Tendeko: Blockchain Based E Procurement System

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Introduction

Public procurement systems in Zimbabwe face critical challenges including corruption, lack of transparency, and inefficient tracking mechanisms. Over 30% of government contracts show irregularities, resulting in significant financial losses and diminished public trust. Our blockchain-based e-procurement system leverages immutable records and smart contracts to enhance transparency, reduce corruption, and improve process efficiency in Zimbabwe's public sector procurement.

Objectives

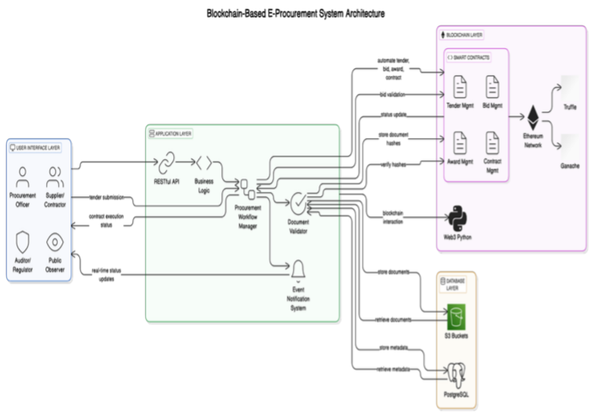
Primary Objective:
To design, develop, and evaluate a blockchain-based e-procurement system that enhances transparency, reduces corruption, and improves efficiency in Zimbabwe's public procurement processes.

Specific Objectives:

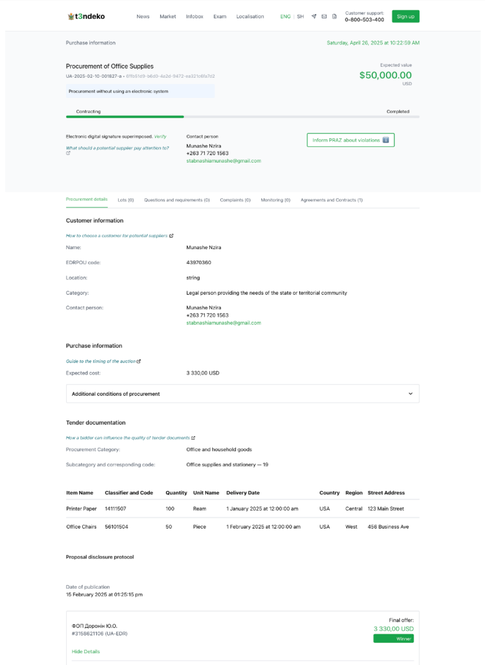
1. **System Design and Architecture:** To develop a comprehensive blockchain-based e-procurement system architecture that addresses identified gaps in current procurement processes while ensuring scalability, security, and user accessibility.
2. **Transparency Enhancement:** To implement immutable transaction recording and real-time process visibility mechanisms that increase procurement transparency by at least 50% compared to current systems.
3. **Corruption Mitigation:** To design and implement automated controls and audit mechanisms that reduce opportunities for corrupt practices through process standardization and human intervention minimization.
4. **Efficiency Optimization:** To automate key procurement processes including tender publication, bid evaluation, contract awarding, and payment processing, targeting a 40% reduction in average procurement cycle time.
5. **Stakeholder Integration:** To create an integrated platform that serves multiple stakeholder groups (procuring entities, suppliers, auditors, regulatory bodies) with role-based access controls and customized interfaces.

Methodology

Solution Architecture



Software Implementation



The web app has 4 different views with different access rights. The Supplier's dashboard, Procurer's dashboard, Regulatory Authority dashboard and the Public View

Conclusion

The Tendeko blockchain-based e-procurement prototype successfully demonstrates significant potential for transforming Zimbabwe's public procurement. With projected 40% reduction in procurement cycles, 25% cost savings, and enhanced transparency, the system addresses critical corruption and efficiency challenges. While infrastructure limitations and regulatory alignment remain challenges, the prototype validates blockchain technology's transformative potential for developing nations' public procurement systems.

Future Work

Although this project has been a success based on the objectives, there are always improvements that can be made to make the project more efficient. These include:

1. **Scalability Enhancement:** Explore layer-2 scaling solutions for nationwide deployment
2. **Advanced Integration:** Develop comprehensive integration with government systems (tax, business registry)
3. **Cross-Border Capabilities:** Extend system for international procurement processes
4. **Self-Sovereign Identity:** Implement blockchain-based supplier verification
5. **Full-Scale Pilot:** Conduct comprehensive real-world implementation and impact assessment

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Bibliography

Munashe Stabnashia Nzira is a student who studied Software Engineering at Harare Institute of Technology. This project was under the supervision of Mr. Wellington Manjoro. He is a lecturer at Harare Institute of Technology and hold a BTech(Hons) in Software Engineering and an MTech in

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