points	There are no details of the methodology, nor is there any mention of a logical set of processes to be followed. There is no description of strategies or approaches to ensure obligations are fulfilled.
Satisfactory:	_ points	The methodology is explained, but there is no detailed description of the logical set of processes to be followed or of strategies or approaches to ensure obligations are fulfilled.
Good:	_ points	There is a detailed description of the methodology, including the logical set of procedures to follow to achieve the final deliverable.
Very good:	_ points	There is a detailed description of the methodology and the logical sequence of the processes to follow. There is also a description of the strategies or approaches that will be used to fulfil objectives. It is purposeful and includes considerations that are relevant to the project in question.

Work Plan (_ points): The Work Plan is designed to provide detailed information about how the contractor will carry out the various stages of the project. It must be sufficiently detailed, describing the activities and tasks to be performed to achieve the expected deliverables. It should include a delivery schedule for the deliverables.

Scoring criteria	Score	Scoring guidelines
Inadequate:	_ points	There is no work plan or schedule. There is a work plan but no schedule. There is a schedule but no work plan. There is a work plan, but it does not describe the activities and tasks to be performed or does not include a plan of activities for the deliverables. There is a schedule, but it is not detailed.
Satisfactory:	_ points	There is a work plan, but it only describes activities and tasks. There is a schedule, but it does not define stages and activities in line with the proposed methodology.
Good:	_ points	There is a work plan that describes activities and tasks to be performed to achieve the deliverables. There is a schedule that includes stages and activities, but it does not include a delivery schedule for the deliverables.
Very good:	_ points	There is a work plan that describes activities and tasks to be performed to achieve the deliverables. There is a schedule that includes stages and activities, clearly including a delivery schedule for the deliverables.

Qualifications of key staff and suitability for the work (__ points)

The __ points will be awarded as follows, based on the specific project experience or background of the professionals. Profiles will be scored as follows:

Scores for the qualifications of key staff

ROLE	MAXIMUM POINTS
Project Manager	
Blockchain Developer	
Front-end Engineer	
Back-end Engineer	
User-interface Designer	
TOTAL SCORE	

Primary project team	**Specific experience**	
	Scores for additional experience, over and above the minimum requirements	
Profiles	**Points for additional project or academic experience**	**Maximum score**
Project Manager		
Blockchain Developer		
Front-end Engineer		
Back-end Engineer		
User-interface Designer		
TOTAL		

Price (_ points)

____ points will be awarded based on proposed price.

Inclusion of minorities or people with disabilities (__ points)

An additional _ points will be awarded based on the degree to which teams include minorities or people with disabilities.

16. INTELLECTUAL PROPERTY RIGHTS

This section should describe the intellectual property rights for the contract's deliverables.

As a starting point, answers to the following questions should be determined:

- Will the software engineering team receive ownership of the software during or after the completion of the project?
- Who owns the intellectual property rights related to the project, including the software code and project deliverables?
- Are there any licensing arrangements related to intellectual property (e.g. the sponsoring institution could authorize the use of the project's intellectual property for academic purposes on a case-by-case basis)?

Model Request for Proposal: Appendix

The guidelines in this section complement the information in this publication's main report, *Exploring Blockchain Technology for Government Transparency: Blockchain-Based Public Procurement to Reduce Corruption*. As with the guidelines in that report, they were created for the software PoC in the *Transparency Project*. This report aims to provide additional technical guidance by including them here. At the same time, these guidelines can also be included in the annex section of an RFP for the development of a blockchain-based e-procurement system. Thus, they seek to both provide additional technical information to policy and technology researchers, and to demonstrate potential contents for an RFP.

For any new projects, guidance should be modified to suit their specific goals, scope and legal requirements. Moreover, software development teams should be empowered to generate new ideas to address technical challenges and should not feel obliged to adhere strictly to the guidance in this appendix.

The sample annex sections in the model RFP template cover:

1. **The process flow chart**

   The process flow chart in Annex 1 serves as an example of a technical flow chart that can guide software development teams. It reflects the flow chart employed in the *Transparency Project* PoC and follows Colombian law for procurement processes. If relevant, such a flow chart could be included in an RFP to guide solution development. Alternatively, it could be designed by the software development team after the contract has been awarded.

2. **Solution requirements**

   The list of criteria in Annex 2 serves as an example of technical solution requirements for a blockchain-based e-procurement system. It draws inspiration from the *Transparency Project* PoC.

3. **Software functionality specifications and guidelines**

   The model functional specifications provided as an example in Annex 3 can provide guidance as to specifications for a blockchain-based e-procurement system. They were used to inform the *Transparency Project* PoC and they relate to the Colombian context. Thus, they should be carefully modified for new projects and for the jurisdiction in question.

As with the information throughout the template annexes, this section aims to be an inspirational guide to software developers, who should depart from the guidelines in certain areas as relevant and pursue additional creative solutions to address the project's goals and requirements.

ANNEXES

The template annexes can provide additional technical guidelines and specifications, or "blueprints", for the development of a blockchain-based public procurement system. Potential annexes include:

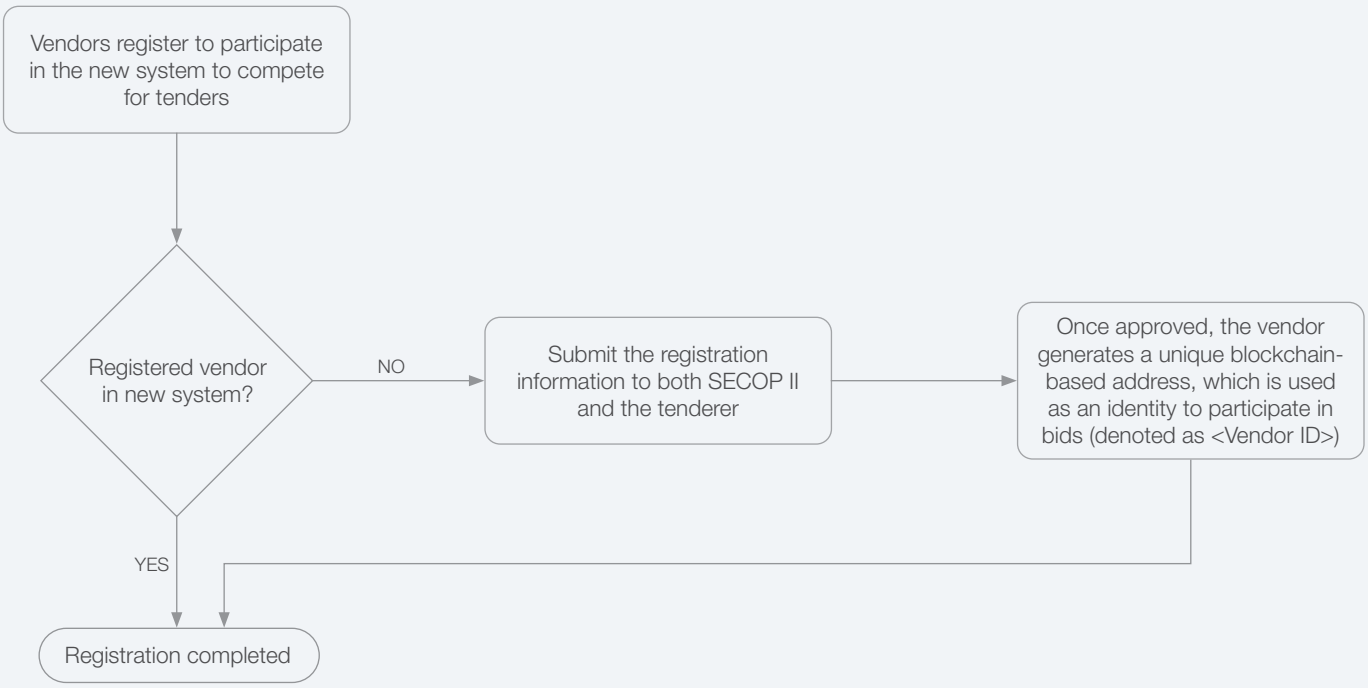
1. *Process flow chart*
2. *Solution requirements*
3. *Software functionality specifications and guidelines*

1. PROCESS FLOW CHART

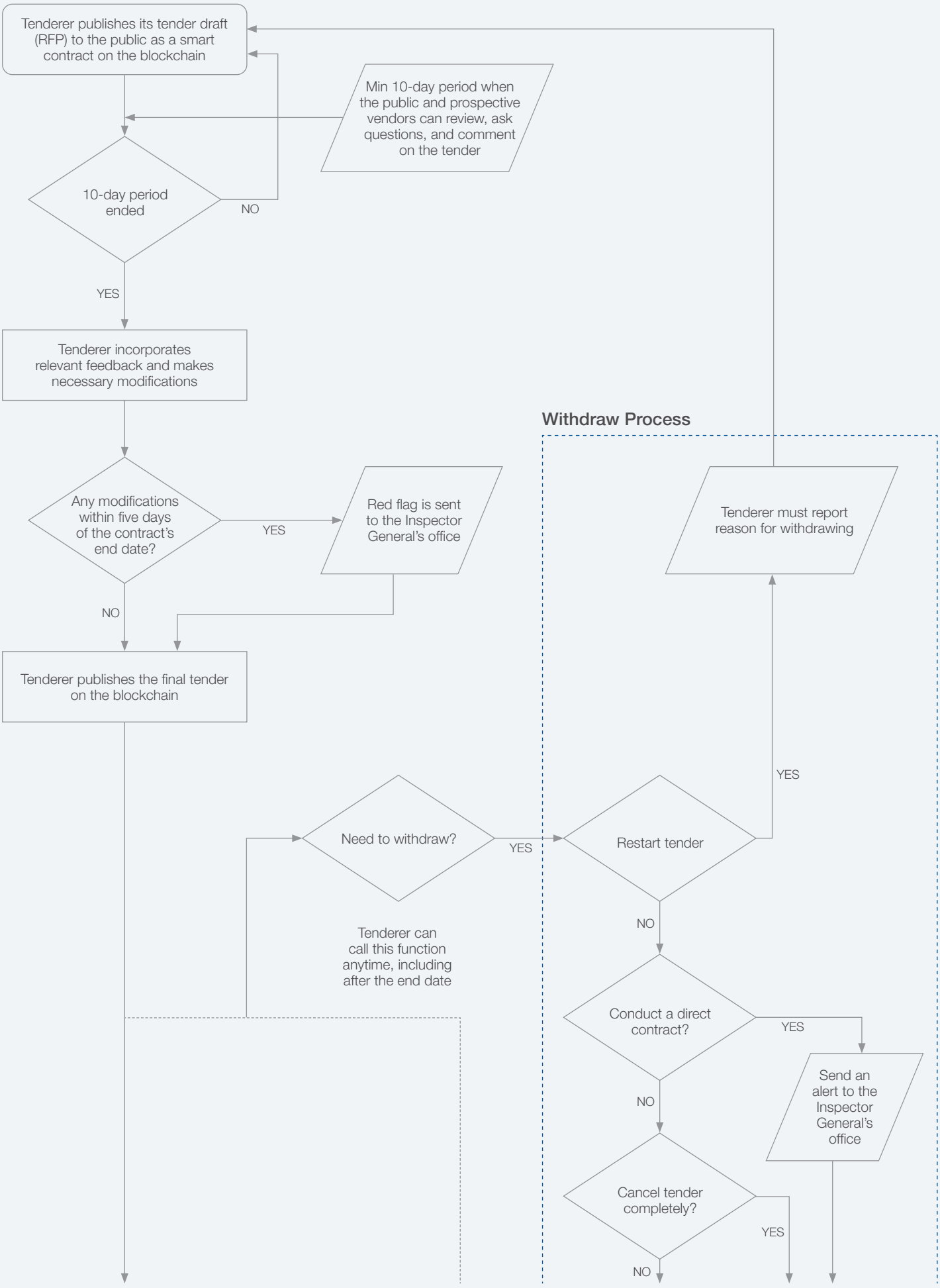
This flow chart shows the step-by-step approach to the blockchain-based e-procurement solution.

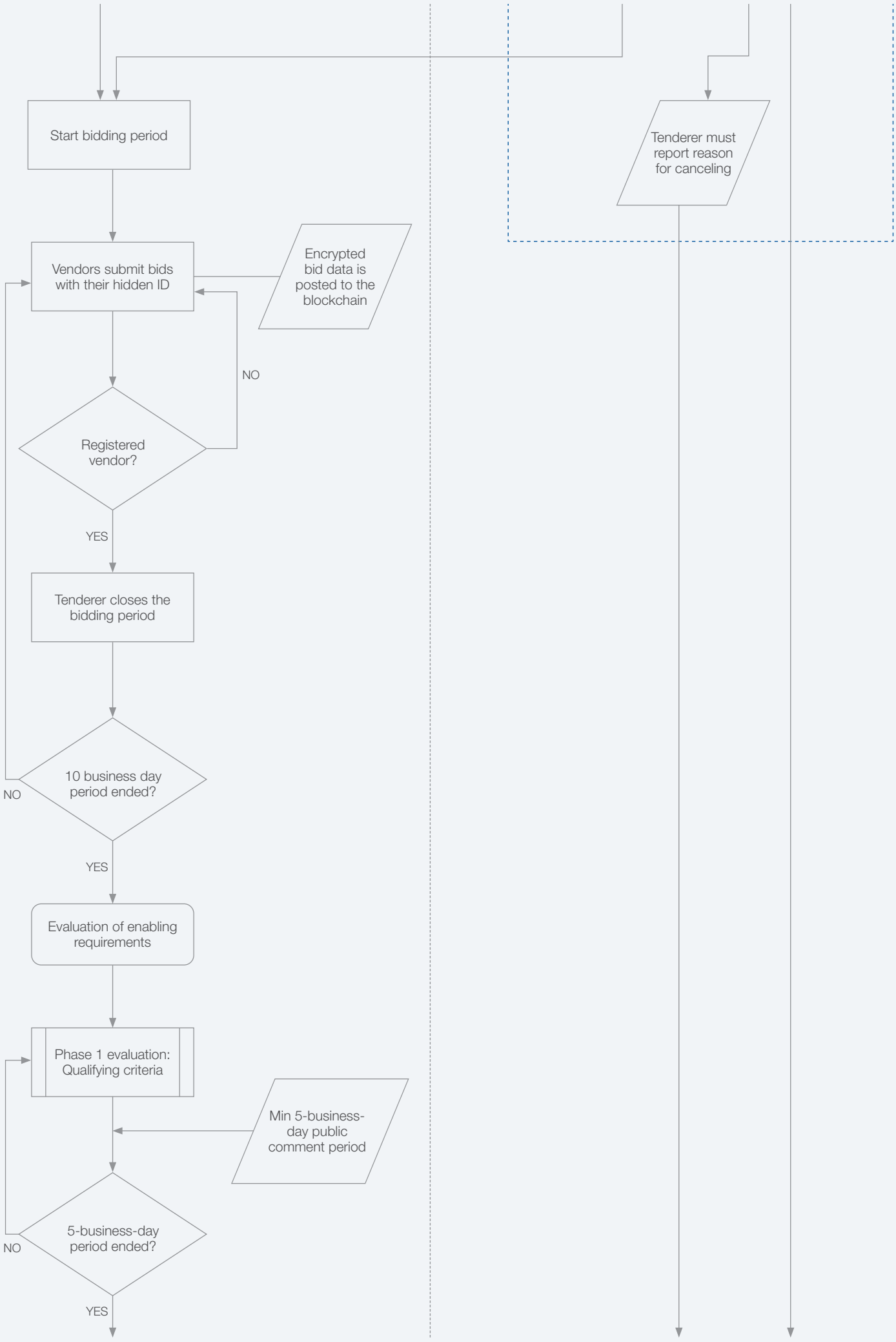
Note: SECOP II refers to the Colombian national e-procurement system. [The solution in the Transparency Project *was designed to integrate with it for risk management purposes yet also operate independently.]*

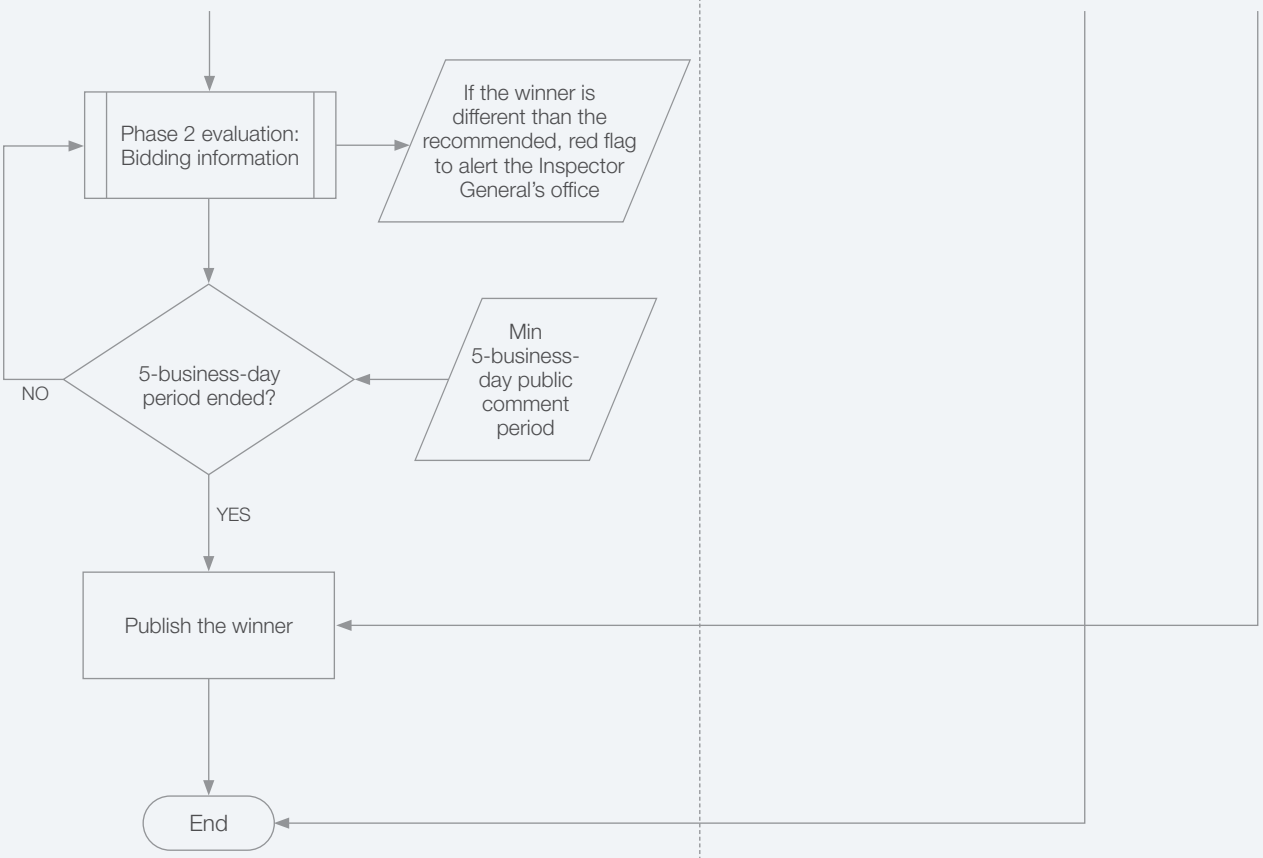
Registration Process



Procurement Process




Start bidding period
Vendors submit bids with their hidden ID
Encrypted bid data is posted to the blockchain
NO
Registered vendor?
YES
Tenderer closes the bidding period
10 business day period ended?
NO
YES
Evaluation of enabling requirements
Phase 1 evaluation: Qualifying criteria
Min 5-business-day public comment period
5-business-day period ended?
NO
YES
Tenderer must report reason for canceling



2. SOLUTION REQUIREMENTS

This annex provides minimal criteria for a successful blockchain-based procurement solution and highlights the highest priority features and components. It also lists lower priority features that would support enhanced deployment, along with requirements for the software development team to document and describe certain aspects of the solution, such as attack vectors and vulnerabilities.

- User interface and data accessibility for citizens to view or monitor past or present auction processes that run through the blockchain-based e-procurement system (including all bids)
- User interface or functionality for citizens to view all competing bids in a current or past tender offer running through the system to evaluate if the most competitive bid was selected
- Functionality for citizens to raise alerts or comment on suspicious behaviour when monitoring current auction processes
- Database resistance to manipulation (e.g. of bids, tender offers) and tamper-proof auction record log; includes censorship-resistance of bids and tender offers
- Confidentiality of bid offers to ALL parties (including the bidding agency) until the bidding period closes for an auction
- Automatic and timed auction open/close dates and phases for public commentary
- Auditability of direct contracting decisions, tender offer modifications and price benchmarks

The following features or components can be considered priorities:

- The correctness of implementation with respect to national legal processes
- Integration with existing e-procurement system front-end and back-end databases if relevant; integration with the national vendor database if relevant
- The development of a "procurement client" that implements all non-blockchain functionalities required for the vendors, tenderers, the bid agency and other non-public system participants

As a lower priority if feasible, the solution could benefit from the following capabilities:

- The use of a standardized tender contract provided by the relevant ministry or department
- Automatic calculation of the "recommended winners" based on the sum of their scores in the tender evaluation; this recommended winner can either be confirmed or rejected by the tenderer but, if rejected, the tenderer must describe why another vendor is superior and the system should also create an automatic red flag marking the activity as risky
- Additional citizen-led and automated "red flag" alert functionalities
- The use of a blockchain-based data storage component (e.g. InterPlanetary File System (IPFS) for Ethereum)
- A system tracking and rewarding positive behaviour by vendors to inform the vendor evaluation process

The solution development team must also write the following commentary as part of delivering the solution:

- Written justification and explanation of decision processes for protocol selection (e.g. Ethereum, Hyperledger Fabric, etc.) and any read/write permissions
- An indication of solution attack vectors and vulnerabilities
- Descriptions of architecture, code and functionalities for knowledge transfer

In addition to guidelines indicated in the technical specifications, the solution should operate such that:

- Once the tenderer (e.g. the municipality) opens the tender with a certain final, published description and evaluation criteria, the tenderer cannot change it outside the predesignated modification period.
- Data fields for tender and bid information (criteria, pricing, etc.) can be modified for future tenders.
- No one should know who has bid or who else is bidding, or any information inside bids, until the bidding period is closed.

3. SOFTWARE FUNCTIONALITY SPECIFICATIONS AND GUIDELINES

This section provides a set of informal model functional specifications that were designed to guide the development of the Transparency Project *PoC. It includes details that relate to the Colombian context.*

Technical specifications

1. **Reader's guide**
2. **Timeline for a procurement auction**
3. **Privacy and confidentiality requirements**
4. **Censorship-resistant and confidential vendor registration and bidding scheme**
5. **Specification**
   a. Tender contract
   b. Bid contract
   c. Direct contract
   d. Vendor registration contract
6. **Other components**
7. **Explorer user-interface (UI)**
8. **Procurement client/non-blockchain communication**
9. **Other information**

Reader's guide

- Roles, e.g. related to Bid Agency, Tenderer, etc., are colour coded.
- The "Tenderer" represents the municipality, state or government entity issuing the vendor procurement auction
- The "Vendor" role can be taken by several participants, who represent the competing bidding entities, e.g. competing public-school food lunch providers
- The "Bid Agency" is the existing bid agency for the region – in Colombia it is called Colombia Compra Eficiente
- The national vendor database and registry stores vendor records including registration information – in Colombia it is called RUP
- The existing Colombian national e-procurement system is called SECOP II. The solution integrates with SECOP II as a risk management measure, although it is designed to be functionally independent from SECOP II
- The "IGN" denotes the Colombian Inspector General's Office
- The field types roughly resemble Python programming language field types:
  - fieldName: <type>
  - functionName(parameters): function/constructor can be called by
  - [field] – array
  - (field1, field2, field3) – tuple
  - set([field]) - a set of fields

Timeline for a procurement auction

The timeline in this section is based on Colombian law.

- Tenderer publishes the Request for Proposal (RFP) draft
    - 10-day term for public review and question and answer (Q&A) period
    - Tenderer can incorporate feedback and make changes
- Begin bidding period
    - RFP published to public
    - Minimum 10-day length of bidding period
    - Vendors place bids
        - All bids are encrypted and confidential to all, and bidders do not know who else has bid
- End bidding period
    - Closed to all new bids
- Phase 1 – Evaluation of enabling requirements for bidders
    - The tenderer does not know the identity of the vendors until the auction is closed
    - The tenderer decrypts a portion of the bids to evaluate whether bidders meet qualifying criteria (typically 5-10 days)
    - Then the Phase 1 decision info is made public. All vendor identities and information related to their qualifying criteria are published. This helps provide transparency, enabling public scrutiny of tenderer decisions
        - Published list of all vendors meeting enabling requirements who proceed to Phase 2 evaluation
    - Then a minimum 5-day public comment and scrutiny period (by public or other participants) is established
    - The tenderer integrates changes after public comments and scrutiny
        - The tenderer can make various non-specified amendments
        - The final list of all vendors meeting the enabling requirements is published
- Phase 2 – Evaluation of bids for those vendors passing the enabling criteria
    - The tenderer decrypts and evaluates the remainder of bids to identify the winner (for vendors who pass the qualifying criteria) – typically 5-10 days
    - The tenderer then publishes the preliminary vendor selection decision and written evaluation of all qualifying vendors and bid offers; the tenderer also publishes all bid information revealed in Phase 2
    - The vendor selection decision and written evaluations are made public
    - Then a minimum 5-day public comment and scrutiny period is established
    - The tenderer integrates changes or confirms bid evaluations and the selection decision.
        - The tenderer can make various non-specified amendments
    - The final vendor selection decision is published

Privacy and confidentiality requirements

- No parties, including the tenderer or the national bidding agency, must be able to censor bids, or claim that bid data was not received
- Vendors must not be able to modify their bids once submitted
- Vendors' bids may not be repudiated
- The confidentiality of bids with respect to all actors must be preserved until appropriate stages in the auction process when they should be revealed to the tenderer or the public
- The integrity and availability of bid records with respect to all actors must be preserved indefinitely

Censorship-resistant and confidential vendor registration and bidding scheme

- Registration requirements
    - The vendor must be registered in the national vendor database – all information on vendors is public in this database. Relevant information in this database may include:
        - Category – e.g. “cafeteria meal provider”
        - Financial information
        - Information on whether the vendor is sanctioned or not
    - The Certificate of Representatives that attests to the vendor’s legal registration is stored at the Chamber of Commerce
    - The vendor provides the Certificate of Representatives or the Personal National ID
    - The vendor applies for registration with both SECOP II and the tenderer
    - Note: The tenderer defines the requirements per bid
        - Some requirements are stored as data by RUP

- The vendor sends registration information to both SECOP II and the tenderer:
    - Personal National ID of representative
    - Certificate of Existence/Representatives
    - RUP code

- SECOP II or the tenderer call Approve() on the vendor registration contract, which marks that a registering vendor’s registration documents have been verified, and identifies the vendor while omitting sensitive information (such as National ID)
    - Vendor generates a <VendorID> address
    - SECOP II and the tenderer verify <VendorID> via Approve()
        - SECOP II and the tenderer BOTH have the power to do this so neither alone can deny approval

- Bidding
    - At the time of registration (prior to any bids), the vendor generates multiple anonymous addresses (<HiddenID>) using a private key, where each one will be used for a distinct bid. Each anonymous address represents an ephemeral identity that is initially unlinked to the bidder’s identity but will quickly be linked through cryptographic commitment
    - All the anonymous (<HiddenID>) addresses are committed to using the <VendorID> prior to any bids. This is so that one cannot tell that a vendor is expecting to bid when they make a commitment
    - At bidding, the vendor uses one of the anonymous addresses to submit bids
        - Bid submission includes making a transaction that includes the hash of the respective bid data. After bids are revealed during the evaluation process, bid data can be verified against this hash to check for any tampering of the bid information after submission
        - The ciphertext representing the encrypted bid is published at a public data store (such as InterPlanetary File System - IPFS) where it is possible to verify that the ciphertext exists. Ideally it is also time stamped
            - Potential challenge: Verifying that a ciphertext is encrypted under the correct key (for instance under the tenderer’s public key)
    - Upon bid close, the vendor reveals the commitment it made to the anonymous address <HiddenID> from its main <VendorID> address to prove ownership of the bid. There is a mapping between the symmetric key the vendor uses to encrypt bid data and its <VendorID>. As a result, when the commitment between <HiddenID> and <VendorID> is revealed after the bidding process, the vendor is also revealing the symmetric key to the tenderer who can then use it to decrypt the bid data

Specification

Note: *This informal specification section should be used as a guide for inspiration and to specify the* ***key functionalities*** *required for the envisioned solution. However, the software development team should generate its own data structures and implementation that would better suit the specific application needs.*

Tender contract

- TenderContract(): constructor <Tenderer **Admin**>
  - Sets the PublicationDate with associated fields
  - Populates the Office, Admin, Description, EnablingCriteria, EnablingScore, EconomicCriteria, MaximumPrice, PriceBenchmarkDocs, PublicationDate and EndReviewDate fields described in more detail below
- Office: <DepartmentIdentifier>
  - The office that initiated the tender
- Admin: <Tenderer **Admin**>
  - The officer at the office that initiated this tender
- Description: <text>
  - Includes background information, purpose, additional info, etc.
  - Includes methodology on how the different criteria are to be analysed
- EnablingCriteria: [(name, description, weight)]
  - The minimum criteria that the vendors must comply with
    - Weights must add up to 100
  - Example: [("numPriorContracts", "How many contracts with the same object that they've done in the past X years", 50), ("financialCapacity", "Debt (%) (less than or equal to 0.68)", 50)]
  - Fields should be determined with the tenderer and bidding agency during development
- EnablingScore: <number>
  - The passing total score for a vendor to be considered, e.g. 70
- EconomicCriteria: object
  - Applies only to vendors that qualified past the EnablingCriteria
  - Determines which among the qualified vendors wins the bid
  - [(name, description, weight)]
  - Weights must add up to 100
- Additional fields (example: technical offer, incentive for involving people with disabilities) should be identified and developed during software development. The list of fields in this document is not exhaustive and additional fields may be necessary
- MaximumPrice: <$$>
  - Denotes maximum price the tenderer is willing to pay for goods or services stipulated in tender. The procurement auction is a reverse auction

- PriceBenchmarkDocs: [<BenchmarkDocumentHash>]
  - A list of the hashes of documents that establish the price benchmark used for the RFP. Should also include accessible links or records of these documents for easy public scrutiny
  - The documents themselves must be preserved on the RecordKeeping System
- PublicationDate: <datetime>
  - The date when the draft RFP contract was first created and published on the blockchain; must post hash or full bid information on blockchain when tender is published publicly
- RFPReviewQAEndDate: <datetime>
- Questions: [Questions]
- Comments: [Comments]
- Complaints: [Complaints]
- Answers: [Answers]
- SubmitQuestionCommentComplaint(type, question): function <All Unregistered Users>
  - Can be called by anyone before RFPReviewQAEndDate
  - Allows people to submit questions, comments or complaints to be answered by the tenderer
    - Submitter specifies the type
  - Must be in the form of text (tenderer does not hold a hearing)
    - e.g. “This is a tailored auction” or “The price weight should be lower because XYZ” or “What is meant by debt ratio?”
  - Will likely have to be implemented in the form of a document stored on the RecordKeeping System as queries may be quite long
  - Will need to manage the risk related to public agents either unintentionally or maliciously bombarding the tenderer with too many questions or complaints for the tenderer to address and proceed with the tender process
- AddressQuestionsCommentsComplaints(answer): function <Tenderer User>
  - If queries were submitted, the tenderer must address them before the auction can be started
  - Stores answers/justifications on the RecordKeeping System and leaves the document hash as a receipt
- AmendRFP(newDescription, newCriteria): function <Tenderer User>
  - Can only be called by the tenderer
  - Allows the tenderer to update the description and change the criteria, including the categories and associated weights, both before and during the auction
    - Specifically, only before EndAuctionDate
    - RFP final draft should be published on the blockchain
  - If this function was called within 5 days of EndAuctionDate, then MarkFlagged() is automatically called
  - It might be necessary to force a minimum time after this function is called until the auction itself can start, to allow for more complaints
- StartAuctionDate: <datetime>
- StartAuction(EndAuctionDate): function <Tenderer **Admin**>
  - Can only be called by the tenderer
  - Starts the bid, sets StartAuctionDate as the time this function is called, and EndAuctionDate as specified by the tenderer
  - Must check that all questions/comments/complaints have been addressed

- SubmitBid(Bid): function <Vendor **Admin**>
  - References a bid
  - The vendor anonymously publishes the bid ciphertext and key ciphertext to IPFS
  - Any onlooker can click into any of the associated bids for information, only after the auction is finished and bids are made public through decryption
  - Note: Bids must remain confidential until indicated to be made public
- EndAuctionDate: <datetime>
  - No more bids allowed for submission, and all bids remain confidential
  - Minimum 10-day difference between StartAuctionDate and EndAuctionDate
  - Identities of vendors must not be known
- Phase1Scores: <map<HiddenID, EnablingCriteriaScore>>
  - Represents the evaluations of enabling requirements for all the bids
  - Maps bids to the EnablingCriteriaScore determined by the tenderer
  - Includes the score of all vendors in the same format as the enabling requirements, e.g. experience 97, capacity 95
  - Phase1Description: <text>
  - The tenderer's additional comments for their Phase1 Evaluations
- QualifyingVendorsByScore: set([<VendorID>])
  - This will be computed automatically by the smart contract as the linear combination of evaluation weights and criteria scores
- QualifyingVendorsByChoice: set[<VendorID>])
  - The vendors that passed the experience and capacity tests
  - MarkFlagged() will be called automatically if the QualifyingVendorsByScore differs from QualifyingVendorsByChoice
- PublishPhase1(evaluations, Phase1ContestEndDate): function <Tenderer **Admin**>
  - Sets Phase1Scores, Phase1Description and QualifyingVendors
  - Only the tenderer can call this function
  - The tenderer completes evaluations prior to calling this function
  - The tenderer assigns scores, etc.
    - The tenderer checks enabling criteria against the vendor record in RUP
  - Sets Phase1ContestEndDate
    - If Phase1ContestEndDate is less than 5 days after the time this function is called, this function would fail to execute
  - Publishes and makes public all information that was used for Phase1, including all vendor identities and the enabling requirements portion of their bids
- Phase1ContestEndDate: <datetime>
  - Must be at least 5 days after PublishPhase1 was called
- ContestPhase1(text): function <All Unregistered Users>
  - Lets anyone call this function before Phase1ContestEndDate to contest the evaluations or submit complaints
  - May be a text complaint, or will be presented at the hearing held by the tenderer
  - Preserves submissions in the Recordkeeping System, with a receipt on the blockchain

- AmendPhase1(newInfo): function <Tenderer User>
  - The tenderer can amend Phase1Scores, Phase1Description and QualifyingVendors to reflect an updated view
  - Can be called any number of times after PublishPhase1() was called and before FinalizePhase1 is called
- Phase1Justification: [<text>]
- AddressPhase1Complaints(text): function <Tenderer User>
  - If contests/complaints were submitted, the tenderer potentially must address them before FinalizePhase1() can be called
    - Will confirm original evaluations or specify new set of qualified vendors
  - Stores answers/justifications on the RecordKeeping System and leaves the document hash as a receipt
- FinalizePhase1(answers): function <Tenderer **Admin**>
  - Only the tenderer can call this function
  - Finalizes the decision for Phase1
- Phase2Scores: <map<HiddenID, EnablingCriteriaScore>>
  - Represents the evaluations of the remaining criteria for all the bids, including the final decision
  - Maps bids to the EnablingCriteriaScore determined by the tenderer
  - Includes the score of all vendors according to the economic requirements, e.g. price 90, disability 10
- Phase2Description: <text>
  - The tenderer's additional comments for their Phase2 Evaluations
- WinningVendor: <VendorID>
  - The vendor that wins the tender contract
  - MarkFlagged() will be called automatically if WinningVendor is not the same as HighestScoreVendor
- HighestScoreVendor: <VendorID>
  - The vendor that has the highest score, but is not necessarily the winning vendor
  - Automatically computed when PublishPhase2() is called
- PublishPhase2(evaluations, Phase2ContestEndDate): function <Tenderer **Admin**>
  - Sets Phase2Scores, Phase2Description and WinningVendor
  - Only the tenderer can call this function
  - Sets Phase2ContestEndDate
    - If Phase2ContestEndDate is less than 5 days after the time this function is called, then the function will fail to execute
  - Publishes all information that was used for Phase 2, including Vendor identities and all remaining criteria in their bids
- Phase2ContestEndDate: <datetime>
  - Must be at least 5 days after PublishPhase2 was called

- ContestPhase2(text): function <All Unregistered Users>
  - Lets anyone call this function before Phase2ContestEndDate to contest the evaluations or submit complaints
  - Allows vendors to contest the evaluations or submit complaints
  - May be a text complaint, or will be presented at the hearing held by the tenderer
  - Preserves submissions in the Recordkeeping System, with a receipt on the blockchain

- AmendPhase2(newInfo): function <Tenderer User>
  - The tenderer can amend Phase2Scores, Phase2Description and Qualifying Vendors to reflect an updated view
  - Can be called any number of times after PublishPhase1() was called and before FinalizePhase1 is called

- Phase2Justification: [<text>]

- AddressPhase2Complaints(text): function <Tenderer User>
  - If contests/complaints were submitted, the tenderer potentially must address them before FinalizePhase2() can be called
    - Will confirm original evaluations or specify new set of qualified vendors
  - Stores answers/justifications on the RecordKeeping System and leaves the document hash as a receipt

- FinalizePhase2(answers): function <Tenderer **Admin**>
  - Only the tenderer can call this function
  - Finalizes the decision for Phase2
  - MUST check against the RUP database that sanctioned vendors cannot win; if the vendor who wins Phase2 is sanctioned, then this function will fail to execute
    - Note: Implementing this will probably require an oracle

- WithdrawTenderRestart(reason): function <Tenderer **Admin**>
  - The tenderer can call this function anytime, including after the end date
  - Reason: <text>
    - Why the tender was withdrawn
  - The whole process will restart, which must include the minimum 10 days for public comment and suggestions for revision again
  - Can call only one WithdrawTenderRestart or WithdrawTenderDirectContract or WithdrawTenderCancel

- WithdrawTenderDirectContract(params): function <Tenderer **Admin**>
  - The Office can call this function anytime, including after the end date
  - Reason: <text>
    - Why the tender was withdrawn and a direct contract was initiated instead
  - Creates a DirectContract

- WithdrawTenderCancel(reason): function <Tender **Admin**>
  - The tenderer can call this function anytime, including after the end date
  - Reason: <text>
    - Why the tender was cancelled
  - Creates a record marking that the tendering process was terminated for the reason listed above

- IsFlagged: boolean
  - Marks that this tender is suspicious
  - Ideally, flagged tenders and their associated reasons should be isolated and displayed prominently in the Explorer UI, perhaps even on the home page, to maximize public exposure to allegations of fraud

- MarkFlagged(): function <All Unregistered Users>
  - Sets IsFlagged to True
  - Lets anyone in the public call this function
  - Notifies the Inspector General
  - Reason: <text>
    - Why this tender is flagged, e.g. that the terms have been designed to favour a specific vendor

Bid contract

- Bid(): constructor <Vendor **Admin**>
  - Fills out the associated info
  - Sets a random value for the <HiddenID>
- Requirements:
  - Cannot know the Price or Identity of other vendors until the evaluation process is done
  - Must authenticate the identity
- Tender: <Tender>
  - The tender to which this corresponds
- Vendor: <VendorID>
  - Must be persistent across subsequent bids
- Price: <$$>
  - Economic offer; must be hidden along with vendor identity until explicitly revealed
- Description: <text>
  - General statement on why they are suitable for this tender
- Experience: [<documents>] <numPriorContracts>
  - e.g. “We have experience in food, here’s a certification of prior contracts and execution”
  - List of documents certifying prior experience
- FinancialOperationalCapacity: [<documents>] <capacity>
  - e.g. Capacity to hire transportation, refrigerate food, etc.
- Additional and listed fields should be refined and developed during software development
- IsRisky: boolean
- MarkRisky(): function <All Unregistered Users>
  - Sets IsRisky to True
  - Lets anyone in the public call this function
  - Notifies the Inspector General
  - Reason: <text>
    - Why this is marked as risky
- IsSuspended: boolean

- Suspend(): function <Inspector General Users>
  - Can only be called by the Inspector General
  - If the Inspector General suspends a bid, the tenderer must justify their decision at the end of the bid, either in agreement or disagreement with the Inspector General

Direct contract

- Office: <DeptID>
- Admin: <AdminID>
  - The officer at the tenderer that initiated this direct contract
- Description: <text>
  - Includes background information, purpose, etc.
- Reason: <text>
  - Reason for direct contracting
- Price: <$$>
- Add any additional tender offer fields and criteria
- Vendor: <VendorID>
- BidAttempted: boolean
  - Whether or not they attempted to conduct a bid
  - This will automatically be set to True if WithdrawTenderDirectContract was called after the EndAuctionDate
- Direct contracts must be displayed prominently in the Explorer UI

Vendor registration contract

- TendererApprover: <Tenderer>
- <VendorID>: <address>
  - Represents the verifiable identity of a vendor linked to their legal identity and documents. This address is used to make authenticated, non-anonymous transactions
- VendorID(AddressCommitments): constructor <All Unregistered Users>
  - Can be called by anyone who wants to bid in the system, i.e. vendors
  - Populates the AddressCommitments field
- ProfileData: fields
  - Several fields containing relevant but non-sensitive information such as company email, phone, address, etc.
- VerifiedByTenderer: boolean
- VerifiedByBidAgency: boolean

- Approve(): function
  - Can be called by any User at <BidAgency> OR <Tenderer>
  - An approval by either party is sufficient to verify a <VendorID>, setting VerifiedBy[Tenderer, BidAgency] to True. This prevents censorship in case one of the parties does not agree to approve a legitimate registration
  - The vendor must provide both of the following:
    - Personal National ID of representative
    - Certificate of Representatives (stored at the Chamber of Commerce)
    - RUP code
  - Outside of the blockchain, the approver must check that:
    - The Personal National ID is legitimate
    - The Certificate of Representatives is indeed stored at RUP
    - The vendor has not been sanctioned
    - The ProfileData is correct

- AddressCommitments [<CommitmentsToHiddenID>]
  - As part of registration onto the blockchain, the vendor generates a set of anonymous addresses that will be used for bidding. These <HiddenID>s are committed to in AddressCommitments. The commitment to a <HiddenID> used for bidding is revealed after the auction has closed and Phase1 Evaluations have been published, at which point it is acceptable to reveal the identities of vendors. Since the <VendorID> address publishes the commitments to <HiddenID>s used for bids, ownership of a bid by a vendor is established

- UpdateCommitments(): functions
  - Allows the <VendorID>

- Documents: [<DocID>]
  - Any documents that have been submitted in association with a vendor must be stored in the Recordkeeping System and referenced on the blockchain, to prevent wilful omission and provide maximum transparency

Other components

Recordkeeping System API (for larger documents that shouldn't be on the blockchain)

- Dual Implementation
  - Primary data provider: SECOP II
  - Secondary data provider: IPFS

- Put(document): function <Vendor User>
  - Adds the document to both SECOP II and IPFS
  - Keeps a receipt of the document on the blockchain in the form of a hash

- Get(docHash OR docID): function <All Unregistered Users>
  - First query SECOP II
  - IPFS used as backup
  - Checks the retrieved document against the hash stored on the blockchain

- UIs
  - Uses the "explorer" UI to implement the Get functionality with SECOP II/IPFS so that it is publicly verifiable

Integration points with other components may need to be specified to a greater degree and vary depending on the country and systems in question.

Explorer user-interface (UI)

- Primarily for displaying information to the general public and allowing users to submit complaints

- Hosted on a website but can also be downloaded and run locally attached to an Ethereum node (e.g. a browser or browser plug-in such as MetaMask)

- Generating wallet addresses and encryption keys is not part of the UI and should be performed on the users' local machines and not shared with other parties, in order to avoid security issues

- Must be able to view all Auction, Bid, Registration, Complaints and Document data, including all its data fields

- Must display all current and historical data

- Must be able to submit information to the tenderer

    - Confidential bids

- Review Interface - Prominently displays the following

    - Flagged auctions
    - Bids marked as risky
    - RFPs currently open for review
    - Phase 1 decisions currently open for review
    - Phase 2 decisions currently open for review

- Auctions – Both past and present auctions clearly viewable for public and civil society monitoring

    - Description
    - Criteria
    - Price benchmarks
    - Additional relevant criteria

- Bids

    - Experience
    - Capability
    - Price
    - Additional relevant criteria

- Vendors

    - Registration documents
    - History

- Evaluations

    - Justifications

- Complaints

    - Stakeholders can view complaints in real time for live auctions, complaints for past auctions

Procurement client/non-blockchain communication

- The client that implements all the non-blockchain functionalities required for the vendors, tenderers, IGN and bid agency. It is run by each party locally
    - Allows registration, address generation, commitments, encryption/decryption, bidding, data submission to IPFS/SECOP II, publishing data to IPFS / SECOP II, etc.

Other information

Identity

- Required distinct identities:
  - <VendorID> vendors
  - <HiddenID> one-time anonymous ID for bidding vendors
  - <AdminID> administrator at the Office that initiated this tender

Roles

- Bid Agency Admins/Users
  - Bid Agency Admins can be hardcoded
  - Bid Agency Admins add Bid Agency Users and other Admins
- Bid Agency Admins/Users approve registrations from vendor Admins
- Tenderer Admins/Users
  - Bid Agency adds tenderer Admins
  - Tenderer Admins add tenderer Admins/Users
  - Tenderer Admins can initiate auctions
  - Tenderer Users can edit auction information and respond to complaints
  - Tenderer Admins/Users can post the results of the auction
  - Tenderer Admins can close auctions
- Vendor Admins/Users
  - Vender Admins add vendor Admins/Users
  - Vender Admin can register all details of the vendor as a bidder
  - Vender Admin can place a new bid
  - Vender Admin can withdraw bid that they placed
  - Once the bidding period is over:
    - Vendor Users can view all information that is available to the public, including bid results and Phase 1/Phase 2 outcomes
    - Vendor Users can contest the outcome of an auction for a preset time period
- Inspector General **Admins**/Users
  - Inspector General Admins hardcoded
  - Inspector General Admins can add Inspector General Users
  - Can call suspend()
- Civil Society/All Unregistered Users
  - Permissionless – Anyone can register contact info and submit questions, comments and complaints
    - Make complaints during specified windows in Phase 1 and Phase 2 of evaluation
    - (Once bidding period is over): View all bids placed by vendors as well as vendor details marked as public (non-confidential)
    - View past auctions and post complaints
    - Allow journalists, teachers' association, transparency groups to view transactions/activity during review periods, post complaints

Datetime

- This solution may need to integrate the Ethereum datetime library to encode certain parameters: https://github.com/pipermerriam/ethereum-datetime
- Note: "Days" in the system are business days and do not include weekends or holidays

Concept: Vendor- and contract-performance tracking

- At the end of each contract, when the vendor completes the delivery of goods or services, the tenderer, bidding agency and end-users (e.g. the parents of the children who would receive public-school meals) could submit a rating or score to the vendor's RUP database record (RUP is Colombia's specific vendor database).
    - End-users (e.g. school parents in this case) can register as "parents" to the smart contract solution. This could be achieved by asking the school to give each parent a password (string) generated by the software. The software would keep these generated passwords and only accept the ratings from someone who has a valid password. Since the school is free to randomly distribute the passwords, this would preserve the anonymity of the parents, who may then be more inclined to give a rating.
- Vendor rating scores can be as follows: 0-3, where 0 is neutral, and 1, 2 and 3 are extra marks for positive/strong performance. One could outline exactly what strong performance means and criteria for the associated scores 0-3.
    - Record goes to vendor record in the RUP database.
- Upon the next contract, during evaluation, this record field is pulled and included. It is added as a "bonus" score on top of the final score. This way, vendors who do not yet have the scores from a prior contract are not hurt. But those who do have past bonus scores have an opportunity to benefit from past contract performance.
    - Example: Vendor A's score is 87, Vendor B's is 91, Vendor C's is 74. Vendor B has a "2" extra score from a prior contract, so Vendor B's final score is 93.

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744

contact@weforum.org
www.weforum.org