

**UNIVERSITI KUALA LUMPUR**

**MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY**

**ISB42303 - SOFTWARE CONFIGURATION MANAGEMENT**

**Hotel Empire SCM PLAN V1 (STILL IN PROGRESS)**

**PREPARED FOR**

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1. **Introduction**
   1. **Purpose**

This plan purpose is to provide a proper planning and coordination of software configuration management, its activities and resources for Hotel Empire Reservation system. This document defines the process of SCM in term of control/handling changes within the Hotel Empire system project. In addition to that, it states how the organisation record, track, implement, control and audit configuration matters. All of these to increase productivity, maintain integrity, traceability, ease out changing implementation and minimize redundancy and mistake throughout the configuration/changing process.

* 1. **References**

1. *ANSI/IEEE Std 828-1998, IEEE Standard for Software Configuration Management Plans.*
2. *ANSI/IEEE Std 1042-1987, IEEE Guide to Software Configuration Management.*
3. *NMMSS Configuration Management Plan*
   1. **Definitions and Acronyms**
      1. **Definitions**

**Software Test Plan –**

[To be defined later]

**Software Requirements Specification –**

[To be defined later]

**Testing –**

[To be defined later]

**Configuration Management (CM) –**

[To be defined later]

**Release –**

[To be defined later]

**Baseline –**

[To be defined later]

**Version –**

[To be defined later]

**Configuration –**

[To be defined later]

**Configuration Item –**

[To be defined later]

**Configuration Identification –**

[To be defined later]

**Configuration Control –**

[To be defined later]

**Configuration Status Accounting –**

[To be defined later]

**Audit –**

[To be defined later]

**Review –**

[To be defined later]

**Release –**

[To be defined later]

**Revision –**

[To be defined later]

**Configuration Control Board (CCB) –**

[To be defined later]

* + 1. **Acronyms**

SCM Software Configuration Management

SCMP Software Configuration Management Plan

CM Configuration Management

CR Change Request

IEEE Institute of Electrical and Electronics Engineers

ANSI American National Standards Institute

CCB Change Control Board

CI Configuration Item

SQA Software Quality Assurance

QA Quality Assurance

SQAP Software Quality Assurance Plan

STP Software Test Plan

SRS Software Requirements Specification

SDD Software Design Document

COTS Commercial-Off-The-Shelf

UML Unified Modelling Language

VDD Version Description Document

NMMSS Nuclear Materials Management and Safeguards System

* 1. **Document Overview**

The SCM plan document consists of seven chapter where the first chapter define the purpose of SCM, references, document overview, definition and acronym detail. The second chapter define the organization management detail which discusses the organization profile, CCB and responsibilities. The third chapter is written more specifically for SCM activities where it describes all that need to be done and performed for configuration management. Chapter four defines the sequence and duration required to get activities of SCM and milestones conducted. Meanwhile chapter five identifies the tools, techniques and resources needed for SCM. Next, chapter six define the plan maintenance strategy to maintain the SCM plan updated. Last chapter seven is to showcase necessary attachments that plan may needs and used.

1. **Organization**
   1. **Project Organization Profile**

The organisation that fully in charge in developing the IT project of Hotel Empire Reservation System is Empire Technology, a subsidiaries company of Empire Hotelier Corporation to cater IT technology needed for Hotel Empire. It is fully owned by Empire Hotelier (parent organisation company) that specialize in hotel and tourism industry business.

This system is made for Hotel Empire business that located at Port Dickson. Empire Hotelier endorse the project and considered as investor for this IT project. Hence, Empire Technology organisation need to ensure that the development and configuration management tasks are performed accordingly.

* 1. **Project Organization Chart**

This is the project organizational chart which demonstrate the designation roles for each team members and the hierarchy structure



* 1. **Configuration Management Authority**

Empire Hotelier Corporation as project sponsor and Change Control Board has the highest authority right for this configuration management and its implementation. Change Control Board will assist the project sponsor to make a good decision and under their command, they may give approval and rejection whenever necessary especially when it comes to changes. Hence, any changes required need to go through these two faction.

* 1. **SCM Roles and Responsibilities**

Since the scale size of organisation team is small hence most team member need to take part in the software configuration management tasks with own respective roles and responsibilities.

* + 1. **Configuration Management (CM) manager**

CM manager is considered as the head of this configuration management where she takes full responsibility by leading and handling the configuration management and its activities throughout the software development. The CM manager have strong presence in the SCM activities. Along with project manager, CM manager will approve or reject proposed changes.

CM manager need to ensure all process of SCM are used, noted and obeyed by all of the team members’ accordance to SCM plan. Also resolve any SCM issues specially when it comes to change. In addition to that, CM manager need to create, maintain, review, update and fix SCM plan and overall SCM infrastructure. Last but not least, CM manager become the chairperson in the change control board (CCB) and lead the meeting of CCB.

* + 1. **Project Manager**

The project manager is in charge in leading and coordinating the whole software development. Hence, project manager plays major part in SCM by participate in making a lot of CM decision, strategy and plan since it is part of development. So project manager need to keep an eye on any changes, approve or reject any proposed changes.

The project manager will analyse, estimate and evaluate proposed changes impact based on resources and project schedule to determine whether change is a viable option and necessary or not. PM need to do estimation to ensure changes can be done within feasible time frame and budget cost. Moreover, assign priorities of the change request according to its importance, difficulty and value. Project manager should also review, estimate and approve the change request first before CCB meeting and its approval. If the CR is not approved by PM, then there won’t be any CCB meeting.

* + 1. **Software Developer and Designer**

The developer for this organisation are the owner/creator of the configuration item specifically source code and program. Thus, responsible in notifying any changes they do and maintaining the configuration as expected. Furthermore, the developer responsible for proposed change requests whenever necessary.

* + 1. **QA Engineer**

In charge achieving excellence software quality by conducting SQA activity which include conducting the auditing and review of software quality assurance (SQA). QA Engineer will perform configuration audit and review activity to check the consistency, conformance, compliance and completeness of configuration management and its CI.

* + 1. **Hotel Empire (Client)**

They also have responsibility which is understand the basic necessary SCM terms since produced software, prototypes and its artefacts may need to be reviewed to give feedback. Hence they have to aware of latest updated version of the software or its artefacts. In addition they also may request for changes and so required to understand how SCM process flow work.

* + 1. **SCM Activities** **Mapping**

This is overall general SCM activities that each involved team member responsible.

|  |  |
| --- | --- |
| **SCM Activity** | **Team Member Responsible** |
| Creation of SCM plan | CM Manager |
| Setup SCM tools | CM Manager |
| Configuration Identification | CM Manager |
| Configuration Control | CM Manager, Project Manager and Software Developer |
| Configuration Status Accounting | CM Manager, Project Manager and Software Developer |
| Configuration Audits and Review | CM Manager and QA Engineer |
| Interface Control | CM Manager and Project Manager |
| Subcontractor/Vendor Control | CM Manager and Project Manager |
| Archive SCM references | CM Manager |
| Conduct CCB Meeting | CM Manager |
| Version Control | CM Manager |
| Manage Controlled Library | CM Manager |
| SCM plan maintenance | CM Manager |

* 1. **Change Control Board (CCB)**

It a board that consist of several steering committee stakeholders that will cooperate to control and accommodate changes related matters. Steering committees involve internal development team such as project manager, software developer, tester, system analyst and CM manager or even external such as individual from sponsor organisation or subject matter expert.

The main aim of CCB is to authorize and endorse proposed change request made by developer after already evaluate all the constraints, impact and risks that involve. Secondly, to keep track of the active change requests status whether it is smoothly on going or there are difficulties.

* + 1. **CCB Meeting**

In addition to that, there a CCB meeting that will be conducted to attain approval regarding change specifically change request. During this meeting there a detailed discussion regarding the change with the vision of generating a good conclusive decision. Within this meeting, prioritization of change will be made to ensure better organization. A negotiation between CCB and the creator/developer regarding change completion duration, commencement of work and even functionality will further discuss.

* + 1. **CCB Members**

|  |  |
| --- | --- |
| **CCB Members** | **Roles and Responsibilities** |
| **Empire Hotelier Corporation**  **Project Sponsor Representatives** | They are the representative from Empire Hotelier Corporation (parent company) that will take part as one of the decision maker in endorsing the change request. As sponsor, they need to know any changes done. They also part of the final authority for CCB decision along with CM manager and project manager. |
| **Empire Technology Configuration Management (CM) Manager** | The chairperson to lead the CCB Meeting, facilitate and answer everything about the SCM and its process. The CM manager have to prepared the CCB Meeting and ensure all steering committee attend. If they cannot come, then prepare somebody else to replace. |
| **Empire Technology**  **Project Manager (PM)** | The project manager will further discuss with CCB and also give any beneficial input regarding project context in term of scheduling, costing and resources that may associate/needed for changes. |
| **Empire Technology System Analyst** | Part of the CCB where system analyst can give insight input regarding the system and organisation business problem. This may relate with the cause of changes. System analyst can recommend and give opinion. |
| **Empire Technology Requirement Engineer** | Part of the CCB where requirement engineer may give insight input regarding the requirements of the system during discussion. |

* 1. **Configuration Management Policy and Procedures**

The SCM shall follow the policy and procedures that tally with project plan sponsor organisation which is Empire Hotelier Corporation. On top of that, shall follow all relevant universal policy and procedures from IEEE references used. These policies and procedures shall be used as guideline.

Most important, any abnormalities actions that deviate from the SCM process and activities can only be made with permission of CM manager and project manager.

1. **SCM Activities**
   1. **Configuration Identification**

This activity is all about identifying and acquiring configuration item in order to control it. The term of configuration identification and configuration item has been defined in section 1.3. Meanwhile, this section will define the process of identifying and the way to standardize the configuration item in term of naming convention, identifier, version number, rule and details. Moreover, outline what kind of baseline, how and when it can be established and controlled.

* + 1. **Configuration Item**

In brief, CI is any work artefacts produced or used during development. There are several kind of characteristics that can be used to determine configuration item. The artefact must be vitally important, used by more than one person at a time and it tend to change gradually through time.

Below is the list of software artefacts that considered as configuration item based on several characteristics that its possess. These items will be maintained via configuration control procedures.

**List of configuration item**

* Software Project Management Plan and Project Charter
* Software Requirements Specification (SRS)
* Software Design Document (SDD)
* Software Test Plan (STP)
* UML diagram
* Source code, any program, software components database & server
* Test case, test data, test scripts
* Wireframe, storyboard and sketches of UI design
* Support tools including IDE, testing tools, SCM tools
* Operation, support and verification documents
  + 1. **Baselines**

A baseline is an approved version of one or a set of configuration items that have been developed at a specific time throughout the development life cycle. Baseline indicate that the configuration items has been agreed and can only be changed via formal change control procedures. These baselines can be used as basis reference for other and also milestone that can be reviewed.

There are four category of baseline to be used and each category of baseline reflect different project timeline (requirements, design, development). We will identify functional baseline then followed by allocated baseline, development baseline and lastly product baseline.

* **Functional Baseline** – this baseline available once SRS complete and got its final approval. This baseline is all about sealing the established requirements in SRS so that if there any changes, it need to go through formal configuration control procedures. It is important for the contract purpose as well.
* **Allocated Baseline** – considered as design baseline where it is available after SDD have been approved. Allocated baseline occur only after SRS have been created.
* **Development Baseline** – this baseline exists during the development of the software; it could be any work product produced during development such as source code or any components. It will be considered as baseline once have been approved.
* **Product Baseline** – this baseline exists after the approval of development baseline and its conformance to SRS specification and it has passed all testing where it is considered as completion of product.

Below is the list of items that fall under which baseline category.

|  |  |
| --- | --- |
| Baseline | Artefacts |
| Functional | Software Requirement Specification |
| Software Configuration Management Plan |
| Project Management Plan |
| Software Quality Plan |
| Allocated | Software Design Document (SDD) |
| Software Test Plan (STP) |
| Refined SRS, SCMP, PMP, SQP |
| Development | Software (source code, database) |
| Refined STP, SRS, SDD, SCMP, PMP, SQP |
| Test Case, Test Procedure, Test Data |
| Product | User Manual |
| Training Plan |
| Refined Software, STP, SRS, SDD, SCMP, PMP, SQP |
| Test Report for System and Acceptance |

* + 1. **Naming Conventions Standard**

The labelling and identifier of the configuration items and baseline start with either CI/Baseline name (Software Design Document/Baseline1) or CI/Baseline mnemonic letter code (SDD/BL1) then its own CI random four-digit number (for e.g. 1842). Next, a version number which you can refer at version control section (V1.0.1).

There is a special attribute keyword to reflect the state status of that work artefacts conditions. The status can only be change with a new version number.

* Progress, Review, Revision, Approved, Released, Outdated

Example

* SDD-1842-V1.0.1
* BL1-1925-V1.0.0 (For baseline)

The table below showcase the mnemonic of core work artefacts.

|  |  |
| --- | --- |
| **Work Artefact Name** | **Mnemonic Letter Code** |
| Software Project Management | SPM |
| Software Requirements Specification | SRS |
| Software Design Document | SDD |
| Software Test Plan | STP |
| Software Configuration Management Plan | SCMP |
| User Manual | UM |
| Training Plan | TP |
| Source Code | SC |
| Prototype | PROTO |
| UML Diagram | UML |
| Test Report | TP |
| Software Quality Assurance Plan | SQAP |
| Project Charter | PC |

* + 1. **Version Control**

A version reflects the progress evolution of project artefacts, it can be applied to artefacts such as software and documents. Version indicate the release or re-release in which the item is being generated and accepted at that specific time of release based on the current progress.

Version control outline the strategy way of attaining new version and maintaining the previous predecessor version where CM manager is in change in managing and maintaining the version number. For version number, it will have standardize format of Vx.x.x (example V1.0.0). The standard is as shown below.

**<major update>. <minor but impactful update>. <minor bugfix>**

The first digit indicates a major severe changes to software. Meanwhile, second digit (middle) suggest minor changes that still have a good considerable impact but not major. The last third digit signify very minor change. Each digit will be incremented based on those conditions. Once the digit has reached 10 increment (for e.g. V1.10.10) then it can continue to 11 and so on (for e.g. V1.2.111).

There are two kind of release that may force version to be incremented into a new version number. Below is the types of version release.

1. **Modification**

Creation of new version is possible when a software or document have been modified due to some bugs or fault, inadequacy of contents and does not conform to specification. Few examples of modification are rephrasing requirements in document and revised the software faulty function.

1. **Enhancement**

Another need of version creation is when software or document need additional contents or elements so that it can improvise and further enhance the whole products. It usually bigger work hence required more determination needed than modification. Few examples of enhancement are adding new requirements in document and adding new functionalities for software.

**Version release method**

Before a new version is approved and created based on enhancement or modification. The changes of that need to be tested first to ensure it conform to specification, does not badly affect other sources and enrich the current version artefacts or product. If the changes is major where it is severe in impact then all affected CI work artefact and its sub shall be updated.

On top of that, the release of the version can be in the form of individual change or a group of changes. Table below showcase release method for a version.

|  |  |
| --- | --- |
| Method | Description |
| Monthly | Version is created at the end of each month which may consist group of changes. |
| Immediate | Version is created as soon as possible, directly and continuously whenever there a need of change. |
| First Availability | Version is created when the group of changes are adequately enough to permit a version creation. |

* + 1. **Preservation and storage of configuration items**

The baseline and configuration items are stored in online cloud platform service of Microsoft OneDrive and also GitHub where it will be backup regularly. By using two cloud platform, if the file is corrupted or platform got cyber attacked then we can refer to another platform as the contingency and disaster recovery plan. On top of that, offline mode is non-encouraging due to how it could pose to natural disaster.

* 1. **Configuration Control**

This activity is all about accommodating changes in a very systematic controlled way to ensure smoothness of project development, minimize any risks of heighten cost and development time. This activity encompasses process of acquiring change request, assessing it then approve or disapprove the request. In order to perform this action, the controlled library aka storage that retain the CI and baseline is accessed to attain any information required during evaluation.

* + 1. **Getting Change Request**

This is the first process of configuration control where CCB and PM receive change requests via form online (GitHub) or offline by team members especially software developer and client. PM will receive it first then identified the affected CI that will be changed. Usually change can be due to modification (include defect) and enhancement. All of these change request form will be stored and backup at online cloud platform by CM manager.

A change request form contains information such as submitter name, type of CR, date submitted, date required, priority, reason for change, list of artefacts impacted, assumption and notes, comments, attachment, brief description of request and also approval signature. A change request form template is available at appendix to be refer.

CM manager will check and ensure CR is complete and follow format (this will be further specified in section 3.4.2.1).

* + 1. **Assessing Change Request**

As mentioned before, PM will receive and evaluate first to check whether the CR is really viable option. The evaluation consists of investigating whether the changes necessary, its impact, its pros and cons, difficulty and even the possibility of implementation considering the available resources. For example, some defect fixing can be less important as compare to release the software within the on track defined timeline. Once project manager decide it is viable and approved the CR then the form will be passed to CCB where meeting will be held. If the project manager is unsure then PM can just proceed to CCB and together discuss the outcome of that CR.

During CCB meeting, there will be a detailed discussion between steering committee which include assessment just like what PM do beforehand, also recommendations and deciding priority among available active CR.

* + 1. **Endorsement of Change Request**

At the end of CCB meeting, there will be an outcome whether proposed change request is approved or disapproved by all CCB steering committee. The decision is made based on voting made by each members in CCB where they convince everyone with reasoning on why to reject or approve. If approved, then the affected CI or baseline will be “check out” from controlled library to make amendment. In addition, the developer and other that involved in changing the artefacts shall take note on every recommendation given and what tasks need to be done (updating and creation of artefacts). If rejected, CCB shall state the reason in the CR form and stored it at online cloud platform. Also alert the requester on the reason why CR got rejected. A resubmission of CR can be done with the amendment needed based on the reasoning.

* + 1. **Executing Change Request**

This is where the implementation of the active CR begins where the development started and all verification needed to verify the approved change request and other affected artefacts are created or updated. For example, STP and its test case, test data and test procedures. For documentation, those involved like requirements engineer and system analyst need to update the SRS and SDD. The progress of the CR will be tracked by CM manager. The CR will be completed only after it has been tested, other affected artefacts are also updated and under fine control, lastly changes agreed by CCB. Once active CR has been completed and agreed then the CI/baseline will be “check in” and be back as controlled item.

* 1. Configuration Status Accounting (Faizah)

[To be defined later]

* 1. Configuration Audits and Reviews (Faizah)
     1. Configuration Audits
     2. Configuration Reviews
        1. Review of Change Request (Completeness)

[To be defined later]

* 1. Other supporting activities (Faizah, just short one)
     1. Interface Control (just paraphrase what the sample plan punya)
     2. Subcontractor/Vendor Control (paraphrase what the sample plan punya)

[To be defined later]

1. **Software Configuration Management Schedule**

It is important to plan activities to ensure the project objectives are achieved. This technique is effective to ensure that project cost and resources are not wasted on unnecessary work. Team members must understand what to do and how to plan enough time to complete certain task. To ensure scheduling success, important task must be listed as below: -

|  |  |
| --- | --- |
| **Phase** | **Activities** |
| SCM planning | - Research on specific configuration standard  - define version naming type and category  - assign task to every involved team member  - identify and document change request policy  - plan and organize resources and tools for scm |
| Configuration identification | - Identify scope of system  - Identify configuration item  - Source code module  - Test case  - Requirement specification  - Identify new changes baseline  - Identify configuration item in software change management repository  - Detail out what when and why the changes are made  - Identify before and after object feature changes  - List out resources to use for changes  - Document  - Tools |
| Configuration control | - Version the software configuration item  - Define tool used to manage every object version  - Check change request technical merit, possible effect and impact on another configuration object  - Achieve new baseline, a formal accepted version of software configuration item |
| Configuration Status Accounting | - Record all changes made on previous baseline  - Monitor status of change request  - Track configuration object modification status to the next baseline  - Test every version of object |
| Configuration audit and review | - Double check all defined process  - Verify compliance with configuration control standard  - Ensure all item tractability is maintained  - Check the object changed  - Produce all necessary report of final change  - Verify and validate documentation consistency |
| SCM maintenance | - Perform Adaptive maintenance  - Control change process  - Implement changes into system |

1. **Software Configuration Management Resources**

Resources are important to maintain project consistency. The correct resource must be used to ensure system quality attribute are achieved. Resources for this SCM planning can be categorized into SCM team, hardware, environment and tools. Below is the list of resources needed in this SCM project: -

**5.1 Team**

Below are the important SCM team member the will be involved throughout the project. All of their roles and responsibilities can refer on SCM roles and responsibilities section.

* Configuration manager
* Project manager
* Software developer and design
* QA engineer

**5.2 Hardware**

|  |  |
| --- | --- |
| Hardware | Description |
| Computer (PC) | This hardware needed to develop the system as well as to produce documentation for project reference |
| Server | Server is used to manage network and the system when it goes online It is also used to store the system database information. |

**5.3 Environment**

|  |  |
| --- | --- |
| **Environment** | **Description** |
| Development environment | This where the system hardware being setup to develop the and modify the system based in change request. |
| Testing environment | Testing environment is where the changed system being test before its check-out into the main development. |

**5.3 Tools**

|  |  |
| --- | --- |
| **Tools** | **Description** |
| Microsoft Office | Including Word, PowerPoint, Excel, Note, Outlook and OneDrive software to help complete documentation task, presentation, email services, accounting and others. |
| Microsoft Project | Used in project management to assist in project planning, tracking project progress, scheduling, resource allocation and project costing management. |
| Microsoft Visio | This software help in illustrate diagram such as WBS, activity diagram, UML diagram and more |
| Microsoft Teams | Help communication between teammate during project development to save time and improve productivity. |
| GitHub | A high efficiency open-source tool to help in project version control |
| CFEngine | An open-sources tool to help SCM in application deployment and control changes in project. |
| Google Drive | Google tool used for online storage and file sharing between project team |

1. SCM Plan Maintenance
2. Appendices (Determine what necessary to be put here)
   1. Change Request Form
   2. Change Request Workflow
   3. CCB Meeting Signature Sheet