E-Voting System Requirements Specification

Version 1.0

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Use this Requirements Specification template to document the requirements for your product or service, including priority and approval. Tailor the specification to suit your project, organizing the applicable sections in a way that works best, and use the checklist to record the decisions about what is applicable and what isn't.

The format of the requirements depends on what works best for your project.

This document contains instructions and examples which are for the benefit of the person writing the document and should be removed before the document is finalized.

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1. Executive Summary

1.1 Project Overview

Following the current political events in Albania we want to revolutionize our voting system which has been accused for years to be manipulatable. “Voting is not only our right — it is our power.” So what we are doing is making Albanians more powerful by creating a platform to ensure a more reliable voting system. Our platform is based on DRE - Voting System and it has its advantages:

- The speed of vote counting will be increased
- As it will be easy to use the number of irregular votes will decrease
- It will provide a more secure voting process then the actual one.

1.2 Purpose and Scope of this Specification

The purpose of this project is to offer a more secure voting system in order to assure that each vote will be counted correctly and there will be no manipulation of the votes. Also a lot of the votes are declared invalid for various reasons and this will be avoided using our platform, solving problems from the past elections like in 2011. Another problem is also the time required to finish the whole voting and counting process which will decrease significantly.

2. Product/Service Description

This project will offer three software based applications that will be interconnected with each other and a website that will give detailed information pre, during and post elections. The software applications will serve for different users. One is for the voter who will give as an input his vote for one of the candidates, another application will be for the supervisor who will insert the personal information of the voter and will give access to the voter to use its application and the third application will be for the administrator of the voting process. The website will serve for polls, to make visible the results in real time and to offer different notifications about the voting process.

2.1 Product Context

This platform is related with the elections in Albania and its voters. It will require to be connected with the database of the citizens of Albania. Apart of that it is not dependent on any other platform or service thus it relates only to its own implementation.

2.2 User Characteristics

There are

- Voter
  - Every person who wants to vote and satisfies all the requirements asked by the administrators of the elections.
- Supervisor
  - Supervisor are the persons selected from the candidates and the administrators to help the ongoing of the voting process.
- Admin
  - Admin is the organization responsible for holding the elections and it can add or remove candidates.

2.3 Assumptions

It is assumed that the administrators will offer devices to make the implementation of the platform possible.

It is assumed that supervisors will be available during the voting and counting process.

2.4 Constraints

The system will be potentially constrained by:

- The need to have the devices connected to the internet.
- The need to have the devices battery powered in case of a power outage.
- The fact that supervisors should be trained on how to use the platform.

2.5 Dependencies

Dependencies that affect the requirements are:

- This platform requires internet connection.
- Availability of the supervisors.

3. Requirements

3.1 Functional Requirements

The scheme for the requirement numbering is BR_##

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
BR_01	The platform should have a software application with which voters can interact	This will give the voters the possibility to check the list of candidates	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_02	The platform should have a software application with which supervisors can interact	This will be used by the supervisors to assure the ongoing of the process	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_03	The platform should have a software application with which administrators can interact.	This will be used from the administrators to monitor the election process	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_04	The platform should have a website which is accessible from every person	This will be used to check different notifications about the elections	2	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_05	The platform should provide admins with the ability to register new candidates	This will be done in the admin software application	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_06	The platform should provide admins with the ability to register new voting centers	This will be done in the admin software application	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_07	The platform should provide supervisors to insert personal information about the voter	This will be done in the supervisor software application	3	30/03/2019	Regan Kaci/ Patrik Simixhiu

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
BR_08	The platform should provide the voters to vote for a specific candidate	This will be done in the voters software application	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_09	Voters app should be eligible only when given access from supervisor app	Voters can only use their application once the supervisor has given them access to do so. Using TCP connection (Security reasons)	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_10	The current number of votes for each candidate should be stored locally in every device	Then the votes on each device for each candidate are counted. (Security reasons)	2	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_11	Once an eligible voter has voted he should be removed from the list of available voters	So that there are no duplicate votes for a person.	3	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_12	Every voting machine should have its own queue of voters	So that the supervisors can continue their process no matter how much time the voter requires.	2	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_13	Every voting machine should be linked to one group of supervisors computer.	Implementation reasons	~~3~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_14	The website should organize polls and allow visitors to vote.	This will be implemented in the website.	~~1~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_15	Every IP address that visits the website can only vote once in a poll.	This will be implemented in the website	~~1~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_16	Every device should be battery powered	So in case of power outage the process should go on.	~~2~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_17	Admins can start and end the voting process	Meaning that admins can have access on supervisior software	~~2~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_18	The voters app should not allow voters to vote multiple candidates and should not allow the insertion of invalid votes	This will be implemented in the Voters application	~~3~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_19	Supervisor's application should be connected with the database of the voters	This will serve to check if a voter has voted or not or if he is eligible to vote	~~3~~	30/03/2019	Regan Kaci/ Patrik Simixhiu
BR_20	Every vote should not be mapped with the voter to assure privacy	This is done for privacy reasons	~~3~~	30/03/2019	Regan Kaci/ Patrik Simixhiu

3.2 Non-Functional Requirements

3.2.1 User Interface Requirements

The three applications will be desktop applications which will be installed in specific computers. The first application which is the Admin App will have a sign in form to be completed and if the sign in credentials will be correct the user will be prompted to the admin interface where he will have the possibility to add and remove candidates and voting centers. Also the admin can start and end the elections.

The other application which is the Supervisor App, will get permission to operate once the admin starts the elections. It will have a form to be completed from the supervisor with the personal information of the voter. On the other hand once the supervisor submits the information and it is verified as correct, it will grant the permission to the voter to use its app to vote. The voter will have its own application which will have the list of the candidates and he will be able to select the one he wants to vote.

Then the web app will have a news tab where the user can read the latest news regarding the article. On the right side it will have a poll where the user can vote. And there will be different options regarding the elections such as history, statistics in a particular area etc.

3.2.2 Learnability

- All of the applications are user-friendly and anyone can use them without any difficulty.
- Web app is very simple to use.
- Error messages will be displayed if a specific condition is not met or an error happens

3.2.3 Performance

The overall performance of the platform will be high as there is no need for high resources. The performance will be dependent on:

- Database transaction efficiency
- Voting center's internet connection speed
- Servers hardware capabilities
- OS installed in the PCs
- Frameworks used to implement the application

3.2.3.1 Capacity

All of the repositories of the applications including: web and desktop application are going to be stored on a server that is going to need to have a minimum of 250 MB of size for all of these modules. The database is going to be moderate in complexity with approximately 25 tables in total. If the number of businesses and users registered in the application is going to be large than it is going to be somewhat large in size of data.

3.2.3.2 Availability

- Admin application is going to be running 24/7
- Supervisor application is going to be running when given access from admin application.
- Voting application is going to be running when given access from supervisor application
- Web application is going to be running 24/7
- It is going to cover all voting centers

3.2.3.3 Latency

Latency of software and web application depends on:

- Internet connection strength
- Size of db
- Latency for transactions to happen
- Latency depending on the distance to the server
- Login should open for 100ms

- Mobile should open for at most 1.5 secs
- All modules of web application should load for at most 250 ms

3.2.4 Manageability/Maintainability

3.2.4.1 Monitoring

If admins declare the voting process opened then the supervisor application will be available. If a supervisor enters the personal information of a voter and they are correct when confirmed with the database than the voter will be given access to use the voting app. If the information will not be correct then it will show a message explaining why. When a voter submits the vote a message will be shown that confirms if that the voting has been successfully or alerts the user that there was a problem and invites them to vote again. The connection between the two software will be a TCP connection. For every interaction that is done with the database, everything is going to be validated before and if they do not match than the changes are not going to be made.

3.2.4.2 Maintenance

If a system crash happens the core application is going to restart. While being in this process we are either going to use the other backup server or show to the page the message that for the moment our page is in maintenance until the moment that the server is up and running again. If restart or backup does not happen correctly than the whole server is going to be restarted. We will use servers of Google and that is why we are about 100% sure that it is going to be reliable and as fast as possible.

3.2.4.3 Operations

Operations required by the user are:

- Vote for a specific candidate. (Voter)
- Enter the personal information of a voter. (Supervisor)
- Add or remove candidates and voting centers. (Admin)
- CRUD functionalities

3.2.5 System Interface/Integration

Access in database is restricted to only the persons authorized to it that belong to the IT department. Users are only allowed to make changes in the db that are offered to them encapsulated in graphical user interface.

3.2.5.1 Network and Hardware Interfaces

We want a secure and reliable packet transferring so we are going to use TCP connection.

3.2.6 Security

The voters can only vote once a permission is granted from the supervisor which will be connected with TCP connection. The information that is kept in our database is considered sensitive information. Every personal information or information considered private will be encoded so that it will be difficult to be hacked. Admins and Supervisors should also be careful with the information that they have for the voters.

3.2.6.1 Protection

Protection will serve to check the validity of the data inserted. All the personal information will be verified and in case of invalid or empty information the submission should be prevented.

3.2.6.2 Authorization and Authentication

The admin should login with his correct login credentials and also the Voter's App will be authorized to operate once given permission from the Supervisor which also needs the authorization of the Administrators.

3.2.7 Data Management

In the database should be stored all the personal information of the voters

3.2.8 Standards Compliance

The standards compliance will be based on the government's laws. There will be obligatory and compulsory field to be filled and also the relationship between the tables will be defined
Entity that are likely to be stored in the database are:

- Full name
- Passport ID
- Birthdate
- City of residence
- Street Address
- Etc

3.2.9 Portability

3.2.10 Other Non-Functional Requirements

There is no much space needed for these applications. They are highly efficient. Anyway the platform is organizational and human dependent meaning that the speed of the process depends in the personal skill of the supervisor and even in the time asked by each voter to vote.

3.3 Domain Requirements

The PC's should be battery powered in case a power outage occurs so that the voting process can go on. Each time a supervisor completes the form with the personal data of the voter. The voter will be listed in a queue so that there is no waste of time.

4. User Scenarios/Use Cases

Provide a summary of the major functions that the product will perform. Organize the functions to be understandable to the customer or a first time reader. Include use cases and business scenarios, or provide a link to a separate document (or documents). A business scenario:

- Describes a significant business need
- Identifies, documents, and ranks the problem that is driving the scenario
- Describes the business and technical environment that will resolve the problem
- States the desired objectives
- Shows the "Actors" and where they fit in the business model
- Is specific, and measurable, and uses clear metrics for success

APPENDIX

The appendixes are not always considered part of the actual Requirements Specification and are not always necessary. They may include

- Sample input/output formats, descriptions of cost analysis studies, or results of user surveys;
- Supporting or background information that can help the readers of the Requirements Specification;
- A description of the problems to be solved by the system;
- Special packaging instructions for the code and the media to meet security, export, initial loading, or other requirements.

When appendixes are included, the Requirements Specification should explicitly state whether or not the appendixes are to be considered part of the requirements.

Appendix A. Definitions, Acronyms, and Abbreviations

Define all terms, acronyms, and abbreviations used in this document.

Appendix B. References

List all the documents and other materials referenced in this document.

Appendix C. Requirements Traceability Matrix

The following trace matrix examples show one possible use of naming standards for deliverables (FunctionalArea-DocType-NN). The number has no other meaning than to keep the documents unique. For example, the Bargaining Unit Assignment Process Flow would be BUA-PF-01.

For example (1):

Business Requirement	Area	Deliverables	Status
BR_LR_01 The system should validate the relationship between Bargaining Unit/Location and Job Class.---Comments: Business Process = "Assigning a Bargaining Unit to an Appointment" (Priority 1)	BUA	BUA-CD-01 Assign BU Conceptual Design	Accepted
		BUA-PF-01 Derive Bargaining Unit-Process Flow Diagram	Accepted
		BUA-PF-01 Derive Bargaining Unit-Process Flow Diagram	Accepted
BR_LR_09 The system should provide the capability for the Labor Relations Office to maintain the job class/union relationship.---Comments: Business Process = "Maintenance" (Priority 1)	BUA	BUA-CD-01 Assign BU Conceptual Design	Accepted
		BUA-PF-02 BU Assignment Rules Maint Process Flow Diagram	ReadyForReview

For example (2):

BizReqID	Pri	Major Area	DevTstItems DelivID	Deliv Name	Status
BR_LR_01	1	BUA	BUA-CD-01	Assign BU Conceptual Design	Accepted
BR_LR_01	1	BUA	BUA-DS-02	Bargaining Unit Assignment DB Modification Description	Accepted
BR_LR_01	1	BUA	BUA-PF-01	Derive Bargaining Unit-Process Flow Diagram	Accepted

BizReqID	Pri	Major Area	DevTstItems DelivID	Deliv Name	Status
BR_LR_01	1	BUA	BUA-UCD-01	BU Assign LR UseCase Diagram	ReadyForReview
BR_LR_01	1	BUA	BUA-UCT-001	BU Assignment by PC UseCase - Add Appointment and Derive UBU	Reviewed
BR_LR_01	1	BUA	BUA-UCT-002	BU Assignment by PC UseCase - Add Appointment (UBU Not Found)	Reviewed
BR_LR_01	1	BUA	BUA-UCT-006	BU Assignment by PC UseCase - Modify Appointment (Removed UBU)	Reviewed
BR_LR_09	1	BUA	BUA-CD-01	Assign BU Conceptual Design	Accepted
BR_LR_09	1	BUA	BUA-DS-02	Bargaining Unit Assignment DB Modification Description	Accepted
BR_LR_09	1	BUA	BUA-PF-02	BU Assignment Rules Maint Process Flow Diagram	Accepted
BR_LR_09	1	BUA	BUA-UCD-03	BU Assign Rules Maint UseCase Diagram	Reviewed
BR_LR_09	1	BUA	BUA-UCT-045	BU Assignment Rules Maint: Successfully Add New Assignment Rule	Reviewed
BR_LR_09	1	BUA	BUA-UCT-051	BU Assignment Rules MaintUseCase: Modify Rule	Reviewed
BR_LR_09	1	BUA	BUA-UCT-053	BU Assignment Rules MaintUseCase - Review Assignment Rules	Reviewed
BR_LR_09	1	BUA	BUA-UCT-057	BU Assignment Rules MaintUseCase: Inactivate Last Rule for a BU	Reviewed
BR_LR_09	1	BUA	BUA-UI-02	BU AssignRules Maint UI Mockups	ReadyForReview
BR_LR_09	1	BUA	BUA-TC-021	BU Assignment Rules Maint TestCase: Add New Rule (Associated Job Class Does Not Exist) - Success	ReadyForReview
BR_LR_09	1	BUA	BUA-TC-027	BU Assignment Rules Maint TestCase: Modify Rule - Success	ReadyForReview
BR_LR_09	1	BUA	BUA-TC-035	BU Assignment Rules Maint TestCase: Add New Rule (Associated Job Class Does Not Exist) - Error Condition	ReadyForReview
BR_LR_09	1	BUA	BUA-TC-049	BU Assignment Rules Maint TestCase: Modify Rule - Error Condition	ReadyForReview

For example (3):

BizReqID	CD01	CD02	CD03	CD04	UI01	UI02	UCT01	UCT02	UCT03	TC01	TC02	TC03	TC04
BR_LR_01			X		X		X			X		X	
BR_LR_09	X			X		X			X		X		X
BR_LR_10	X			X					X		X		
BR_LR_11		X											

Appendix D. Organizing the Requirements

This section is for information only as an aid in preparing the requirements document.

Detailed requirements tend to be extensive. Give careful consideration to your organization scheme. Some examples of organization schemes are described below:

By System Mode
Some systems behave quite differently depending on the mode of operation. For example, a control system may have different sets of functions depending on its mode: training, normal, or emergency.

By User Class
Some systems provide different sets of functions to different classes of users. For example, an elevator control system presents different capabilities to passengers, maintenance workers, and fire fighters.

By Objects
Objects are real-world entities that have a counterpart within the system. For example, in a patient monitoring system, objects include patients, sensors, nurses, rooms, physicians, medicines, etc. Associated with each object is a set of attributes (of that object) and functions (performed by that object). These functions are also called services, methods, or processes. Note that sets of objects may share attributes and services. These are grouped together as classes.

By Feature
A feature is an externally desired service by the system that may require a sequence of inputs to affect the desired result. For example, in a telephone system, features include local call, call forwarding, and conference call. Each feature is generally described in a sequence of stimulus-response pairs, and may include validity checks on inputs, exact sequencing of operations, responses to abnormal situations, including error handling and recovery, effects of parameters, relationships of inputs to outputs, including input/output sequences and formulas for input to output.

By Stimulus
Some systems can be best organized by describing their functions in terms of stimuli. For example, the functions of an automatic aircraft landing system may be organized into sections for loss of power, wind shear, sudden change in roll, vertical velocity excessive, etc.

By Response
Some systems can be best organized by describing all the functions in support of the generation of a response. For example, the functions of a personnel system may be organized into sections corresponding to all functions associated with generating paychecks, all functions associated with generating a current list of employees, etc.

By Functional Hierarchy
When none of the above organizational schemes prove helpful, the overall functionality can be organized into a hierarchy of functions organized by common inputs, common outputs, or common internal data access. Data flow diagrams and data dictionaries can be used to show the relationships between and among the functions and data.

Additional Comments
Whenever a new Requirements Specification is contemplated, more than one of the organizational techniques given above may be appropriate. In such cases, organize the specific requirements for multiple hierarchies tailored to the specific needs of the system under specification.

There are many notations, methods, and automated support tools available to aid in the documentation of requirements. For the most part, their usefulness is a function of organization. For example, when organizing by mode, finite state machines or state charts may prove helpful; when organizing by object, object-oriented analysis may prove helpful; when organizing by feature, stimulus-response sequences may prove helpful; and when organizing by functional hierarchy, data flow diagrams and data dictionaries may prove helpful.