

Requirement Analysis

Verification and Validation Document

Group-1

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Verification and Validation Processes

Introduction

Verification is concerned with the process of examining whether the set of requirements for a software project is correctly outlined. It's about ensuring that the requirements are written with the desired quality, making them clear, complete, consistent, and testable. The verification process is inward-looking, focusing on the technical correctness and completeness of the requirements document itself. It asks, "Have we documented the requirements correctly?".

Validation, in contrast, extends beyond the internal consistency and completeness of the requirements document to assess whether these requirements accurately reflect the needs and goals of the stakeholders. This process is outward-looking, aiming to ensure that the project, as defined by its requirements, will satisfy customer expectations and meet business objectives. Validation is about making sure that the project team is working on the right problem and proposing solutions that will deliver value. It asks, "Are we documenting the right requirements?"

Verifying and Validating Functional Requirements

Requirement	Verification	Validation
User Registration and Login	Check for secure, user-friendly UI/UX and adherence to design specs.	User testing to ensure the process is intuitive and error-free.
Car Registration	Review data fields and database schema for accuracy and completeness.	Perform tests with varied data sets to ensure all vehicle types are supported.
Request Repair/Maintenance Services	Verify workflow completeness and logical sequence in request submission.	Simulate service requests to validate user experience and system responses.
Specify problem, Vehicle Details	Ensure all required fields are clearly defined and have data validation checks.	Test with users to confirm clarity in specifying details and identifying problems.
Assign Pickup Requests to Driver	Review assignment algorithms for efficiency and accuracy.	Validate with real scenarios to ensure drivers receive correct assignments.
Integration with GPS for Tracking	Check integration points and data flow for real-time tracking.	Real-world tracking to validate the accuracy and timeliness of location data.

List of Preferred Service Centers	Ensure listing criteria and user preference settings are functional.	User feedback sessions to confirm the list meets user needs.
Service Centers Receive Requests	Confirm notification and request handling mechanisms are in place.	Test with service centers to verify timely receipt and clarity of requests.
Generate/Send Quotes	Review the accuracy of the quote generation process and information relay.	Evaluate with stakeholders to ensure quotes are clear and comprehensive.
Review and Accept/Reject Services	Check options and controls for review and decision-making are present.	Test the process with users to verify the ease of making informed decisions.
Partial Acceptance of Services	Verify the handling of partial acceptance logic in the system.	User trials to ensure the system supports and accurately processes partial acceptances.
Documentation of Repair Process	Inspect document generation and management for adherence to standards.	Assess with users for completeness and understandability of documentation.
Detailed History of Services	Audit data retrieval and display functions for accuracy and completeness.	Engage users to confirm the history is informative and easily accessible.
Secure Payment Gateway Integration	Test for security protocols and seamless integration with the payment system.	Validate transactions to ensure user trust and error-free processing.
Billing and No-Charge Policy	Review the billing system for accuracy and compliance with the no-charge policy.	Simulate scenarios to validate the correct application of billing policies.
Towing Services for Non-Drivable Vehicles	Confirm the activation process for towing services and provider communication.	Test with mock scenarios to ensure the reliability and efficiency of towing services.
Data Protection and Privacy Compliance	Verify adherence to data protection laws and privacy standards.	Conduct compliance audits and user testing to validate privacy assurances.
Secure Data Storage and Transmission	Check for encryption and security measures in data handling.	Perform security testing to validate the integrity and confidentiality of data.

Verifying and Validating Non-Functional Requirements

Non-Functional Requirement	Verification	Validation
Reliability	Verify system redundancy, error handling, and recovery processes.	Validate through stress testing and simulating system failures.
Usability	Review adherence to usability standards and guidelines.	Conduct user experience testing and gather user feedback.
Security	Perform security audits and ensure compliance with security protocols.	Test with penetration testing and other security testing methodologies.
Performance	Verify system meets performance criteria under the expected load.	Validate by monitoring system performance under peak load scenarios.
Scalability	Check that the system can be scaled up according to the specified requirements.	Validate by testing system performance as the number of users grows.
Documentation and Transparency	Review technical documentation for clarity and completeness.	Gather user feedback to ensure the documentation is understandable.
Regulatory and Data Security	Verify compliance with relevant regulatory standards and data security laws.	Validate with compliance audits and ensure user data is secure.

Process of Stakeholder Engagement

Stakeholder Engagement:

We engaged with stakeholders through scheduled online meetings, ensuring inclusivity and convenience for all parties involved.

During these sessions, we discussed and consolidated diverse viewpoints from end-users, business analysts, developers, and testers.

Iterative Approach:

An iterative approach was adopted for our verification and validation processes, embracing adaptability and continuous improvement.

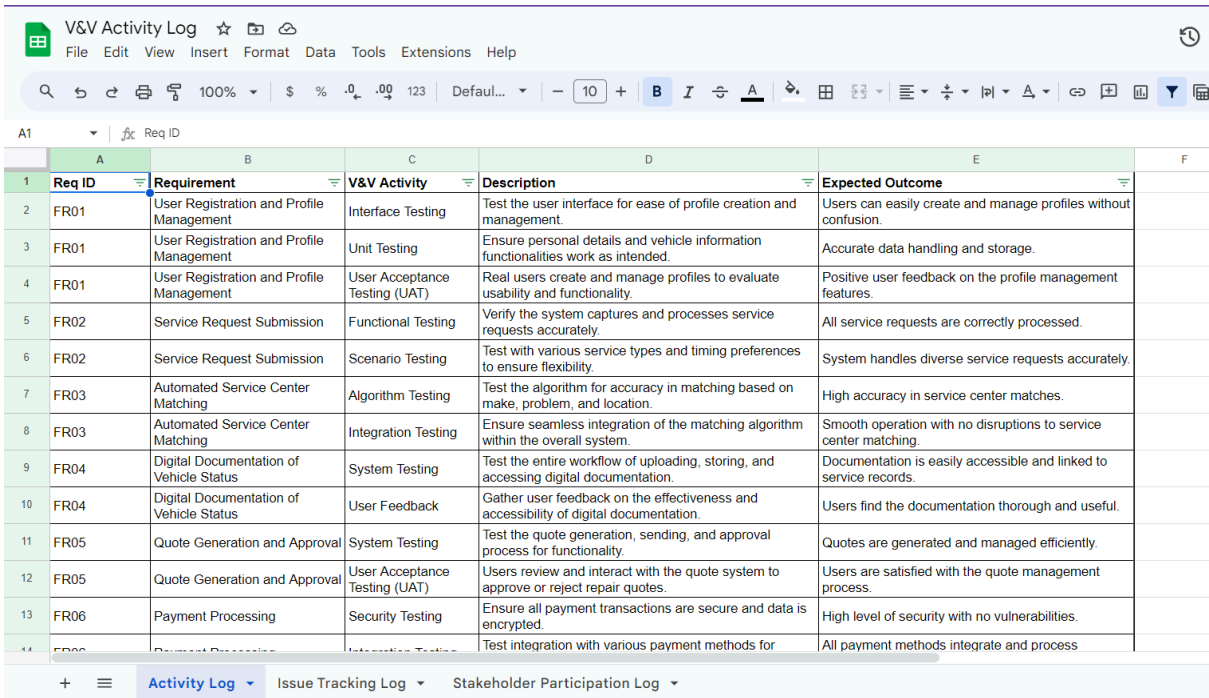
This method facilitated the progressive refinement of our project's requirements, accommodating emerging insights and adjustments.

Detailed Documentation:

We committed to comprehensive documentation throughout the verification and validation stages, creating a thorough record of the processes. This documentation captured the evolution of our project and provided a foundation for future reference and assessments.

Activity Log:

An Activity Log was meticulously maintained in the V&V Activity Log, documenting each action and decision made during the verification and validation activities. It served as a chronological record, detailing the specifics of each task, the individuals involved, and the results achieved.



Req ID	Requirement	V&V Activity	Description	Expected Outcome
FR01	User Registration and Profile Management	Interface Testing	Test the user interface for ease of profile creation and management.	Users can easily create and manage profiles without confusion.
FR01	User Registration and Profile Management	Unit Testing	Ensure personal details and vehicle information functionalities work as intended.	Accurate data handling and storage.
FR01	User Registration and Profile Management	User Acceptance Testing (UAT)	Real users create and manage profiles to evaluate usability and functionality.	Positive user feedback on the profile management features.
FR02	Service Request Submission	Functional Testing	Verify the system captures and processes service requests accurately.	All service requests are correctly processed.
FR02	Service Request Submission	Scenario Testing	Test with various service types and timing preferences to ensure flexibility.	System handles diverse service requests accurately.
FR03	Automated Service Center Matching	Algorithm Testing	Test the algorithm for accuracy in matching based on make, problem, and location.	High accuracy in service center matches.
FR03	Automated Service Center Matching	Integration Testing	Ensure seamless integration of the matching algorithm within the overall system.	Smooth operation with no disruptions to service center matching.
FR04	Digital Documentation of Vehicle Status	System Testing	Test the entire workflow of uploading, storing, and accessing digital documentation.	Documentation is easily accessible and linked to service records.
FR04	Digital Documentation of Vehicle Status	User Feedback	Gather user feedback on the effectiveness and accessibility of digital documentation.	Users find the documentation thorough and useful.
FR05	Quote Generation and Approval	System Testing	Test the quote generation, sending, and approval process for functionality.	Quotes are generated and managed efficiently.
FR05	Quote Generation and Approval	User Acceptance Testing (UAT)	Users review and interact with the quote system to approve or reject repair quotes.	Users are satisfied with the quote management process.
FR06	Payment Processing	Security Testing	Ensure all payment transactions are secure and data is encrypted.	High level of security with no vulnerabilities.
FR06	Payment Processing	Integration Testing	Test integration with various payment methods for	All payment methods integrate and process

The image depicts the activity log

Issue Tracking Log:

We kept an Issue Tracking Log to record and manage any issues that surfaced during the verification and validation phases. The log was crucial for tracking issue resolution progress, and documenting the nature of each issue, its assigned priority, and resolution status.

V&V Activity Log

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The image depicts the issue tracking log

Stakeholder Participation Log:

A Stakeholder Participation Log was created to document the involvement and contributions of each stakeholder. The log recorded the details of stakeholder engagement in the online meetings, including their inputs and feedback on shared documents, ensuring transparency and recognition of all contributions.

Stakeholder ID	Name/Group	Role in Project	V&V Activities Involved	Method of Participation	Feedback Provided	Action Items
STK01	User Representatives	End-User	User Acceptance Testing (UAT)	Direct Feedback	Separate vehicle info from registration process.	Implement separate vehicle registration feature.
STK02	QA Team	Quality Assurance	Functional Testing	Testing & Reporting	Optimize database queries for performance.	Optimize database queries and indexing.
STK03	Security Analysts	Security Analysis	Security Audit	Audit & Recommendations	Update to the latest encryption standards.	Update encryption protocols.
STK04	DevOps Team	System Operations	Load & Scalability Testing	Testing & Reporting	Implement cloud-based auto-scaling.	Integrate cloud services with auto-scaling.
STK05	Service Center Reps	Business Stakeholder	Process Workflow Review	Workshops	Streamline the quote approval process.	Simplify the approval process in email.
STK06	Compliance Officer	Regulatory Compliance	Compliance Review	Review & Recommendations	Incorporate compliance updates in development sprints.	Include compliance tasks in sprint planning.
STK07	Support Team Lead	Customer Support	Support Structure Evaluation	Evaluation & Feedback	Establish dedicated support teams for zones.	Set up regional support teams.
STK08	Product Management	Product Development	Feature Feedback Sessions	Direct Feedback	Propose customizable dashboard per user role.	Develop role-specific dashboards.
STK09	End-Users	End-User	Feedback Sessions	Direct Feedback	Propose customizable notification settings.	Implement customizable notification settings.
STK10	Technical Team	Technical Development	Technical Review	Review & Reporting	Recommend a guided troubleshooting process.	Develop a troubleshooting guide feature.
STK11	Payment Processor	Financial Operations	Payment Processing Evaluation	Evaluation & Feedback	Suggest a fallback payment gateway for redundancy.	Implement additional payment gateway.
	Users & Service	End-Users &			Incorporate user ratings in	Adjust service center

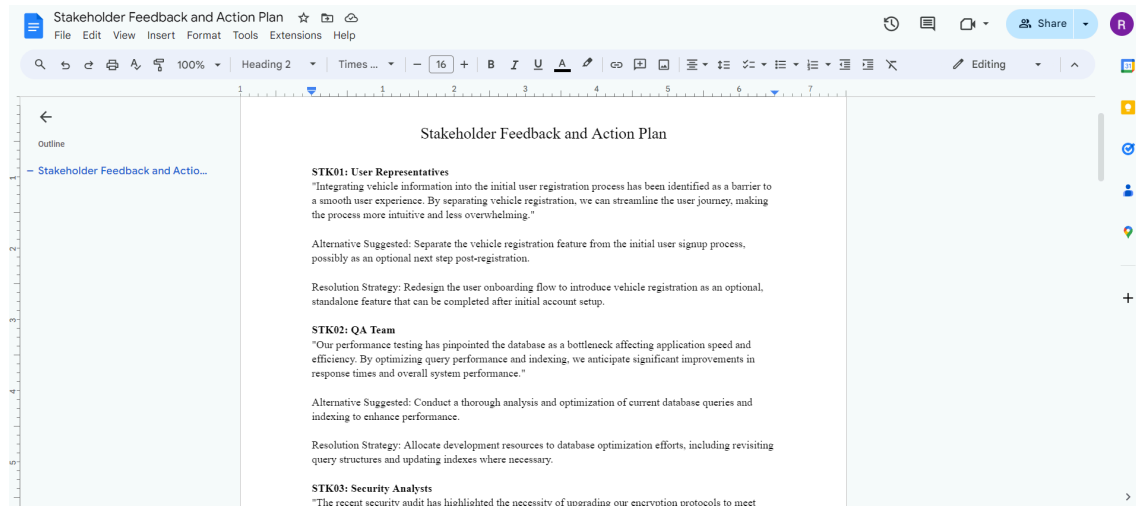
The image depicts the stakeholder participation log

The V&V activity Excel sheet has been attached for complete reference

Online Meetings and Shared Documents:

All stakeholder engagements were conducted via online meetings to facilitate real-time collaboration and discussion.

Shared documents were utilized during these meetings, where conversation threads, comments, and decisions were recorded live, providing an interactive and dynamic medium for capturing the essence of each discussion.



The image depicts the discussion and conversations carried out through a shared document between all the stakeholders and internal teams

The Stakeholder Feedback and Action Plan document sheet has been attached for complete reference

References:

1. Wiegers, K., & Beatty, J. (2013). *Software Requirements*. Microsoft Press.
2. Kung, David Chinho, and Hong Zhu. "Software Verification and Validation." (2008).
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4. Rakitin, S.R., 2001. *Software verification and validation for practitioners and managers*. Artech House.