VIRTUAL CONSULTANT

Software Configuration Management Plan
Version 1.1
<05/10/2021>

Aditya Chandrasekhar (U1923951A) : Project Manager / Lead Developer
Aratrika Pal (U1922069F) : Backend Developer
Shruthi Srinivas (U1923611G) : Backend Developer / Release Engineer
Chong Zhe Ming (U1920757K) : Frontend Developer
Khush Kothari (U1922279J) : Frontend Developer
Kushal Sai Gunturi (U1923232F) : QA Manager
Yi Jia Xin, Joceline (U1920057J) : QA Engineer
Lim Yun Han Darren: (U1921275J) : Frontend Developer

TABLE OF CONTENTS

1   Identification

This document is the Software Configuration Management Plan of Team 404 Found. This document will define and provide the necessary steps to be taken for the configuration management plans for this project.

1.1   Document overview

This document contains the software configuration management plan of the software system Virtual Consultant. It addresses all the responsibilities, procedures, activities and oversight necessary to provide configuration identification, change control, status accounting and configuration audits. This plan describes not just how the Configuration Management processes for a product, project or program will be implemented but also how they should be used and maintained throughout the lifecycle of the product, project or program.

The Configuration Management Plan states how and at what level **Configuration Identification** is to take place including specific lot or serial number requirements and the metadata fields associated with them.

This Plan also defines **Change Control Classification** (minor, major or critical) and stipulates the Change Control Board (CCB). This includes specification of its structure, membership and approval authority for each classification. Processes are specified for how changes in proposals, changes in requests and change notices are handled as well as deviations, variances and waivers.

The activities of **Configuration Status Accounting** activities are also clearly addressed in this CM Plan. It includes the reporting, recording as well as metrics pertaining to change in states and status, change requests, change notices and the impact of approved changes to releases of drawings, documentation, red-lining, analysis, reports, procedures etc. associated with each CI as well as the date the change is incorporated in each affected effectivity.

Verification and Audit of the items chosen as CIs and their components are also defined by this CM Plan. It includes the verification and validation of the CIs against functional baseline requirements and sufficiency of functional requirements allocation to subsystems and components. In-process Functional Configuration Audits (FCA) as well as formal Physical Configuration Audit (PCA) criteria are defined against contractual requirements as are criteria for acceptance, delivery, maintenance and final disposition.

Furthermore, this Plan evolves and strengthens over time during each of the product or program lifecycle phases. It is an important component of a program manager's tool chest assuring an integrated strategy. Its long winding digital thread flows through Systems Design and Engineering, Requirements Planning, Safety Mission Assurance, Supply Chain Management, Production, Assembly, Test, Logistics, Acceptance, Delivery, Support, Maintenance and Disposition.

In summary, this document's aim is to define those items that are configurable, those items that require formal change control and the processes for controlling changes to such items.

1.2   *Abbreviations and Glossary*

1.2.1   Abbreviations

SCM	Software Configuration Manager
SVN	Apache Subversion
SRS	Software Requirements Specifications
CM	Configuration Management
CI	Configuration Item
VDD	Version Description Document
SOUP	Software of Unknown Provenance

1.2.2   Glossary

Add here words definitions

1.3   *References*

1.3.1   Standard and regulatory References

#	Document Identifier	Document Title
1	SCM1	IEEE 828-2012 - IEEE Standard for Configuration Management in Systems and Software Engineering
2	SSCM1	IEEE Standard for Software Configuration Management Plans

1.4   *Conventions*

Typeface	Usage	Example
Bold	Emphasis,headers, titles	IEEE 828-2012 - IEEE Standard for Configuration Management in Systems and Software Engineering
Highlighted	Special emphasis	Sam
Italics	Minor emphasis	The system *Virtual Consultant*

2   Organization

The software configuration is managed by the members of the project with specific tools. The responsibilities are shared between the Project Manager, Software Configuration Manager, Quality Assurance Manager and Lead Developer.

2.1   Activities and responsibilities

Activities when setting up the project	Person responsible
Identify the configuration items	SCM
Install the bug repository tool and set up the database	SCM
Install the software configuration repository tool and set up the database	SCM
Manage and structure the reference space	SCM
Define the configuration processes	SCM

Activities during the project lifecycle	Person responsible
Export components for modification, test or delivery	SCM
Set under control validated components	SCM
Create version, write version delivery document	SCM
Approve reference configurations	Project manager
Verify version to be delivered and authorise deliveries	Project manager
Backup spaces	SCM
Do configuration audits	Quality Manager
Inspect configuration records	Quality Manager
Archive reference version	SCM

Management activities	Person responsible
Manage versions and archives	SCM
Manage configuration records	SCM
Produce reports and statistics	SCM
Manage reference space and its access control list	SCM
Manage spaces backup and archive media	SCM
Manage quality reports	Quality Manager

2.1.1   Decisions process and responsibilities

Responsibilities during reviews, audits and approvals are listed below:

At the end of an activity of the project:

Activities	Person Responsible
Do a configuration freeze	SCM
Present a configuration state of the components impacted by the activity	SCM
Present a documentation state of the components impacted by the activity	SCM

During a configuration management process audit:

Activities	Person Responsible
Do the configuration management process audit	Project Manager
Present the records of the configuration management process	SCM
Present the quality records of the configuration management process	Quality Assurance Manager
Present the records of the documentation management process	SCM

3   Configuration identification

Configuration identification is the process of:

- Labeling software and hardware configuration items with unique identifiers.
- Identifying the documentation that describes a configuration item.
- Grouping related configuration items into baselines.
- Labeling revisions to configuration items and baselines.

The purpose of configuration identification is to maintain control of an evolving system by:

- Uniquely identifying the system, revisions of the system and the component parts of each revision.
- Understanding the status of configuration items as they progress through the development process.

The configuration identification includes:

- Selection of configuration items at appropriate levels of the product structure to facilitate the documentation, control and support of the items and their documentation.
- Determining the types of configuration documentation required for each CI to define its performance, functional and physical attributes, including internal and external interfaces; configuration documentation provides the basis to develop and procure software/parts/material, fabricate and assemble parts, inspect and test items and maintain systems.
- Determining the appropriate configuration control authority for each configuration document consistent with logistics support planning for the associated CI.
- Issuing identifiers for the CIs and the configuration documentation.
- Maintaining the configuration identification of CIs to facilitate effective logistics support of items in service.
- Releasing configuration documentation.
- Establishing configuration baselines for the configuration control of CIs.

Lastly, below are some of the advantages of configuration identification:

- Determines the structure (hierarchy) of a product and the organization and relationships of its configuration documentation and other product information.
- Documents the performance, interface, and other attributes of a product.
- Provides unique identity to a product or to a component part of a product.
- Provides unique identity to the technical documents describing a product.
- Enables correlation of document revision level to product version or configuration.
- Provides a reference point for defining changes and corrective actions.

3.1   Identification rules

3.1.1   Identification rules of configuration items

3.1.1.1   Identification of a configuration item

The identification of configuration item is:
Give you identification scheme, eg:
- XXX_Vm.n
- where: "Vm.n a" is the version of the configuration item.

3.1.1.2 *Version number of a configuration item*

Software versioning is a way to categorize the unique states of a computer software as it is developed and released. The version identifier is usually a word, a number or both. In fact, the attribution of a version number is a prerequisite to any delivery of any configuration item. This number shall be incremented before a new delivery, if the product or its documentation were modified.

The definition rules of a version number are the following:
- Major edits call for a new major version (a)
  - Adding or removing significant parts, functions or features.
  - Redevelopment of document.
- Minor edits call for a new subversion (b)
  - Editing significant sections, functions or features.

3.1.2 Identification rules of documents

3.1.2.1 *Description of documents identifiers*

The identification of documents is described below:
XXX_<document type>_<document number>_<revision index>
where:
" document type " is:
- Mobile for MOBILE documents,
- Web for WEB documents

" document number " is a incremental number, with a separate list for each document type,
" revision index " designates the approved iteration of the document. The revision index is V1 for the first iteration, V2 for the second and so on.

3.1.2.2 *Definition and evolution of the revision index*

The attribution of a revision index is a prerequisite to any delivery of a document or file. This index shall be incremented before the diffusion of a modified document.
The definition rules of a revision index are similar to the ones in Version number of a configuration item.

3.1.3 Identification rules of a media

3.1.3.1 *Internal identification*

The identification of a media is described below:
<configuration item identification >/<media>/<volume>
where:
"media" is the media number,
"volume" is an incremental number to distinguish the media if the delivery contains more than one media.

3.2   Reference configuration identification

Each reference configuration is defined by:
- An identifier,
- Its content listed in the corresponding Version Delivery Description document,
- The acceptance or validation reviews associated with the building of the reference configuration.

A reference configuration is established for each design review and each test review of the project.

3.3   Configuration Baseline Management

It describes what baselines are to be established. It also explains when and how they will be defined and controlled.

- In configuration management, a baseline is an agreed description of the attributes of a product, at a point in time, which serves as a basis for defining change. A change is a movement from this baseline state to a next state. The identification of significant changes from the baseline state is the central purpose of baseline identification.

- Generally, a baseline may be a single work product, or set of work products that can be used as a logical basis for comparison. A baseline may also be established as the basis for subsequent select activities when the work products meet certain criteria. Such activities may be attributed with formal approval.

- Conversely, the configuration of a project often includes one or more baselines, the status of the configuration, and any metrics collected. The current configuration refers to the current status, current audit and/or current metrics. Similarly, but less frequently, a baseline may refer to all items associated with a specific project. This may include all revisions of all items, or only the latest revision of all items in the project, depending upon context.

- Baselines themselves are valued not only to use to identify the notable state of work product(s) but also provide historical views of how work product elements have proceeded together over time. When a historical baseline is retrieved, the state of the work product(s) in that subset share the same significance in their history of changes; that allows project leaders to compare the relative progress of single parts of a project to the project as whole, which allows project leaders to identify individual items that lag or lead in progress toward better functionality or performance. For this reason, baseline identification, monitoring, and retrieval are critical to the success of configuration management. Once retrieved, the baseline may be compared to a particular configuration or another baseline.

- Most baselines are established at a fixed point in time, and serve to continue to reference that point (identification of state). However, some baselines are established to carry forward as a reference to the item itself regardless of any changes to the item. These latter baselines evolve with the progression of the work effort but continue to identify notable work products in the project.

Examples of baselines :

Functional baseline (FBL) - A baseline which defines the functionality requirements of the system or the system specifications and its interface characteristics. It simply documents the system's capability, functionality and overall performance at the minimum.

Allocated baseline (ABL) - Defines the configuration items that compose the system and how it is being distributed or allocated across the lower-level configuration items. The performance of each configuration item in this baseline is described in its preliminary design specification.

Product baseline (PBL) - Contains the selected functional and physical documentation which are needed for the different kinds of testing of the configuration item.

Developmental Baseline - State of work products amid development.

Other baselines based upon proprietary business practices may be used.

The baselines will be defined and controlled by:
- Having gained approval from the Project Manager of the team.
- The quality assurance team has approved the standards.
- The project has been completed or else has at least been tested once

4   Configuration control

Most of the features will not have to be changed unless a bug is found or performance is not optimal. However, Virtual Consultant's integration with external systems like MOH website, Private and Public Hospital Systems etc. may require heavy changes based on the additional features, change in environment and technological changes. Our process will involve ensuring the proper functioning of the software system after any change is made.

4.1   Change Management

Changes are bound to occur in complex software projects. This could either be due to changing user demands or due to errors and bugs. No matter the change, none of the software components must break. The process for controlling the changes to the baselines and for tracking the implementation of these changes is as follows: Changes requests are emitted from by the project manager according to the problem resolution process.

Following are the change management steps to be undertaken for Virtual Consultant:
- After a change request has been created and logged by the change manager, the change request's status is updated as needed.
- After evaluation and When a change request is accepted by the project manager/product manager, a branch is created in the SCM.
- The branch identification is done as per the configuration item identification protocol. In this case for instance: NC_.
- The branch content will then have the required changes which will then go through the rest of the change management workflow.
- After implementation of the change, the CR will be reviewed and closed accordingly. An example for multiple configuration is the changes requests of configuration files are emitted by the product manager according to the production procedure.

- When a change request is accepted by the project manager/product manager, a branch is created in the SCM.

4.2 Interface Management

Optional, use it only if you have interfaces with 3rd parties
Identify the interfaces to be managed and describe the procedures for identification of interface requirements.

5 Configuration support activities

5.1 Configuration Status Accounting

Configuration Status Accounting (CSA) is the process to record, store, maintain and report the status of configuration items during the software lifecycle. All software and related documentation should be tracked throughout the software life. This accounting ensures that all the configuration items are traceable, and properly backed up for future reference.

5.1.1 Evolutions traceability

The traceability of modifications of items given their types:

- **Document**: The modification sheet number identifies the origin of the modification. The modified paragraphs in the document are identified, if possible, by revision marks.

- **Source file**: The software configuration management tool records, for each source file or group of source files, a comment where the modification is described
.
- **Configuration item**: The Version Delivery Description of the article identifies the modification sheet included in the current version.

The modification sheet describes the modifications done to the components with enough precision to identify the modified parts.

5.1.2 Setting up Configuration status

The SCM sets up the state of all versions and of each configuration article with:
- The label,
- The version number,
- The creation date of the Version Description Document (VDD).
-
The SCM writes the VDD, which is described as follows:
- It is the primary configuration control document used to track and control versions of software to be released to the operational environment.
- The VDD is a summary of the features and contents for the software build, and it identifies and describes the version of the software being delivered to the State, including all changes to the software since the last VDD was issued.
- Every unique release of the software (including the initial release) shall be described by a VDD. If multiple forms of the software are released at approximately the same time (such as, to different sites) each must have a unique version number and a VDD.

- The VDD is part of the software CI product baseline. When distributed, the version description document should be sent with a cover memo that summarizes, on a single page, the significant changes that are included in the release.
- The label and the version helps uniquely identify each VDD and trace it accordingly.

The attached memo with the version description document will serve as an executive summary for the details found in the attached VDD. The treatment should be titled, on the cover memo, as Summary of Changes.

5.1.3   Configuration status diffusion

The SCM and the quality manager will write the above described Version Description Document.

5.1.4   Configuration status records storage

The records are stored in a configuration folder, which contains:
- The requests sorted by record number,
- The software documents,
- The VDD's,
- The configuration states are sorted chronologically.

5.2   Configuration audits

Configuration audits determine to what extent the actual CI reflects the required physical and functional characteristics. Configuration reviews are management tools for establishing a baseline. The audit plan identifies the configuration audits and reviews to be held for the Virtual Consultant.

For Virtual Consultant, three kinds of audits will be performed:

Functional Configuration Audit (FCA): It is an evaluation of the completed software products to determine their conformance, in terms of completeness, performance and functional characteristics, to their requirements specification(s).

Physical Configuration Audit (PCA): It is an evaluation of each configuration item to determine its conformance to the technical documentation that defines it.

In-Process SCM Audits: They are ongoing evaluations conducted throughout the life cycle to provide management with information about compliance to SCM policies, plans, processes and systems, and about the conformance of software products to their requirements and workmanship standards.

At a minimum, a configuration audit will be performed on a CI prior to its release. For each planned configuration audit or review, the Audit Plan shall define the following:

- Its objective.
- The CIs under audit or review.
- The schedule of audit or review tasks.
- The procedures for conducting the audit or review.
- The participants by job title.

- Documentation required to be available for review or to support the audit or review.
- The procedure for recording any deficiencies and reporting corrective actions.
- The approval criteria and the specific action(s) to occur upon approval.

5.3   Reviews

The **Configuration Management Plan Review (CMPR)** will be produced, which is an independent review of an existing configuration management plan using a multi-faceted analysis to assess its thoroughness in addressing the five core functions of CM which are configuration planning, identification, status accounting, change control, and verification and audits.

The technical reviews during the project helps to ensure that a qualified product is delivered by the team at the completion of the project, with all the baselines met. The Configuration Manager will verify and make sure all project components are identified correctly, and changes made to the documents are also noted down. The evaluation is performed independently on an existing written plan using a substantial checklist of the most important questions that every valid configuration management plan must address.

As part of the review process the CM experts will also assess and evaluate how realistic it is for the plan to be adhered to give the applicability and specificity of the details of the project. Additionally, they will verify if the CM Plan satisfies contract quality management and regulatory compliance.

5.4   Configuration management plan maintenance

The configuration management plan described the activities and responsibilities for continued configuration management planning during the life cycle of the project. The SCM plan maintenance information will identify the activities and responsibilities necessary to ensure continued SCM planning during the life cycle of the project.

Following is the SCM Plan information for Virtual Consultant:
- The SCM Manager is responsible for monitoring the configuration plan.
- The updates to the configuration management plan will be made on a monthly basis.
- The changes will be evaluated and approved by the Project Manager.
- The changes to the plan will be communicated through a memo communicated to the project team.

The Configuration Management Plan will be reviewed at the start of each project software phase, changed accordingly, and approved and distributed to the project team. If the Plan has been constructed with detailed procedures documented elsewhere in appendixes or references, different maintenance mechanisms for those procedures may be appropriate.

The CM Plan Maintenance activities for Virtual Consultant that will take place include:
- Revising CM Organizational Structure (Personnel, Resources).
- Revising SCM Activities like Identification Methods, Control, Auditing and Reporting methods.
- Changing the SCM schedules.
- Adjusting SCM Resources (Increasing or Decreasing).

- The Configuration Manager will be responsible for the periodic updates to this plan and on all of the above activities.

All of the above activities will follow the IEEE 828 Standards for Software Configuration Management Plans.

6   Appendix

6.1

Section	Description
Introduction	Describes the Plan's purpose, scope of application, key terms, and references
SCM Management	Identifies the responsibilities and authorities for accomplishing the planned activities.
SCM Activities	Identifies all activities to be performed in applying to the project.
SCM Schedules	Identifies the required coordination of SCM activities with the other activities in the project.
SCM Resources	Identifies tools and physical and human resources required for execution of the Plan.
SCM Plan Maintenance	Identifies how the Plan will be kept current while in effect.
SCM Plan Review	Tracks the reviews performed for the software configuration management plan.