BMC Hardware Services

Software Quality Assurance Plan

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Preface

Document Version Control: The reader has the obligation to ensure that they are reading the current version of this document. For any further questions and concerns please contact the project manager or the persons involved in this.

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1. Introduction

The BMC Hardware Services (BMC-HS) online application's Software Quality Assurance Plan (SQAP) offers a methodical framework to guarantee that quality criteria are met at every stage of the project. In accordance with industry standards such as IEEE and ISO, this plan outlines roles, duties, review procedures, and documentation requirements. The SQAP guarantees that deliverables will undergo thorough review, possible problems are resolved and stakeholders consent is obtained by including stage exits as checkpoints. This methodical approach reduces risks, promotes openness, and aids in the BMC-HS project's successful completion.

Purpose and Scope

This paper is designed to provide a detailed Software Quality Assurance Plan (SQAP) for the BMC Hardware Services (BMC-HS) to ensure that all the quality assurance processes are effectively managed. This SQAP is stated in the BMC-HS Project Plan and it is meant to: Specifically, this SQAP:

Defines Roles and Responsibilities: Defines the quality assurance responsibilities of the project team and the SQA consultant so that there is an understanding of who did the task and who will be held accountable.

Defines and Describes the Review and Audit Processes: Describes the approach that BMC-HS reviews and audits, the parts that are covered in the review, the frequency of the reviews and the criteria that would be used to determine if the work product meets the project standards

Outlines Quality Assurance and Work Products: Describes the processes, activities and work products that are to be reviewed and audited by the SQA consultant in order to ensure that they are in line with the project objectives and quality standards.

Documents SQA Deliverables: Outlines all the outputs and the documentation that has been generated during the course of the quality assurance process to ensure that there is consistency in the quality assurance approach.

Thus, the SQAP outlines a systematic way of monitoring and enhancing the quality of the BMC-HS project products in order to ensure effective project executing and compliance with quality norms and practices.

Reference Documents

Reference materials used to develop the BMC-HS (SQAP) include:

- IEEE Guide to Software Design Descriptions (IEEE 1016-2009)
- IEEE Standards for Software and System Documentation (IEEE 829-2008)
- ISO/IEC 12207 - System and Software Engineering - Software Lifecycle Processes
- ISO/IEC 25010 - Systems and Software Quality Requirements and Evaluation (SQuaRE)
- ISO 9001: Quality Management Systems
- ISO/IEC 29119 - Software Testing
- IEEE Std 1028: Software Reviews and Audits

Project Checkpoints (Stage Exits)

Each phase of the development process will include at least one formal milestone, referred to as a stage exit. A stage exit is a point in the project where all the draft deliverables expected to be completed by that point in the project have been finished, all the issues raised are well defined and have been given appropriate responses and there is a clear plan for the project especially for the next phase of the project.

At each stage exit there are project approveres (sign-off) authorities who are expected to give a written agreement or disagreement. All the functional areas affected by the project are also included in the stage exit process and are invited to offer their comments and suggestions

This approach makes sure that each stage of the project is well assessed and accepted by all the stakeholders making sure that there is a clear and proper flow of the project. It also minimizes risks since any potential problems are identified and dealt with before a stage and thus before the next stage of the project

2. SQA Description

SQA Roles and Responsibilities

Roles and Responsibilities of the team members of this Software Quality Assurance Plan (SQAP) of BMC Hardware Services we application:

Role	Name	SQA Responsibility	Stage Exit
QA Manager	Villa, Kyle Rafael	Creates and maintains the SQA Plan, oversees all SQA operations, ensures standards are followed, does audits, and offers strategic guidance.	Final Approval
Project Manager	Randrup, Clark	Controls budgets and schedules, coordinates development procedures, and fixes problems with project quality.	Review and Concur
QA Engineer	Labrador, Sean Andrei Jeremy	Works with development teams, produces documentation, finds vulnerabilities, and writes and maintains automated and manual test scripts.	Document Findings
QA Analyst	Santos, Alexis	Produces reports, builds and maintains test cases, runs tests, monitors faults, checks user requirements, and performs thorough audits and reviews.	Execute Validation Checks

Required Skills

Ensuring that the project complies with the established Design of Experiments (DOE) and the described industry standards within the Project Plan is the primary role of the Quality Assurance (QA) consultant. One of these standards is to have in place thorough reviews of Project Plan iterations and lifecycle work products to ensure compliance. A QA consultant also gives guidance regarding project management practices and software development processes, which leads to the overall improvement of the quality of the thing developed and the processes followed in doing so.

The QA consultant is independent of the development team members to maintain objectivity, allowing for unbiased evaluations of work products as they are being developed and created after they have been completed. This independence also allows for impartial reviews of project management practices and formal assessments of stage exits. In addition to these tasks, a QA consultant is also responsible for:

Ensures Standards Compliances: Throughout the project, it makes sure that all deliverables and processes are followed as per the agreed-upon industry standards and best practices.

Identifies Process Improvements: Suggests changes to the projects processes and results driven development methodologies that will improve results.

Demands Risk Management: Offers insights to detect and solve potential risks at the early stage of the development phase.

Promote Stakeholder Engagement: Serves as a conduit between the project team and stakeholders, delivering transparent communication on quality metrics, the status of compliance, and areas that need attention.

This bureau is to be responsible for continually improving the development with efficiency and timely delivery of a properly output project.

3. Audits and Reviews

Standard

The Software Quality assurance plan (SQAP) for the BMC Hardware Services Web Application will follow these guidelines throughout the development process. This involves the Web Application development process such as design, implementation, and testing to make sure it complies with industry standards for reliability and quality. Throughout the Software Development Life Cycle (SDLC), the SQAP will serve as a guide for managing quality control and carrying out audits, reviews, and validation of tasks and changes.

The following standards will guide the project plan:

- **Design Standards:**

  IEEE 1016-2009 Guide to Software Design Descriptions: Guidelines for creating thorough, organized, and manageable design documentation are provided.

- **Testing Standards**:

  IEEE 829-2008 Standard for Software and System Test Documentation: To guarantee comprehensive testing and validation, it specifies the structure and content criteria for test plans, test cases, and other testing documentation.

- **Process Standards**:

ISO/IEC 12207 Systems and Software Engineering - Software Lifecycle Processes: Discusses the steps of software creation, maintenance, and support as well as the procedures for managing the software lifecycle.

ISO/IEC 25010 Systems and Software Quality Requirements and Evaluation (SQuaRE): It provides a framework for evaluating the quality of software, which will aid in determining the application's functionality, dependability, and performance.

ISO 9001 Quality Management Systems: It emphasizes client satisfaction, process efficiency, and ongoing development.

ISO/IEC 29119 Software Testing: A thorough set of guidelines addressing many facets of software testing that guarantee the application of efficient testing procedures at every stage of the project.

IEEE Std 1028 Software Reviews and Audits: Provides instructions on how to carry out methodical audits and reviews to guarantee quality control and compliance.

Assuring that the project complies to the quality standard benchmarks and maintaining the quality of deliverables, the Software Quality Assurance Plan (SQAP) will specify how these standards will be used throughout audits and reviews.

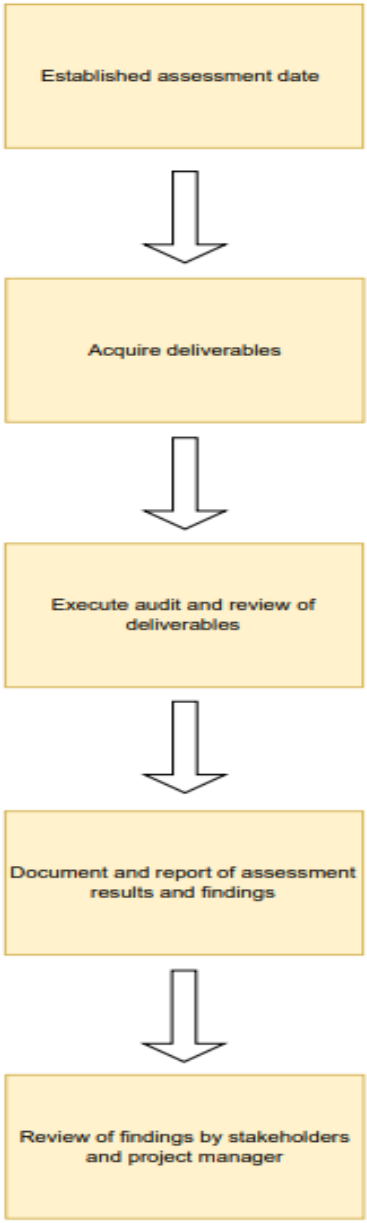
In-stage Audits and Reviews

This project's quality assurance will involve at least one audit of all current draft deliverables and a selection of products at every development stage. The purpose of the audits is to make sure that the established processes and procedures for project management and system

development are being followed. Moreover, their audits will identify and resolve possible risks to the project plan.

The BMC Hardware Services SQAp and all relevant standards will be followed in the conduct and documentation of In-Stage Audits and Reviews. The quality and validity of each deliverable or chosen work product will be assessed. Verification and Validity of each deliverable or chosen work product will be a part of the review, which will be part of the review, which will be documented in an In-Stage Assessment Report. The schedule of In-Stage assessment will be discussed on the next page.

The following diagram outlines the process flow for In-Stage review:



An organized method for assessing the level of quality and suitability of deliverables at every stage of development is the In-Stage Assessment Schedule. Establishing the agreement date with all major participants is the first step in scheduling the evaluation, since it guarantees enough

time for participation. All required deliverables, including project plan, tests results, and development documentation are collected and checked for completeness prior to the evaluation. Project plans are reviewed, deliverables are audited, and other pertinent materials are evaluated as part of the actual assessment. This guarantees that every element complies with the project's requirements and quality standards.

In order to verify that the deliverables satisfy defined requirements, functional performance, and integration tests are performed during the evaluation. Identification, severity classification, and resolution logs are used for defects. A thorough report outlining the risks, issues, and suggestions is created once testing is completed. After that, the stakeholders and project manager are shown this report for their consideration. The schedule is essential for keeping the project on track because any delays or missing items during the evaluation phase might have a domino effect on other phases. The timeline reduces rework and ensures more seamless transition between development phases by facilitating remedial actions in the event of difficulties.

In-Stage Assessment Report

Project Name: _____
Stage of Development: _____
Assessment Date: _____
Reviewer(s): _____
Prepared By: _____

Deliverables Reviewed

Deliverable	Status (Complete/In Progress	Comments

Defects Identified

Defect ID	Description	Severity	Status (Open/Resolved)	Comments

Risk Assessment

- **Overall Risk Level**: [Low/Medium/High]
- **Key Risks Identified**:
    1. _____
    2. _____

Findings Summary

- **Strengths**:
    - _____
- **Weaknesses**:
    - _____

Recommendations

1. _____
2. _____
3. _____

Approval

Assessment Outcome: [Approved/Requires Rework]
Reviewer Signature: _____
Date: _____

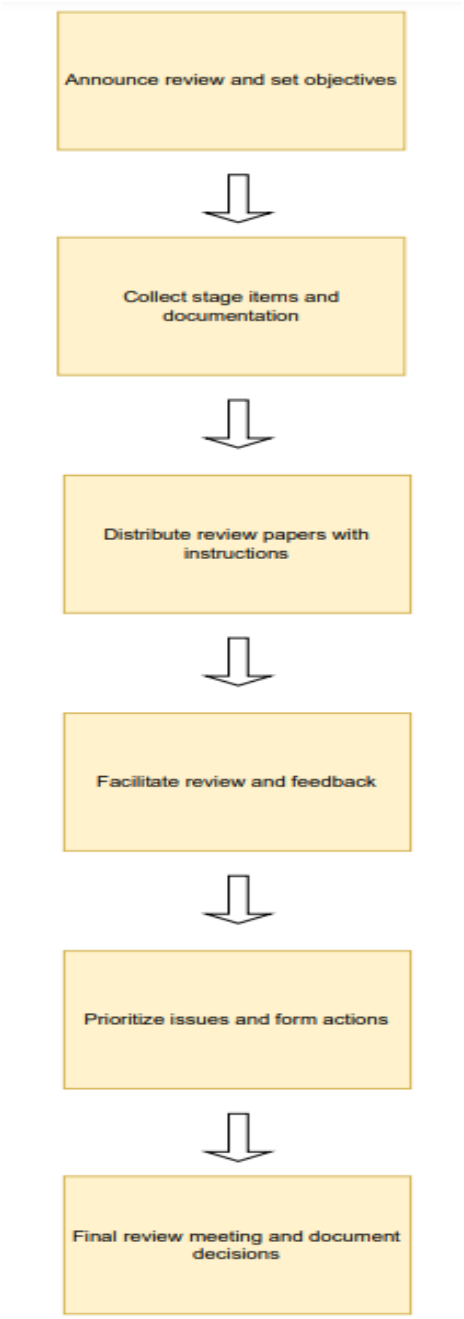
Stage Exit Reviews

To proceed with the project's next phase of development, a stage Exit Review is utilized to obtain the consent of the assigned stakeholders. Through this assessment, it is made sure that all deliverables from the current stage satisfy the necessary criteria and that any problems or issues have been fixed or have a workable plan of action.

A stage exit serves the function of giving all project functional areas a chance to thoroughly examine the present project plan. This entails looking at high-level plans for the rest of the project as well as a specific strategy for the following phase. Additionally, stage exits provide a platform for identifying and addressing any qualifications or problems that might affect the project plan, making sure that they are fixed or that appropriate action plans are in place. Furthermore, Stage Exits make it easier for current stage deliverables to be formally approved, allowing the project to move seamlessly into the following stage of development.

The Stage Exit process ensures that all issues are resolved with feasible strategies. It begins with providing the information to the development teams of the changes that they’ll conduct and ends with approval from selected reviewers. The schedule of Stage Exit assessment will be discussed on the next page.

The following diagram outlines the process flow for Stage Exit review:



In order to guarantee agreement on the scope and expectations, the Stage Exit Schedule starts by explaining the stage exit review to the development team and stakeholders. After that, all pertinent stage artifacts are collected to make sure the materials are current and represent the

project's current status. These include test results, deliverables, updated project documentation, and risk assessments. After that the next is, participants receive these materials in review documents along with specific guidance on the details of the focus areas like, product quality, unresolved issues, and compliance with project milestones.

During the review session, stakeholders are encouraged to actively participate, allowing deliverables to be reviewed, concerns to be addressed and constructive input to be gathered in an open dialogue to uncover hidden risks or issues that have been neglected. Following the review, the feedback gathered is examined, problems are ranked according to their impact and severity, and appropriate solutions are created to deal with the most pressing issues. Team members are then given tasks with precise due dates. To ensure accountability and facilitate a seamless transition to the next development phase, the review's findings are finally compiled in a final meeting where resolutions are presented, approvals are confirmed, and important decisions - including outstanding action items and next steps - are recorded.

Stage Exit Assessment Form

Project Name: _____
Project Stage: _____
Assessment Date: _____
Prepared By: _____
Reviewer(s): _____

Deliverables Reviewed

Deliverable	Status (Complete/In Progress)	Comments

Stage Review Summary

- **Stage Objectives Achieved**: [Yes/No]
- **Key Findings**:
  1. _____
  2. _____
  3. _____

Qualifications (Issues)

Issue ID	Description	Severity	Resolution Status	Comments

Approval Section

- **Concur**: [ ] Proceed with the project according to the current Project Plan.
- **Concur with Qualifications**: [ ] The project can proceed if an acceptable action plan for each issue is in place.
- **Non-Concur**: [ ] Significant issues exist; the project should not proceed to the next stage until they are resolved.

Reviewer Comments

- _____
- _____
- _____

_____

Reviewer Signature: _____
Date: _____

Peer Reviews

In order to find defects, guarantee that standards are being followed, and enhance overall quality, team members evaluate one other's work as part of a collaborative quality assurance process called peer reviews. Maintaining high-quality deliverables and identifying problems early in the development lifecycle depend on these reviews.

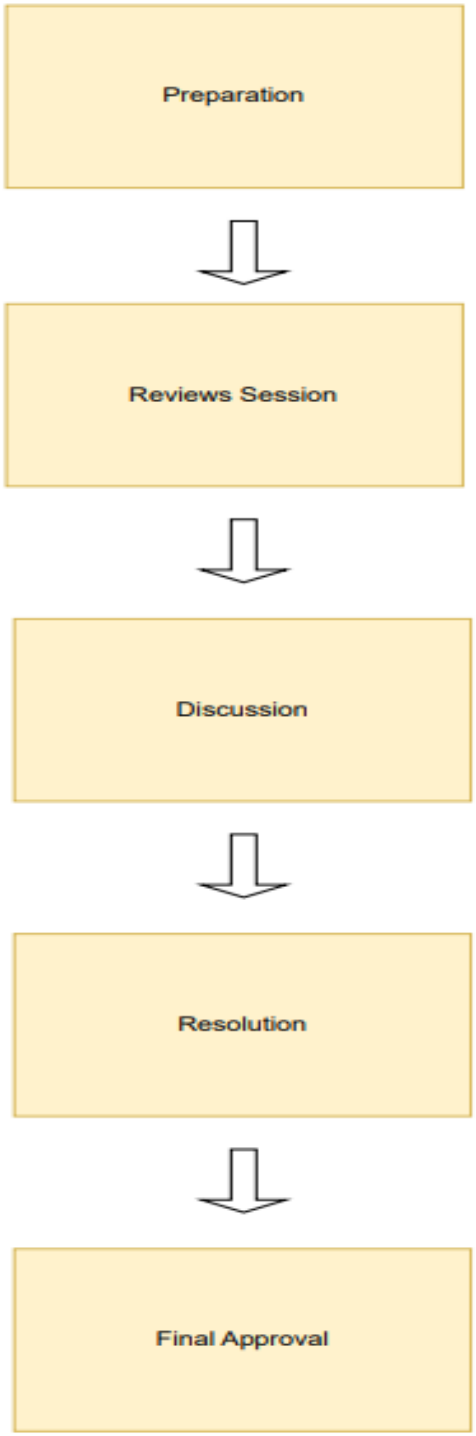
Purpose:

Peer reviews are mostly used to make sure deliverables adhere to project standards and specifications, They also give team members a chance to exchange ideas and improve the project's overall quality by pointing out defects and potential improvements.

Process:

The preparation stage of the peer review process starts when the delivery owner gathers and sends the deliverable to the reviewer, along with any pertinent supporting documentation. Using the peer review checklist, the reviewers independently assess the deliverable during the review session, recording their observations and comments. A discussion phase follows, during which reviewers get together to exchange findings, rank problems, and offer helpful criticism.The deliverable owner then responds to the comments, fixes any problems found, and distributes the revised deliverable for additional review if necessary. In order to ensure that the deliverable satisfies the necessary standards and project objectives, the reviewers lastly attest that all important feedback has been taken into consideration and that it has been authorized.

Peer reviews guarantee that the following aspects of the BMC Hardware Services Web Applications's deliverables are carefully assessed for quality compliance:



Checklist for Peer Review

Checklist Questions	YES	NO
Documentation and Completeness		
Are all required documents and supporting materials attached?		
Is the purpose and scope of the deliverable clearly defined?		
Are workflows, input fields, and expected outcomes detailed for both user and admin interfaces?		
Complete user and admin documentation?		
Standards Compliance		
Does the deliverable follow applicable standards (e.g., IEEE, ISO)?		
Are naming conventions, formatting, and style consistent throughout?		
Are code and database operations compliant with the projects coding design and standard (e.g. IEEE or ISO)?		
Functionality and Accuracy		
Does the deliverable meet the functional and technical requirements?		
Are there any logical errors or inconsistencies?		
Are all inputs, outputs, and workflows clearly documented?		
Traceability		
Are requirements trace to design elements and implementation?		
Are test cases mapped to corresponding requirements?		
Code Quality (if applicable)		
Is the code written following the project's coding standard?		
Is the code modular, maintainable, and free of redundancy?		
Are comments and documentation sufficient for readability?		
Are errors or invalid inputs handled appropriately (e.g. duplicate entries) ?		

4. Verification and Validation of Requirements

A solid basis for next design and development tasks is created by verifying and validating the BMC Hardware Services Web Application requirements at the conclusion of the requirement collection and analysis phase. At a minimum, the functional requirements document (FRD) must contain information about the systems' user and admin interfaces as well as documentation of critical needs including system functionality, performance metrics, design constraints, and attributes.

Verification

Verification is a methodical procedure used to make sure that deliverables fulfill the functional and technical criteria and conform to their predetermined specifications. The first step in verification for the BMC Hardware Services Web Application is creating an extensive traceability matrix. This matrix ensures thorough coverage and alignment with project objectives by connecting each requirement to the relevant design elements and test cases.

A thorough examination of the admin interfaces's CRUD (create, read, update, and delete) processes is one of the main tasks in verification, which guarantees data integrity and appropriate operation across asset management workflows. AJAX workflows are also analyzed to confirm that they meet functional requirements, such as efficient real-time updates without page reloads. As part of the verification process, the system's scalability is evaluated to see if the architecture can accommodate future increases in user interaction and data volume.

The following activities will be performed as part of requirements verification for the BMC Hardware Services Web Application:

- Create a traceability matrix that connects all of the FRD requirements to the software design elements and system objectives. For example, assign corresponding design elements and test cases admin features (such as the Attendance System and CRUD operations) and user needs (such as login and Sign-Up)
- Examine the FRD criteria for accuracy, readability, consistency, completeness, correctness, and testability. For example, confirming that CRUD processes encompass all anticipated functions (create, read, update, delete) as well as the procedure of check out and guarantees that every need is precise and quantifiable.
- To guarantee alignment with project objectives, evaluate the degree to which the functional requirement document (FRD) meets the BMC Hardware Services Objectives.
- Determine the software's main performance or critical areas, such as AJAX performance, attendance system accuracy, add to cart and check out, and login capability, by evaluating the requirements' criticality.

Validation

A systematic procedure called validation makes sure that the BMC Hardware Services Web Application satisfies stakeholder needs and operates as planned in practical settings. It starts with carrying out an Acceptance Test Plan, which assesses system performance, functionality, and user experience. To ensure that functional pages like Login and Sign-Up process inputs effectively and offer insightful feedback, user testing is one of the most important tasks. The usability and adherence to functional requirements of the admin interface's features - such as the

attendance system CRUD Operations, Add to cart and Check out of items, and AJAX driven searches - are verified. Furthermore, performance testing confirms responsiveness and dependability in stressful and high-volume scenarios, ensuring a stable and expandable solution, while system integration testing guarantees seamless interaction between the admin and user modules.

The following activities will be performed as part of requirements verification for the BMC Hardware Services Web Application:

- Plan Acceptance Testing, including criteria for:

  - Compliance to every criteria

  - User documentation is adequate, especially for CRUD operations and the admin interface

  - Performance under pressure and at limits including when multiple users are logging in at once or when conducting database-intensive searches.

- Create test task and result documentation in advance to guarantee reproducibility and traceability
- Cover both admin and user capabilities, including asset management, transaction, records, and user account creation, as you carry out the acceptance test plan.
- Record the outcomes of the acceptance test so that they can be verified against the initial specification and goals of the BMC Hardware Services web application.

5. SQA Milestones

The BMC Hardware Services projects are listed below. The QA consultant will examine and audit the following tasks and outputs:

Stage	Deliverable	In-Stage Assessment Date	Stage Exit Date	Work Product	QA Activity
Requirements	Functional Requirement Document (FRD)			Traceability matrix, user stories, feature lists	Check the FRD for accuracy, consistency, and completeness; align requirements with project goals
Design	System Design Document			System architecture diagram, module designs	Examine designs to ensure that critical, severe, and moderate issues are covered; confirm how user input is handled
Development	Inventory and Transaction Modules			Inventory CRUD, Transaction functionality updates	Examine the admin/user page separation (serious difficulties); test for handling incorrect price inputs (important)
Integration	Admin and User Interface Integration			Home page links, Time-In functionality	Verify fixes for moderate problems (such as non-functional links and the time-in button)
Testing	Test Results			Unit Test reports, integration test logs	Conduct acceptance tests for every module, and during stress tests, concentrate ons serious and moderate problems.
System Deployment	Final System Deployment			Deployed system, final user/admin documentation	Verify that all features are working and check for small problems (such as inconsistent CSS or UI spacing and other)