Configuration Management Plan

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Identification

This document expands on the "Configuration Management" outlined in the Project Management Plan.

Document Overview

This document presents the software configuration management plan for the Nanyang Technological University (NTU) Note-Taking Enhancement System. It outlines the strategies, tools, and protocols employed to manage the software configurations effectively within the project.

Abbreviations and Glossary

Abbreviations

- **SCM** - Software Configuration Management
- **NTU** - Nanyang Technological University
- **API** - Application Programming Interface
- **SOA** - Service-Oriented Architecture

Glossary

- **Configuration Management**: The process of handling changes to software in a systematic and controlled manner.
- **Repository**: A central location where data is stored and managed.

References

Project References

Document Identifier	Document Title
NTU-SCMP-2024-01	Project Management Plan
NTU-SCMP-2024-02	NTU Note-Taking System Requirements Document
NTU-SCMP-2024-03	NTU Note-Taking System Design Document

Standard and Regulatory References

Document Identifier	Document Title
ISO-SCMP-12207	ISO/IEC 12207: Systems and software engineering - Software life cycle processes
IEEE-SCMP-828	IEEE Std 828-2012 for Configuration Management in Systems and Software Engineering

Conventions

- **Typographical Convention**: This document employs standard typographical conventions for clarity and consistency, with important terms highlighted in bold.
- **Versioning Convention**: The document adheres to a semantic versioning scheme, denoted as MAJOR.MINOR.PATCH, where:

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 * MAJOR versions indicate significant changes,
 * MINOR versions indicate enhancements or minor changes,
 * PATCH versions are for bug fixes and minor corrections.
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Organization

The software configuration within the project is managed by designated project members, employing specific tools for various responsibilities. The key roles involved in this process include:

- The **Software Configuration Manager (SCM)**, responsible for the overall management of software configuration processes.
- The **Project Manager**, overseeing the project's progression and ensuring alignment with configuration management policies.
- The **Technical Manager**, ensuring technical aspects of the project align with configuration management standards.

Activities and Responsibilities

The table below describes the functions required to manage the software's configuration and the associated 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 authorize 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

Decisions Process and Responsibilities

Responsibilities during reviews, audits, and approvals are as follows:

Activities at the End of an Activity of the Project	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

Activities During a Configuration Management Process Audit	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 Manager
Present the records of the documentation management process	SCM

Configuration Identification

Configuration identification is essential for managing the various components of the NTU Note-Taking Enhancement System. It involves defining rules for identifying configuration items, documents, SOUPs, and media.

Identification Rules

Identification Rules of Configuration Items

Identification of a Configuration Item

The identification scheme for a configuration item is as follows:

- **NTU_CI_Vm.n**, where "Vm.n" represents the version of the configuration item.

Version Number of a Configuration Item

Version numbers are crucial for tracking changes and ensuring the integrity of configuration items. The version number must be incremented before any new delivery if the product or its documentation has been modified. The rules for version numbering are:

- Major changes result in an increment of "m"
- Minor changes or bug fixes result in an increment of "n"

Identification Rules of SOUPs

Identification of a SOUP

SOUPs can be identified by either creating a unique identifier following the pattern used for configuration items or by utilizing the SOUP manufacturer's ID.

Version Number of a SOUP

The version numbering for SOUPs follows the same rules as for configuration items, ensuring consistency across the project.

Identification Rules of Documents

Description of Documents Identifiers

Document identification follows a structured format:

- **NTU_<document type>_<document number>_<revision index>**

Where:

- "document type" can be "FOO" for FOO documents or "BAR" for BAR documents
- "document number" is a unique, incremental number for each document type
- "revision index" follows a "V1", "V2", "V3", ... sequence, indicating the document's version

Definition and Evolution of the Revision Index

The revision index is incremented with each significant change or update to a document, following a predefined set of rules to maintain consistency and traceability.

Identification Rules of a Media

Media such as tapes or CDROMs are identified using:

- **<configuration item identification>/<media>/<volume>**

Where "media" and "volume" provide specific details about the physical media used for delivery.

Reference Configuration Identification

Each reference configuration includes:

- A unique identifier
- A list of contents detailed in the Version Delivery Description document
- Associated acceptance or validation reviews

Reference configurations are established at significant project milestones, such as design reviews and test reviews.

Configuration Baseline Management

The project will establish various baselines to control and track the system's development, including:

- **Functional Baseline (FBL)**: Describes the system's functional characteristics
- **Allocated Baseline (ABL)**: Outlines the design for functional and interface characteristics
- **Product Baseline (PBL)**: Comprises completed system components and documentation

The definition and control of these baselines will be clearly documented and managed throughout the project lifecycle.

Configuration Control

Configuration control is a critical aspect of software configuration management that ensures all changes to the system's configuration are made in a controlled and coordinated manner. This section describes the processes for managing configuration changes and handling variances in configurations.

Change Management

Change management is the process through which all changes to the project's baselines are controlled and tracked. This includes both problem resolution and management of multiple configurations.

Change management ensures that all changes to the project's baselines are made thoughtfully and tracked efficiently.

Problem Resolution

- Change requests originate from the project manager following the problem resolution process.
- Accepted change requests lead to the creation of a new branch in the SCM system, identified and documented according to a predefined scheme.

Multiple Configuration Management

- Configuration file change requests are initiated by the product manager based on the production procedure.
- Approved change requests result in a new branch in the SCM system, with its identification and content adhering to a specified format.

Interface Management

Interface management is crucial when the project involves interactions with third-party systems or components. It involves identifying and managing the interfaces and ensuring all interface requirements are clearly defined and maintained.

The interfaces to be managed include:

- External API Integration for real-time data synchronization
- Cloud Storage Services for backup and archival
- Authentication Services for secure user access

Procedures for identifying interface requirements involve:

- Conducting interface requirement workshops with stakeholders
- Reviewing third-party documentation and specifications
- Developing interface prototypes for early testing and validation

Evolutions Control of SOUP Items

Managing the evolution of Software of Unknown Provenance (SOUP) involves establishing control measures to ensure stability and compatibility throughout the project lifecycle.

A common approach is to freeze SOUPs at the project's outset, though this may not always be feasible. For instance, freezing the text-to-speech engine version used for generating lecture summaries. Alternative strategies include:

- Establishing a SOUP review committee to evaluate and approve updates
- Implementing a sandbox environment for testing SOUP updates before deployment
- Maintaining detailed documentation of all SOUP dependencies, including version histories and change logs

Configuration control ensures that any changes to the system or its components are made systematically, with full traceability and accountability, safeguarding the integrity and consistency of the project's deliverables.

Configuration Support Activities

Configuration support activities are crucial for maintaining the integrity and traceability of configuration items throughout the software lifecycle.

Configuration Status Accounting

Configuration Status Accounting (CSA) is a systematic process to record, maintain, and report the status of configuration items.

Evolutions Traceability:

- For **documents**, modifications are identified by the modification sheet number, with changed paragraphs marked for revision.
- For **source files**, the SCM tool records a comment describing the modification for each file or file group.
- For **configuration items**, modifications are detailed in the Version Delivery Description (VDD), pinpointing the specific changes.

Setting Up Configuration Status:

- The SCM establishes the status of all versions and configuration items, documenting the label, version number, and the VDD's creation date.

Configuration Status Diffusion:

- The SCM and the quality manager are responsible for creating and disseminating the VDD.

Configuration Status Records Storage:

- Records are kept in a configuration folder, housing sorted requests, software documents, VDDs, and configuration states in chronological order.

Configuration Audits

Configuration audits assess compliance with the Configuration Management Plan through peer reviews and formal audits, ensuring the project adheres to predefined standards and baselines.

- Examples of audits include baseline audits, functional configuration audits, and software configuration audits. These audits verify the project's alignment with established baselines and identify areas for improvement.

Reviews

Technical reviews play a pivotal role in establishing baselines and branches, with the configuration manager actively participating to ensure configuration management considerations are addressed.

- The configuration manager's role includes verifying that technical decisions and changes align with the configuration management plan and contribute to the project's overall stability and integrity.

Configuration Management Plan Maintenance

The ongoing maintenance of the configuration management plan is essential to adapt to project evolutions and emerging best practices.

- Responsibilities include periodic reviews and updates of the plan, ensuring it remains relevant and effective throughout the project lifecycle.
- The SCM, in collaboration with project stakeholders, is responsible for initiating updates, with a predefined schedule for periodic reviews and revisions.

Configuration support activities ensure that the project maintains a structured approach to managing changes, auditing compliance, and reviewing technical decisions, thereby enhancing the project's overall quality and coherence.