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Master of Software Engineering

Social Media Based on Metaverse

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1. **Introduction**

During the course of Software Configuration Management, we've developed a whole system for successfully manage the software configuration of a proposed project. We learned by practice and error many times. Quite a few documents were made, and this final product is the culmination of this master class.

We did this because efficient Software Configuration Management is indispensable for ensuring the systematic central and organization of software assets throughout their lifecycle. This report delves into the pivotal role that SCM plays in the software development process, elucidating its significance in enhancing collaboration, version control, and overall project integrity.

As the software projects evolve, the complexity of managing source code, documentation, and dependencies necessitates a robust SCM framework. This report navigates through key SCM principles, methodologies, and best practices, shedding light on how they contribute to streamlined to streamlined development workflows and improved project scalability. It explores the challenges associated with SCM, such as conflict resolution and ensuring consistency across diverse development environments.

Additionally, the report scrutinizes the evolution of SCM tools and technologies, evaluating their impact on modern development practices. From traditional version control systems to contemporary distributed SCM solutions, a comprehensive analysis is presented to guide organizations in selecting the most fitting SCM tools for their specific needs.

By offering insights into SCM's role in fostering collaboration, traceability, and reproducibility, this report aims to empower software development teams to navigate the intricacies of managing codebases effectively, ensuring the delivery of high-quality software products in a controlled and efficient manner.

2. **Baseline**

2.1. **Intruduction**.

In an ever-evolving digital landscape, where technology is reshaping the way we connect and interact, a groundbreaking social media platform emerges to revolutionize our online social experiences. Welcome to **Communi-kt**, a transformative new social media platform that harnesses the power of. The metaverse to create a virtual realm where people can connect, collaborate, and explore like never before.

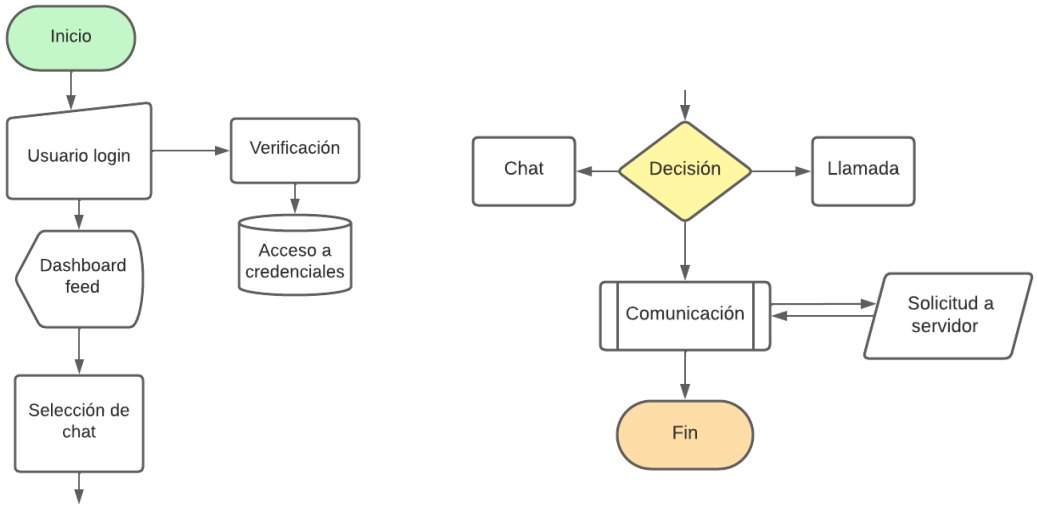
Communi-kt brings together the concepts of social media and the metaverse. Users will be able to create personalized avatars that accurately represent their unique identities and navigate a diverse array of virtual spaces withing the metaverse. Users will have the ability to create and join virtual communities centered around various topics, hobbies, and passions.

Communi-KT is a novel social media platform that leverages the concept of the metaverse to offer users an immersive and interconnected digital experience. Here's what you can expect from Communi-KT:

1. Metaverse Integration
2. 2D for most needed functionalities and 3D support for world interaction in, most likely, VR.
3. Personalized Avatars
4. Virtual Spaces and Communities: individual property -> groups -> neighborhoods -> cities.
5. New shopping experiences
6. Collaborative experiences for co-working
7. Privacy and Security
8. Innovative adverting and Brand engagement
9. 3rd party support on plugins integrations. Most likely to add personalized functionalities and environments and Eshops; with privacy, security and system's integrity put as higher priority.

Overall, Communi-KT represents a convergence of social media and the metaverse, offering users a dynamic and interconnected digital environment where they can express themselves, build meaningful connections, explore virtual spaces, and collaborate on creative projects. It aims to redefine the way we interact each other online, providing a glimpse into the exciting possibilities that the future of social media holds.

2.2. **Process diagram**



2.3. **Interface**

The following picture illustrates the possible final logo for the social media. It represents the world with the sphere, and the human interconnection with the illustrative net upon the planet.

Key features for the message given are:

- People, us, community.
- Planet, world.
- Net, connection.

2.4. **Functional requirements**

- Distributed Database for working.
- 3rd parties' interface for shops, boutiques, healthcare, and services interaction.
- Allow chats between users: Image, Video, Audio and Files.
- 2D and 3D support.
- Collaborative features for co-working.

2.5. **Non-functional requirements**

- Run on Android.
- Run on iOS and iPad.
- Web app for desktop.
- ReactJS for frontend web app development.
- Backend written in Python.

2.6. **Resources**

Effective resource management is a cornerstone of success.

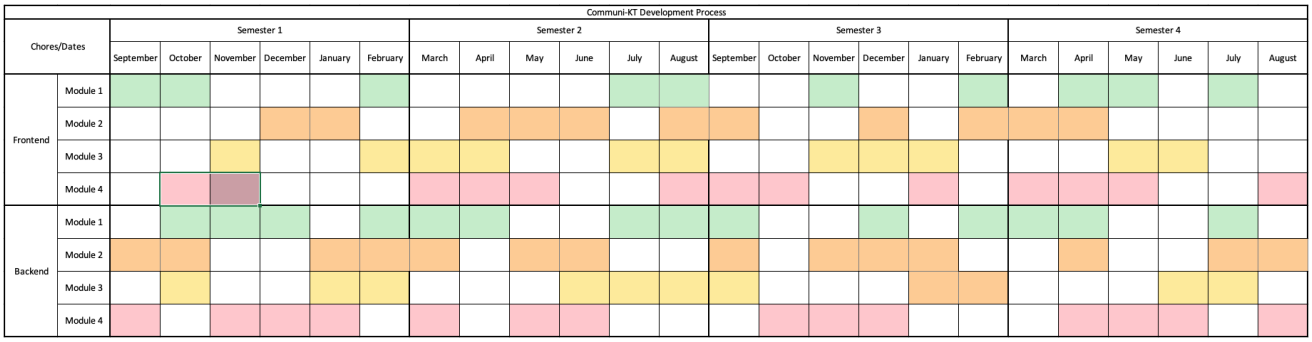
Chores Management and time management:

This platform was designed to be fully covered in 8 modules in total: four on frontend and 4 more on backend.

Those modules can be tracked and manages throughout their lifecycle to ensure that they are properly configured, controlled, and maintained.
Within this document we consider two main parts for our communication system:

- Frontend
  - GUI's design.
  - Multiplatform support for multiple devices: Web, iOS and Android.
  - 2D and 3D realms (user can choose whether to access to trivial interface or access to their own world).
- Backend
  - Database for storage all the information, in the essence of the DB Management software as well as the design.
  - Encryption of the user's information
  - Data analysis of user's behavior.
  - 3rd party integration for e-shops, healthcare, and services.

Time management:



Budget Management:

The total budget needed to successfully complete this project is estimated to be: **$112,000 USD**. This budget totally covers all the functional and not functional requirements.

Risk scale and analysis:

With this proactive process we'll guide ourselves understand and manage the uncertainties we could face. Represents a fundamental component of good governance, strategic planning, and overall business success.

In this specific project, we'll use it for:

- Identification of Potential Threats.
- Prioritization of risks.
- Recourse allocation.
- Decision making.
- Compliance.
- Cost saving.
- Long-term sustainability.

Effort analysis:

This effort analysis for Communi-KT involves estimating the resources, time, and costs required to develop, launch, and maintain the platform. Here's a simplified effort analysis:

Development phase.

- Development team:
- Equipment
- Timeframe.
- Cost

1. Change Request Analysis

2.1. Introduction

This document describes the analysis of three change requests (CRs) analysis conducted for the Communi-KT system, as proposed by our customer. Those change requests are the following:

CR1: User percentage time seeing advertisements.

CR2: The type of content of the advertising attracting the attention of the social media user.

CR3: Purchases made through the platform according to female and male products, age, and sexual orientation.

CR4: The system should report statistics of users regarding time spent, log-in hours, and activities performed. The reports must be encrypted, and the time span of the report must be flexible.

2.2. Configuration context

Configuration Context is a concept to make the configuration layer more flexible. It makes possible to develop and provide different configuration versions on the same application object.

It refers to the set of conditions, settings, or parameters that determine how a software application behaves or operates in a specific environment. It encompasses various aspects of configuration that affect the software's behavior, such as:

1. Environment variables.
2. Configuration files.
3. Database configurations.
4. User preferences.

Within this project there are needed several modules and conditions to get it working at a satisfactory level. Most of them regarding in the advertising and affecting the user's data analysis, especially on the behavior and interaction while in the app.

2.3. Finding the configuration items

A configuration item (CI) is any service component, infrastructure element, or other item that needs to be managed in order to ensure the successful delivery of services. This is a fundamental building block or element within a system's configuration.

CI's are discrete entities that can be identified, tracked, and managed throughout their lifecycle to ensure that they are properly configured, controlled, and maintained. The term

“Configuration Item” can apply to various types of assets, components, or artifacts, depending on the specific context. Some examples are:

1. Software components.
2. Hardware components.
3. Documentation.
4. Network configurations.

In this analysis we consider two main parts for our communication system: Frontend and Backend. Which are important and not particularly the only one, but, in essence, the ones that defines the system itself.

- Frontend
  - GUI’s design.
  - Multiplatform support for multiple devices: Web, iOS and Android.
  - 2D and 3D realms (user can choose whether to access to trivial interface or access to their own world).
  - Testing.
- Backend
  - Database for storage all the information, in the essence of the DB Management software as well as the design.
  - Encryption of the user’s information
  - Data analysis of user’s behavior.
  - 3rd party integration for e-shops, healthcare, and services.

For assessing the impact of the Change Requirement on a given module, we consider the following criteria:

1. Functionality: To evaluate if implementing CR would require adding, remove or modify the existing functionality of a module.
2. Data: To assess if the type of data that the module receives, outputs or processes is compatible with the needs of the CR.
3. Performance: To estimate if the predefined computational resources of the system will suffice the CR’s computational intensity.
4. Dependencies: To check if the module depend on other modules or components that may be affected by the CR.
5. Documentation: To verify if the request needs modifications to the existing documentation or the addition of new documentation to reflect the changes made to the module.

2.4. **Analysis criteria**

- **Effort**: To estimate the non-monetary costs of the project.
- **Human Resources**: To consider costs/hr in budget and bureaucratic procedures.
- **Performance**: Potential for system’s significant updates.
- **Time**: Cost in time for each step.
- **Costs**: To consider the importance of this change regarding the extra cost to invest in the project.

- **Risks**: Potential of failure.

2.5. **Budget**

Pieces/Resources	Human resources		Infrastructure		Energy	Licensing	
	Developers?	Hour/Dev	Equipment	Cost	Hours	Programs	Cost
F_Module 1	4	1600	Computer x4	4800	1600	Github licence	420
F_Module 2	3	1760	Computer x3	3600	1760	Microsoft 360	200
F_Module 3	4	1760	Computer x4	4800	1760	Notion	360
F_Module 4	5	2080	Computer x5	6000	2080	Windows 11	300
B_Module 1	4	2240	Computer x4	4800	2240	Linux	0
B_Module 2	3	2240	Computer x3	3600	2240	Programming languages	0
B_Module 3	3	1760	Computer x3	3600	1760		
B_Module 4	4	2240	Computer x4	4800	2240		
Total	59040		36000		15680	1280	
						112000	

Estimated initial budget: **$112,000 USD**.

2.6. **Effort**

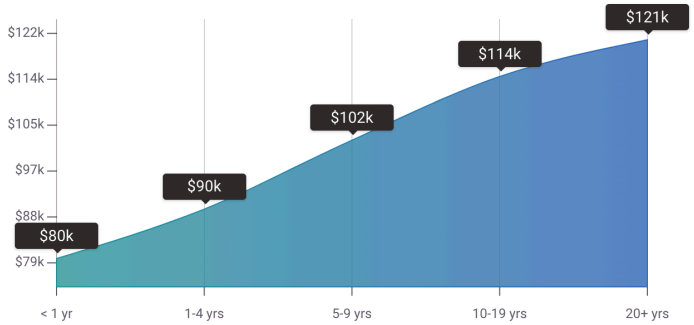
This refers to the process of estimating the amount of human effort, typically measured in person/hrs or person/days, required to complete a specific task, project allocation, and cost estimation.

Originally the project was estimated to be made in 12 months. Divided in 8 modules: 4 frontend, 4 backend. Only 6 developers needed for the task.

2.7. **Human resources**

According to the web pyscale.com, the range of salary for a software developer comes from $80K to $121 USD per year ($7,000 to $12,000 USD per month).

In this project, we already need 6 developers for the current modules.



2.8. **Time**

The initial project schedule is estimated to be launched in 24 months, each module is expected in 3 months.

2.9. **Analysis CR1**

"User percentage time of advertising seen"

Implications: This regards on the importance of advertising for this platform. We're selling a platform that will get people to purchase the products they want and need, therefore, the publicity the are shown must match their likes and interests.

Thus, the fact of knowing how much time the user expends on advertising will help us know in what they like the most and, more importantly, learn what type of adds they are more likely to watch and, eventually, purchase a product or a service.

2.9.1. **Modules affected:**

- Data collection.
- Data analysis.
- Advertising features. New module.
- Support for 3rd party plugins.

Changes to be made:

- Time management.
- Human resources.
- Technologies to be implemented.

2.9.2. **Human resources:**

As more computers aren't needed to fulfill the task, more developers might be hired. In this aspect we got one option:

- Hire more personnel: 2 developers.

2.9.3. **Costs:**

The additional cost of the Change Request is estimated at: **$30,000 USD**. Which includes the additional team salaries and costs associated with adding this feature, such as:

- Database for storage all the information, in the essence of the DB management software as well as the design.
- Encryption of the user's information.
- Data analysis of user's behavior.
- 3rd party integration for e-shops, healthcare, and services.

2.9.4. **Time:**

Since we are planning to utilize the same time schedule and the same amount of developers, we're only expecting to include and extra month in 3rd module.

2.9.5. **Effort:**

Throughout the development of the system, the most affected module is the Data analysis. The addition of a new module will also more work per developer. One extra month at maximum.

2.9.6. **Percentage in which CR1 would affect:**

- Time: 5%
- Budget: 27%
- HR: 33%
- Work Effort: 48%

2.10. **Analysis CR2**

"The type of content of the advertising attracting the attention of the social media user"

This one goes by hand with the previous one in the sense that we're monitoring what the user is more likely to watch and expend time on the add.

2.10.1. **Modules affected:**

To begin with, all of the changes will only affect the server side of the system. By the nature of the CR2, the modules affected require changes on its functionalities:

- Data analysis.
- Link of corporative DB with 3rd party services.

2.10.2. **Human resources:**

The expansion to the development team will involve the addition of 1 new member: A backend developer.

2.10.3. **Costs:**

The additional cost of the Change Request is estimated at: **$45,000 USD**. Budgets that completely covers the additional developer's salaries and costs associated with adding this feature, such as;

- Backend development.

2.10.4. **Time:**

The project is expected to increase in 3 months of development, in order to make sure every single change is working correctly.

2.10.5. **Effort:**

By the analysis of the given CR, is completely clear the most affected modules are Data analysis, Link of DB with 3rd party services. This CR will cost $45,000 USD including the addition of one developer and 3 months of work.

2.10.6. **Percentage in which CR1 would affect:**

- Time: 12.5%
- Budget: 12%
- HR: 16%
- Work Effort: 10%

2.11. **Analysis CR3**

"Purchases made through the platform according to female and male products, age, and sexual orientation"

Implications: This one also lies on the user's data but, more importantly, on the collection of the user's behavior on the platform and the interaction with 3rd party's services (plugins) and regular advertising.

Helping sellers to know what the users are looking for, the way they expected the experience to be and how much people are more likely to make a new purchase. All according on the context of the client: age, sex, sexual orientation, ethnic, location, and so on.

Changes to be made:

- Time management.
- Human resources.
- Technologies to be implemented.

2.11.1. **Modules affected:**

To begin with, all of the changes will only affect the server side of the system. By the nature of the CR3, the modules affected require changes on its functionalities.

- Database inclusion of new entities.
- New terms and technical conditions for 3rd parties' modules.
- Digital marketing system.

2.11.2. **Human resources:**

The development team will be seen growing in 4 more developers: one specialist in digital marketing: 2 developers for 3rd parties' support; and one more developer for data management.

2.11.3. **Costs:**

The additional cost of the Change Request is estimated at **$65,000 USD**. Budget that successfully covers the additional developer's salaries and costs associated with adding this feature such as:

- A developer responsible for all data structures, usage, storage and managing properly this indispensable resource.
- Reliability assurance of business for 3rd party developers and marketplaces.
- Growth in our database model.

2.11.4. **Time:**

The project is expected to increase in 8 more months of development, in order to make sure every single requirement is working correctly.

2.11.5. **Effort:**

During the analysis of given CR, is completely clear that the most affected modules are Databases, Data analysis and Digital marketing. The CR will cost $65,000 USD including the addition of 3 more developers and 5 more months of development.

2.11.6. **Percentage in which CR1 would affect:**

- Time: 34%
- Budget: 58%

- HR: 67%
- Work Effort: 40%

2.12. **Analysis CR4**

"The system should report statistics of users regarding time spent, log-in hours, and activities performed. The reports must be encrypted, and the time span of the report must be flexible".

Implications: This CR relies in tracking all the data from activities performed by the user and its habits over the app.

Changes to be made:

- Data collection and data analysis, data encryption.
- New terms and conditions for the users.
- Advertising features.
- Support for 3rd party's plugins.

2.12.1. **Modules affected:**

To begin with, all of the changes will only affect the server side of the system. By the nature of the CR4, the modules affected require changes on its functionalities:

- Data collection and data analysis, data encryption.
- New terms and conditions for the users.
- Advertising features.
- Support for 3rd parties' plugins.

2.12.2. **Human resources:**

As more computers aren't needed to fulfill the task, more developers might be hired. In this aspect we got one option:

- Hire more personnel: 2 developers.

2.12.3. **Costs:**

The additional cost of the Change Request is estimated at: **$30,000 USD**. Which includes the additional team salaries and costs associated with adding this feature, such as:

- Database for storage all the information.
- Data analysis of user's behavior.
- 3rd party integration for e-shops, healthcare, and services.
- Encryption of the user's information.

2.12.4. **Time:**

Since we are planning to utilize the same time schedule and the same number of developers, we're only expecting to include an extra month in 3rd module.

2.12.5. **Effort:**

Throughout the development of the system, the most affected module is the Data analysis. The addition of a new module will also more work per developer. One extra month at maximum.

2.12.6. **Percentage in which CR1 would affect:**

- Time: 5%
- Budget: 27%
- HR: 33%
- Work Effort: 48%

2.13. Executive summary

2.13.1. **CR1.**

Reason of decline: The current CR does represent a fundamental block for the commercial features of the system.

Due to the no too large extra cost, the addition of 2 extra developers and poor potential profitability we've resolved to decline the Change Request.

2.13.2. **CR2.**

Simple but highly beneficial for the business income in terms of more businesses and marketplaces would be interested in investing with us.

Final decision: Accepted.

2.13.3. **CR3.**

The idea is great, and the income could be highly increased by the good implementation of it. Through it sounds amazing in paper, the reality is that this CR is expensive in finance. Costing almost half of the current budget.

Final decision: Declined.

2.13.4. **CR4.**

Reason of decline: The current CR does represent a fundamental block for the commercial features of the system.

Due to the no too large extra cost, the addition of 2 extra developers and poor potential profitability; we've resolved to decline the Change Request.

3. Committee board

3.1. Introduction

In the intricate nature of humans to develop a hierarchical structure for decision making. In a world where decisions bear consequences that ripple through business and organizations, committee boards stand as the unseen architects of order and strategy. These groups of individuals wield and immense influence, their collective wisdom and expertise as engine for finding the bests strategies for problem solving and auto-improvement.

3.2. Goal of the "Committee board"

What do we expect with the creation of a Committee board in this project? Well, the primary goal we have in this business is to provide us and effective leading and overview of the whole company. It is established to collectively make decisions, set policies, and guide the strategic direction of the entity they serve.

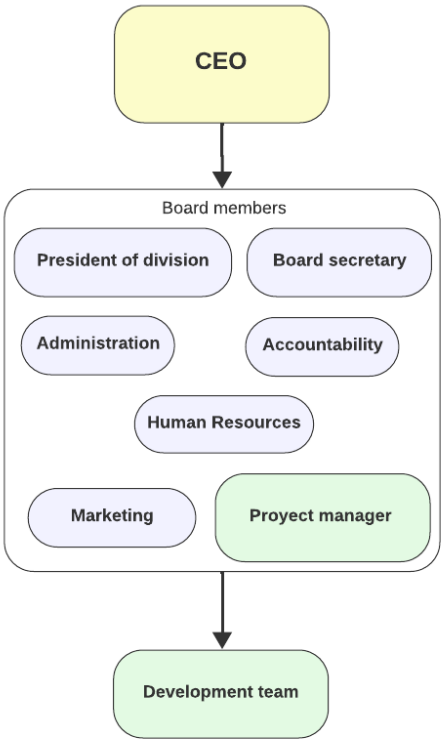
In this project our committee board plays a major role in various sectors, its importance cannot be underestimated. Just as an example of the granted roles:

- Strategic Direction.
- Accountability.
- Expertise and guidance.
- Decision-making.
- Risk management

3.3. Structure of committee board

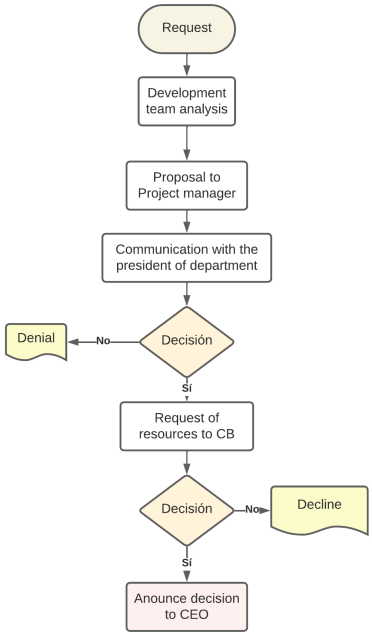
As researched, each cb (committee board) can vary depending on the organization's size, type, and purpose. However, there are common elements that are typically found in the structure of most committee boards.

The one that we selected follows the order:



3.4. **How the decisions will be taken**

Decisions in a committee board are typically taken through a structured and democratic process that ensures that all board members have the opportunity to express their views and vote on matters requiring a decision.



1. Change request is received from the client.
2. Analysis of what the CR is about and its implications.
3. Issuing analysis report from the project manager to the rest of the committee board.
4. Each representant carefully read the report, gives their thoughts.
5. Discussion and resolution.
6. Start's up of project's changes.

3.5. **Criteria for acceptance or decline**

When considering whether to accept or decline a project in a business, it's essential to evaluate various factors to make an informed decision.

Riks factors
Communication
Third party dependencies
Legal & Compliance
Tight Deadline
Maintenece delay

Just to give a risk scale to measure and determine whether accept or decline the Change Request in this project's development.

Risk scale	
Failure %	Meaning
100%-90%	Unacceptable
89%-75%	Good
74%-61	Bad
60%-50%	Barely acceptable
49%-40%	Regular
39%-21%	Good
20%-0%	Excelent

4. Status Accounting

Status accounting is the administrative tracking and reporting of all software items formally identified and controlled.

Software configuration status accounting records the activity associated with the other three SCM function and therefore provides the means by which the history of the software system's life cycle can be traced.

Defining criteria for measuring scales and procedures for money, timing, effort, and team skills.

4.1. Policies (money)

Scale for Status Accounting:

- **Objective**: Evaluate the overall financial health of the project.
- **Metrics**:
  - **Budget Variance (%)**: Calculate the variance between the planned and actual budget.
  - **Cost Performance Index (CPI)**: Ratio of earned value to planned value.
  - **Schedule Performance Index (SPI)**: Ratio of earned value to planned value.
- **Range**:
  - From 0 to 10.

Procedures for Status Accounting:

1. **Current-budget analysis**: First thing is to make a detailed analysis of the current budget, the estimated costs.
2. **Regular monitoring**: Implementation of regular monitoring processes to track actual costs, earned value, and planned value.
3. **Variance analysis**: Conduct regular variance analysis to identify differences between planned and actual costs.

4.2. Policies (timing)

Scale for Status Accounting:

- **Objective**: Evaluate the overall timeline of the project.
- **Metrics**:
  - **Planned duration**: The originally estimated time required for project completion.
  - **Actual duration**: The actual time taken for project completion.
  - **Schedule variance (SV)**: The difference between earned value and planned value for schedule.
- **Range**:
  - From 0 to 10.

Procedures for Status Accounting:

1. **Analysis of current timing**: To make a detailed analysis of the current budget, the project's schedule outlining the start and end dates for each task/activity.

2. **Regular monitoring**: Implement regular monitoring processes to track actual start and end dates for tasks.
3. **Task progress tracking**: Regularly update the progress of each task to reflect actual completion status.

Schedule variance analysis: Conduct regular schedule variance analysis to identify potential

4.3. Policies (effort)

Scale for Status Accounting:

- **Objective**: Evaluate the overall effort expended on the entire project.
- **Metrics**:
  - **Planned effort hours**: The initially estimated effort requires for the project.
  - **Actual effort hours**: The actual effort expended on the project.
  - **Effort variance (%)**: The difference between planned and actual effort.
- **Range**:
  - From 0 to 10.

Procedures for Status Accounting:

4. **Analyze effort estimated**: To make a tough analysis of estimation of the effort required for each task of activity.
5. **Regular effort tracking**: Implement regular time tracking processes to record actual effort hours.
6. **Task progress tracking**: Regularly update the progress of each task of effort expended.
7. **Effort variance analysis**: Conduct regular variance analysis to identify differences between planned and actual effort.

4.4. Policies (team skills)

Scale for Status Accounting:

- **Objective**: Evaluate the overall skill set within the team.
- **Metrics**:
  - **Individual skills matrix**: A comprehensive matrix outlining the skills possessed by each team member.
  - **Team skills inventory**: An aggregated summary of the skills available withing the team.
- **Range**:
  - Senior, Medium or Junior.

Procedures for Status Accounting:

8. **Skill assessment**: Regularly assess the skills of each team member to create a baseline.
9. **Skill matrix development**: Develop an individual matrix to create a team-wide skills inventory.
10. **Task progress tracking**: Encourage team members to regularly update their skills matrix based on acquired sills of changes in proficiency.

Performance evaluation: Integrate skill assessment into regular performance evaluations.

5. Conclusion

In conclusion, Software Configuration Management (SCM) stands as a cornerstone in the ever-evolving landscape of software development, providing a structured approach to handle the intricacies of codebase management. Throughout this report, we've explored the fundamental principles, methodologies, and challenges associated with SCM, recognizing its pivotal role in promoting collaboration, maintaining version control, and ensuring project integrity.

As technology advances, so do the tools and techniques available for SCM. From centralized version control systems to the flexibility of distributed architectures, organizations have a spectrum of options to tailor their SCM strategy to meet specific project requirements. This report has highlighted the importance of thoughtful tool selection and the impact of SCM on the efficiency and scalability of development workflows.

By embracing SCM best practices, development teams can mitigate risks associated with code changes, enhance team collaboration, and ensure the reproducibility of software artifacts. As the software industry continues to evolve, a steadfast commitment to effective SCM remains essential for delivering high-quality, reliable software products.

In essence, this report serves as a guide for organizations seeking to optimize their software development processes through the strategic implementation of SCM, ultimately contributing to the success and sustainability of their software projects.