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Project Proposal

E-voting Blockchain

Version 1.2

Group members:

Nguyen Trong Tri – 1459053 – 16943739

Pham Huynh Tri Minh – 1459036 – 16942517

Supervisor: Mr. Le Ngoc Son

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1. Term of Reference:

Bosch of Engineering and Business Solutions Vietnam Co. LTD (Bosch) is one of the world's leading global supplier of technology and services, offering end-to-end engineering, IT and business solution. The company has its main office in Ho Chi Minh City, a regional office of Bosch Group in Vietnam. Bosch is creating opportunity for students who want to develop their skills, therefore many project has been raised for many universities in Ho Chi Minh City. As our client, Bosch offers a 6-month project of E-voting Blockchain for the students to have a chance to approach with one of the most promising technology which is blockchain. The project is introduced for the student whose major is Service Science, which is one of international education program of Ho Chi Minh University of Science associating with Auckland University of Technology.

Thanks to Bosch associates and teachers from the HCMUS-AUT support and assistance, the project is available for the students looking forward to enhancing their skills. The students, who have responsibility for the project, commit to accomplish the project goals flawlessly.

2. Rationale for the Project:

2.1. Statement of Need

Democratic voting is a significant occasion in any country. At the time being, the most common way that a country or an organization organizes a voting event is by paper based system. However, since the technology is increasingly developing, it could be the time to bring the voting to the next level. Voting system using electronic devices, referring to e-voting, including voting via web browser on the computer, applications on smart devices such as phone and tablet.

The initiation of blockchain is the underlying technology of cryptocurrency bitcoin. It is a distributed database where the transactions are recorded within a block. However, the potential of blockchain is much more than cryptocurrency. Blockchain is a secured and robust system that could be suitable for a secured voting system.

As a result, Bosch want to exploit the potential of blockchain technology and bring its possibility into E-voting system. This could solve many issues that is related to the existing E-voting system.

2.2. Issues

There have been upraising issues that associate with the online voting system and one of the them is integrity and trust. It is essential to keep the votes secured and all the decisions and the ballots of those who participate in the voting event remain unchanged. The current digital voting system bases on server-client. That means the voters submit their vote from their personal devices to a server, the server receive the votes and then generate the result. The voters are only informed the counted result, but the process of counting on the server remains unknown. That is to say, the process is in the server and the voters has no authorized to access so there are questions have been raised: how the voters could tell that their votes are counted or not? Does the server add a clone vote? And the big issue is does the result reliable?

Another issue is robustness. There is no guarantee that the server could be broken or not. Since all the votes are in the server database, the voting event has to be done again on another server. Then the result might not be the same as the first time due to edited votes.

The issue of anonymity is also on the table. Because of the authorized restriction, the voters do not have the right and cannot get access to the database. The information

of the voters is not announced to public. Otherwise, the detail is in the server database which those who are authorized to access may take to exploit for their personal uses. As a result, the information of the voters is not as secured as they thought.

All issues are brought to consider the advantages of E-voting compared to the traditional voting. It may be more convenient for the voter, otherwise, it could loss the significance of a voting event.

2.3. Opportunities

The initiation of blockchain is the underlying technology of cryptocurrency bitcoin. It is a distributed databased where the transactions are recorded within a block. All the blocks are shared to those who are in the network. That means everyone who join the system has a copy of the ledger (database). Since every new transaction or any changes in the database, it would be broadcasted to the whole network to update these ledgers. That makes it impossible to hack or change the data in the ledger. However, the potential of blockchain is much more than cryptocurrency. Blockchain is a secured and robust system that could be suitable for online voting system.

The issues are addressed using technology of blockchain for the E-voting system. Firstly, the trust is ensured. Since blockchain is an immutable and shared ledger, all the voters are able to see each other votes, yet know each other identification due to encryption of blockchain and the number of voters. Finally, robustness. The ledger is shared to the network so that it can be recovered since there is at least 2 nodes remained.

3. Scope and objectives:

3.1. Objectives

The project is about how to apply a Blockchain technology to change the way of current voting which is more secure, truthful, anonymous and robust. After discussing with our client, mentor and team members, these objectives are highlighted:

- **Objective 1:** Create – read – write a shared decentralized databased.
- **Objective 2:** Function to check one-person-one-account.
- **Objective 3:** Function to vote and calculate the result.
- **Objective 4:** Run in a private Bosch network.
- **Objective 5:** Graphic UI/UX to register, join and cast a ballot in a vote.

3.2. Scope

This is a new technology and our team only have 2 members to work with this E-voting system in 6 months. The voting system is expected to work in the network of 11 people.

3.3. Assumptions and Constraints

Description	Impact	Required By	Status
Hardware availability	Schedule	At least 1 week before sprint Start.	Continuous
Software availability	Schedule	Before project start date	Continuous
Team works as full-time internship in 6 months in Bosch Office to complete the project	Schedule, Cost, Quality	Project Requirement	Continuous

We have to be attendance about 40 hours per week and no more than 10 hours per day. (Client suggests 20 hours per week)	Schedule, Cost	Bosch Policy	Continuous
In the morning of Tuesday and Friday, have to take half day leave to study at University	Schedule, Quality	School reason	Continuous
Have to take some days off to participate class in University	Schedule, Quality	School reason	Continuous

4. Project Approach:

4.1. Project Approaches Information:

Project Approaches	
Methodologies	
- Process	Agile
- Team Management and Control	Scrum
Front-end	

- UI/UX	Under Researching. Suggest AngularJS 5, React, VueJS ...
Back-end	
- Blockchain Technology	Under Researching. Suggest Ethereum, Quorum, MultiChain, OpenChain, Dapp, Whisper, Swarm...
Tools and Software	
- Communication Tool	Skype for Business
- Source Code Management Tool	SourceTree (Confidential)
- Document Version Control	DocViewer (Bosch)
- Development Environment	Windows, Remix IDE
- Project Management Tool	Asana
- Designing	Adobe Photoshop
- Office Tool	Microsoft Office

4.2. Project Approaches Description:

4.2.1. Methodologies:

Agile process is recommended.

- E-voting Blockchain is a new project, additionally our team is from university and new the software business so the tasks need to be adjusted continuously.
- The blockchain technology is also new to our knowledge so it takes more time to research than implement the project.
- The sprints are directly under observation of client to ensure no significant misunderstanding.

For Team Management and Control: The sprint of the project is commonly 2 weeks long.

- The members have to work together to complete tasks in the sprint. This helps the members understand each other. Using one strength to cover the other weaknesses.
- Due to working full-time (40hours/week) is required, the working time is not necessary to show for the proposal at school.

4.2.2. Tools & Software:

Communication Tool: The company only provide Skype for Business due to ISO Standard. Therefore, it would be our main communication tool in office. Besides texting, it allows video and voice call which are essential for the communication purpose. Documents can also be sent and received via Skype for Business.

Source Code Management Tool: The SourceTree is recommended.

Document Version Control: We will use Bosch ILM to manage versions of all documents.

Development Environment: Windows, Remix IDE.

Designing: Adobe Photoshop.

Office tools: Microsoft Office.

5. Configuration Management:

5.1. Baseline Description:

According to Bosch Guideline, the Baseline is described by:

- Every first version of the document should always be 1.0.
- If the document need to be stored for further review purpose, it can be saved as v1.0r1 (first review), v1.0r2 (second review) etc.
- At the time of baselining, it should be baselined as version v1.0 and the document history should indicate that it is the initial version.
- After a document is baselined, the changes to the "baselined document" can be implemented only through change request handling process.
- After the implementation of changes, version number should be changed to v1.1.

5.2. List of Configuration Items:

No	Configuration Item	Trigger	Responsibility
1.	Project Plan	After reviewed / approved	Product Owner
2.	Requirement document	After reviewed / approved	Product Owner / Reviewer
3.	Design document	After reviewed / approved	Product Owner / Reviewer
4.	Prototype	After reviewed / approved	Product Owner / Reviewer
5.	Source code	After development finish.	Product Owner

5.3. Storing and Retrieving Configuration Item:

All Configuration Items except Source code are stored on the DocViewer of Bosch.

Source code is store on Source Tree.

The access right will follow the company conventions and approved by Product Owner.

Ex: Project Management Performance Testing Dashboard version 1.0.docx

5.4. CM Tool:

For CM Tool our project will use DocViewer, provided by Bosch to manage documents.

5.5. Naming Convention:

No Configuration Item Type		Filename
1.	Documents <ul style="list-style-type: none">- Proposal- SRS- Use cases- Time tracking Spreadsheet Guidance	- [ProjectName]_<DocumentName>_v<Number>
2.	Task	- [Category] –TaskNameStartWithVerb.
3.	Issue	- [Issue] – IssueName

6. Project Plan:

6.1. Project Deliverables

6.1.1. Deliverables for HCMUS

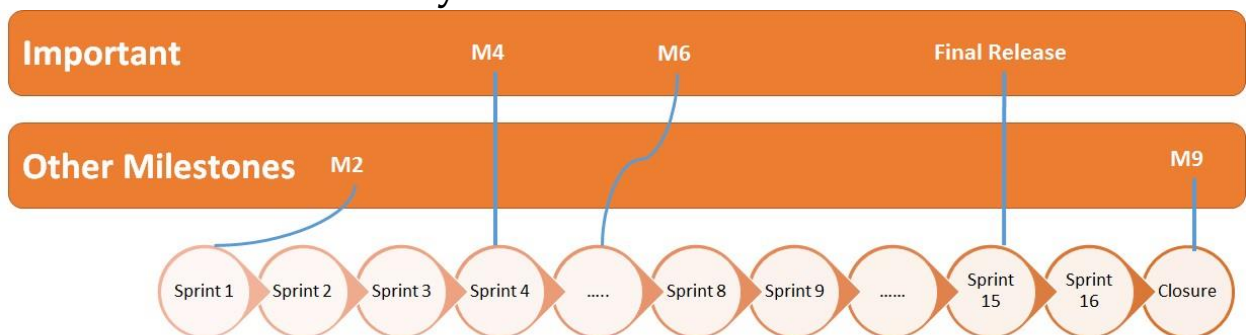
- Proposal
- Design
 - UI/UX.
 - System process.
 - Customer process.

- Use cases
 - System functionality.
 - Test cases.
- Standards
 - Clean code.
 - Maintainability.
- Time Tracking Spreadsheet
 - Tracking development team tasks.
 - Estimate time and the actual time spending on each task.
 - Tracking percentage and time of completed tasks in order to keep on the schedule.

6.1.2. Additional Deliverables for the company

- Voting Blockchain System.
- Technical documentation.

6.2. Timeline summary



6.2.1. Milestones

Key Milestone	Description	Planned date
M1	Gathering Requirements	24/10/2017

M2	Proposal approved	3/11/2017
M3	Agenda approved	6/11/2017
M4	Platform for blockchain	17/11/2017
M5	Design UX/UI	22/12/2017
M6	Implement blockchain	25/12/2017
M7	Prototype/Demo	16/3/2018
M8	Final release	4/6/2018
M9	Project end	4/6/2018

6.2.2. Timeline for Deliverables

Deliverable	Time
Proposal	3/11/2017
Agenda	6/11/2017
SRS	10/12/2017
Prototype	16/3/2018
Use Cases	11/12/2017
Code	15/1/2018
Test plan	At the beginning of each sprint
Go live	3/3/2018
Technical Document	8/1/2018
Final Report	8/1/2018
Time Tracking Spreadsheet	10/11/2017
Final Presentation	4/6/2018

6.2.3. Definition of Done (DOD)

- **Creation of the DOD**

Team members create their own “Definition of Done” for each sprint:

- User stories.

- Sprints output.
- Research document (if necessary).
- Report document (if necessary).

- **Review of the DOD**

The team along with supervisor will review DOD at the end of each sprint.

6.3. Roles and Responsibilities

Role	Responsibilities	Person in charge	Contact
Product Owner	<ul style="list-style-type: none"> • Provide vision for the team. • Represent the users of the system. • Manage stakeholders and their requirements. • Prioritize work for the team. • Set the acceptance criteria. 	Hoang Le Minh	Bosch internal emails, Skype for Business
Scrum Master	<ul style="list-style-type: none"> • Recommend face to face communication. • Review team tasks continuously. • Resolve conflicts. • Track team performance on Tracking Spreadsheet. 	Pham Huynh Tri Minh Nguyen Trong Tri (change after each sprint)	
Development Team	<ul style="list-style-type: none"> • Be full-stack developers (Design UI/UX, front-end, back-end). • Prioritizing the sprint tasks. • Complete tasks (give output). • Daily meeting to review status of working process. 	Pham Huynh Tri Minh Nguyen Trong Tri	

6.4. Meetings

Meeting	Attendees	Time	Duration	Purposes
Sprint Planning	Development team Scrum Master Product Owner	Beginning of each sprint	1 hour	<ul style="list-style-type: none">• Prioritize product backlog.• Evaluate effort to complete tasks.• Create backlog.
Daily Scrum	Development team Scrum Master	Every morning	About 10 minutes	<ul style="list-style-type: none">• Review.• Update status of each task.• What to do today.• Facing issue.
Sprint Review	Development team Scrum Master Product Owner	End of each sprint	30 minutes	<ul style="list-style-type: none">• Review completed function of the product.• Get feedback.
Sprint Retrospective	Development team Scrum Master Product Owner	End of each sprint	60 minutes	<ul style="list-style-type: none">• Review what have been done to complete a task.• Review the method of doing a task.• Recommend improvement.

6.5. Critical Computer Resource

- The development of the application is in Window environment.
- The primary language is Java.

The Company RBVH has provided two computers running Window operation and software including facilities needed for the project.

7. Skills and knowledge involved:

7.1. Professional Skills

- Analyzing.

- Leadership.
- Time management.
- Teamwork.
- Presentation.
- Planning.
- Project management.
- Writing document and report.

7.2. Interpersonal Skills

- Conflict solving.
- Communication skill.
- Decision Making.
- Negotiation.
- Researching.

7.3. Technical Skills

• Programming skill

Under researching. Recommend:

- Solidity, Swarm, Whisper, Dapp, Javascript.
- AngularJS/Vue.JS/React.
- Blockchain technology.

• Testing

Under researching. Recommend:

- Unit Test and Unit Root Test.
- Designing test cases.
- Manual testing.

7.4. Knowledge

- Get to know Blockchain technology.

- Dapp.
- Current E-voting process.
- The process of making a software.
- Get requirements, analyze, develop, test and deliver product.

8. Estimated all costs incurred:

Client supports:

Hardware	Software	Training
<ul style="list-style-type: none"> - Computer (keyboard, mouse, ...). - Workplace. - Internet connection. 	<ul style="list-style-type: none"> - Internal server. - Software/Service provided by BOSCH. - Internal network (social, library, wiki...). - Document. 	<ul style="list-style-type: none"> - Technical training.

BOSCH policy provide an internship program with allowance, estimated total cost for the project:

Number of member	2
Project duration	6
Salary (person/month)	3.000.000 VND
Total cost	36.0000.000 VND

9. Risk Management:

Our proposal for risk management in this project are:

- Identify the risk might occur and evaluate the impact.
- Plan to mitigate and solve the potential risk.
- Review after each sprint to identify potential risk.
- Since risk occurs, it would be recorded and managed based on the priority of the risk.
- The risks are listed on a Risk Management Spreadsheet.