

Project Workflow Management¹

Issue and Configuration Management Process²

By Dan Epstein

Note: *This article is based on the book [Project Workflow Management: A Business Process Approach](#) by Dan Epstein and Rich Maltzman, published by J Ross Publishing in 2014. The book describes PM Workflow® framework, the step-by-step project workflow guiding approach using project management methods, practical techniques, examples, tools, templates, checklists and tips, teaching readers the detailed and necessary knowledge required to manage project “hands-on” from scratch, instructing what to do, when to do and how to do it up to delivering the completed and tested product or service to your client. This article is the third article in the series on Project Workflow Management.*

The project workflow framework is the result of Dan’s research into the subject, having the following objectives:

- 1. Create the virtually error-free project management environment to ensure significant reduction of project costs*
- 2. Reduce demands for highly qualified project managers using the step-by-step workflow guiding approach.*

While PM Workflow® is the continuous multi-threaded process, where all PM processes are integrated together, this article will attempt to describe the Issue and Configuration Management groups of processes as a stand-alone group of processes that can be used independently outside of PM Workflow® framework. It will be difficult in this article not to venture into processes outside of the current topics, such as planning, quality, communications and other management processes, so they will be just mentioned. However, to get full benefit and the error free project management environment, the complete implementation of PM Workflow® is required.

In order to understand how PM Workflow® ensures this environment, I strongly recommend reading my article [Project Workflow Framework – An Error Free Project Management Environment](#) in the PMI affiliated projectmanagement.com (<https://www.projectmanagement.com/articles/330037/Project-Workflow-Framework--An-Error-Free-Project-Management-Environment>)

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The article above provides the overview and explanation of how the project workflow framework works and achieves the established objectives.

For more information, please visit my website www.pm-workflow.com.

This article bundles together two processes: Issue and Configuration Management.

Issue Management

Purpose

Issues are triggered risks which may affect project goals, if they are not resolved in a timely and effective manner. Issues are not the same as scope change request. While scope change requires participation of the delivery team and usually involves design modifications, many issues may be resolved by administrative means. A few examples of issues are:

- Staff or resource problems, such as lack of the necessary skills or team performance
- Lack of cooperation or slow response from the client or from management
- Requirements problems (These usually start as an issue, but eventually scope change will be initiated in order to resolve requirements problems)
- Any triggered risk, such as a large increase in the cost of a resource

The purpose of Issue Management is the identification and management of issues that come up during all project frames; establishing actions to resolve issues and minimizing their impact on the project. The Issue Management Plan identifies resources responsible for each issue resolution task, resources for escalation when needed and the target dates for the issue resolution. The Issue Management Planning triggers every time one or more issues come up. In some cases, when issue requires scope change, it triggers new SCR. SCR will be triggered even if the issue is a result of an insufficient budget or the project slips the schedule without changing the project scope.

Unlike the quality, risk and other project processes, there is no advanced issue planning. Issue planning and issue resolution are processes which are triggered by every new issue. Issue resolution and tracking is done in the Construction Frame.

The Issue Management Process is a set of activities required to manage issues as they occur. Issues are faced by every project. The Issue Management process ensures that:

- All issues that come up during the project lifecycle are identified and recorded
- A resolution owner is identified and responsibility is assigned for resolving each issue by specified deadline
- Impact of each issue to the project is analyzed
- Issue resolutions are planned, approved and managed
- Project stakeholders are notified of the status of issues

- The issue escalation and closure follow the identified process
- The expended costs for issue resolutions are budgeted
- Issue resolution triggers new Scope Change request when needed
- Issues may arise due to:
 - Loss of committed resources or their unavailability
 - Incorrect estimates or planning
 - Ambiguous or incomplete requirements
 - Changing needs and circumstances
 - Project team performance
 - Third parties or suppliers not meeting requirements, delivery time or quality standards
 - Occurrence of the already identified and accepted risks (See Chapter 6)
 - Slow or no response from client in providing answers or signing off documents
 - Other reasons, such as
 - Natural causes
 - Labor actions
 - Changes in relative values in currencies or financial crises

If resolving the issue necessitates the project scope change, the issue should be closed and the scope change management process used instead. The status of all issues is reviewed during the weekly scheduled status meetings with client and decisions are made for escalations if a resolution is not found in a timely manner.

Cost of Issues

Issues may impact the schedule, the budget, and/or project scope and quality, which in and of itself will require opening a new SCR. This affects the project cost and duration even in those cases when the client is not charged for the budget increases. If the issue is due to loss of resources, incorrect estimates, poor planning, faulty design or other reasons, where the responsible side is the project manager or delivery organization, the client is usually not charged for that, depending on the contract type. Also, if the issue is the occurrence of earlier identified and accepted risk, for which the risk response costs have been already allocated and added to the budget, no additional charges should be made, even if the responsible side is a client. If the issue is due to suppliers, who are selected by the delivery organization, not meeting commitments, then cost recovery from the supplier may be attempted by legal means, provided that there is a legal contract between the delivery organization and supplier. Otherwise, the responsible side will be the one who approved using that particular supplier. Also, the project manager's efforts are not additionally charged beyond what is already charged for managing the project and the clients' time can never be charged.

Those issues that cause delays in project implementation and the increased costs, for which clients are responsible, should be charged to the clients' organization. For example, during the course of the project, the client is expected to work with the project manager by representing the business at all times and supporting the project in many ways. Some of the typical client activities include:

- Answering questions
- Signing off various project documents
- Having representation at project related meetings
- Performing user testing and other user tasks
- Resolving issues assigned to the client team members

All the above activities, as well as the expected response time for answering questions and sign offs must be clearly stated in the Statement of Work. For example, the SOW may state that the client must provide answers in writing to the project manager's questions within 48 hours or as mutually agreed. Similarly, it must be stated that the client's sign-off of the project deliverables or refusal to sign-off with reasons documented, must be done within four working days or as mutually agreed.

The project manager must allow clients ample time to review documents before approval is expected. However, if a document requires four signatures in sequence and obtaining each signature takes, say, a week, then it will take one month to get all the signatures together. What will the delivery team be doing during all of that time? All delivery team members assigned to the project must charge their time against the project; otherwise they may be reassigned to another project and it may take a long time before the project will get new staff. This expected time must be planned for use by other scheduled activities whenever possible.

Note: While waiting for a client's action, it may be possible to continue the planned delivery team activities after making certain assumptions, such as approval will be granted; the document will be signed off, etc. There must be the client's consent to continue working temporarily without approval or sign-off. If the assumption turns out to be incorrect, the work produced by the delivery team during that time may not be usable. This will contribute to the project exceeding the budget and for a slipped schedule. In this case, the time spent will be charged to client, if the client did not object to the delivery team doing that work. However, if no client consent is received, then the time waiting for approval or sign-off is not chargeable to the client.

Unfortunately, often clients answer questions, sign off documents and resolve issues assigned to them well past their due dates. It is recommended to send a friendly reminder ahead of the due date, but other priorities may still prevent the client from doing this in a timely manner. The client should be informed of charges for that time using the Scope Change Request process, which provides a basis for the cost or schedule changes and also informs stakeholders about those changes.

Sometimes the issue lies with the delivery organization, rather than the client. Even though the client should not be charged in this case for the cost of the issue resolution, they must be aware of the impact to the schedule due to that issue. The methods to shorten the schedule were described in Chapter 7, but they are not perfect, because they usually increase the cost, risk, or both.

issue was first recorded, a second row must be added to the Issue Log with the same issue number, new date and the issue owner's name.

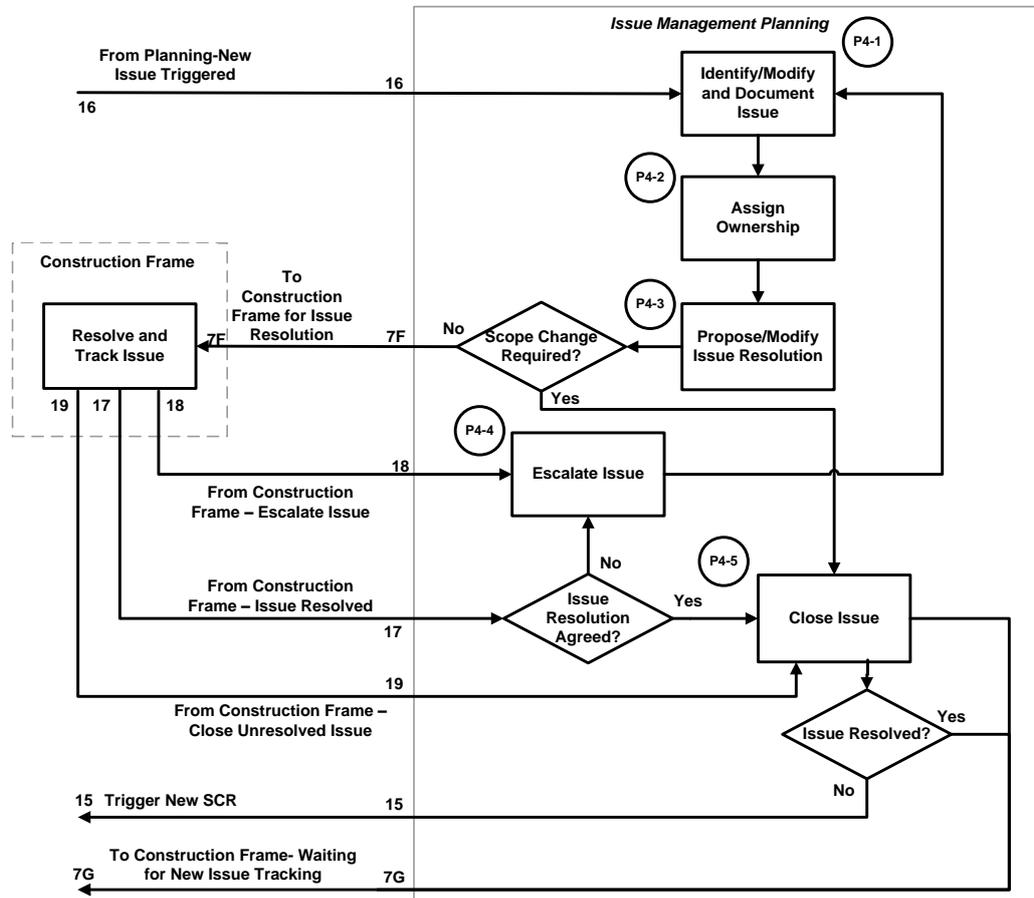


Fig 8-1

Once the issue owner is assigned, he/she must propose a solution and due date for the issue resolution in the Propose/Modify Issue Resolution process (P4-3) and the flow is directed to the control point question (Scope Change Required?). If it is obvious that SCR will be required to resolve the issue, the answer will be YES and the issue will be closed in the process Close Issue P4-5, when a new record in the Issue Log with the status C-SCR will be made. The output of the P4-5 process will return the process flow back to the Construction Frame entry point, waiting for the next issue to track. At the same time, a control question (Issue Resolved?) will be asked. Since the issue can't be resolved without SCR, the answer is NO and the request will be issued to trigger a new SCR via exit point 15.

When it is not clear whether the SCR is required, then the answer to the control point question (Scope Change Required?) is NO. It will be possible to open SCR later from the Construction Frame, so it is better to answer NO if there is any doubt. In this case the flow is directed to the Construction Frame for issue resolution and tracking via exit point 7F. The project manager changes the issue status to Tracked in a new record, which must be entered into the Issue Log.

While tracking the issue in the Construction Frame, one of *three options* will be encountered, which are recorded in the Issue Log and documented in PCB:

- *Issue is resolved.*

The notification comes from the Construction Frame via entry point 17. The project team and all affected groups must give their consent that the issue has been indeed resolved. If this is the case, the answer to the question in the decision point (Issue Resolution Agreed?) is YES and the issue will be closed with status “C” in the process Close Issue P4-5 and the process flow returns to the entry of the Construction Frame, waiting for the next issue implementation and tracking. If the answer to the question in the decision point (Issue Resolution Agreed?) is NO, the issue must be escalated in the Escalate Issue process P14. The Issues Log is updated with the new status E and stored in the PCB.

- *Issue can be resolved, but some help from management is required or the issue owner is not able to deliver a solution on time.*

In this case the request to escalate the issue will come from the Construction Frame via entry point 18 to the process Escalate Issue P4-4. During this process, management is notified, as described in the following paragraph, and takes corrective measures. After the issue is escalated, some changes to the issue may occur, subject to escalation results. The issue may be modified and the issue owner may be changed. Sometimes, changing the issue owner helps resolve the issue. The issue resolution proposal may be modified. Therefore, after the escalation, the process flow returns to process P4-1 and the issue resolution process starts again.

- *Issue cannot be resolved by administrative actions.*

This means that SCR must be triggered to resolve the issue. This decision comes from the Construction Frame via entry point 19. The issue will be closed with the status C-SCR in the process P4-5. The process flow returns to the Construction Frame, waiting for a new issue to track. At the same time, via the control point question (Issue Resolved?), the request will trigger a new SCR via exit point 15.

While the issue implementation is being tracked in the Construction Frame, the status of the issue is monitored and reported at least weekly. Issues are usually discussed during the regularly scheduled project status reviews. Those reviews are planned in accordance with the Communications Planning process and performed as a part of the Construction Frame process. Shortly before the issue resolution due date, the project manager should send a friendly reminder to the issue owner.

Escalation Considerations

Escalation should be avoided whenever possible. Corrective actions should be taken before the situation gets to the point of escalation. Good judgment must be used by the PM to invoke escalation when and only when, it is required. While escalation itself does not require stakeholder notification, stakeholders will be notified by the Scope Change process if there is an impact to the project cost or schedule and the Scope Change Request is issued. This will keep stakeholders informed about the situation, preventing unpleasant surprises at later stages of the project. When the issue is escalated to the business' management, the project manager must inform clients about this in a friendly and non-threatening manner. However, if the project manager avoids escalating issues, those issues will remain unresolved and will become the project manager's liability. The issue is escalated in accordance with the following consideration:

- If the issue is not resolved on time due to action, inaction or inability of the issue owner, who is a client team member, the project manager will escalate the issue to the Lead Client using the Issue Escalation form in Table 8-2. If the decision was not made on time by the client about the course of the action to resolve the issue, the project manager has to present the situation to the delivery manager, who, in turn, will escalate the issue to the client's manager.
- If the issue is not resolved due to action or inaction of the delivery organization member, who does not report to project manager, then the project manager will escalate the issue to the delivery manager, who, in turn, will escalate it to the senior manager.
- If the issue is due to a supplier with whom the delivery organization has a formal contract, then the project manager will escalate the issue to the delivery manager. The manager will bring the subject to the appropriate manager who is responsible for issuing the contract with the supplier, using the contract as leverage for escalation with the supplier.
- If the issue is due to action or inaction of the delivery team member, who reports to the project manager, then the project manager will escalate the issue with the functional manager in charge of the team member in question.
- If the issue is due to the project manager's error in planning, estimating, risk assessment, etc., no escalation takes place, but the issue must be reported to the delivery manager at the next available status meeting.

Most often, the escalation process involves the arbitration between the project manager and the party, which caused the issue. Escalation result may change the issue itself, the priority of the team member work, change the issue ownership or modify the issue resolution proposal. This will allow resolving the issue in a more expedient manner.

In order to escalate issue, an Issue Escalation form - as shown Table 8-2 - must be completed.

Issue Escalation	
Project Name: _____	Issue #: _____
Escalated To: _____	Escalation Date: _____
Escalated By: _____	
Issue Owner: _____	Date Raised: _____
Resolution Due Date: _____	
Brief Description:	
Impact to Project:	
Proposed Solution:	
Escalation Results:	
Comments:	

Table 8-2

Issue Management Forms

The fields are:

- Issue #:** A sequential number, which is assigned to the issue
- Project Name:** The name of the project
- Escalated To:** The name of the person to whom the issue has been escalated
- Escalation Date:** Date of escalation
- Issue Owner:** Name of the person responsible for the issue resolution
- Date Raised:** Date when the issue was raised
- Resolution Due Date:** The committed date of the issue resolution
- Issue Description:** Description of the issue
- Impact to Project:** Impact to the project if the issue is not resolved
- Proposed Solution:** Detailed description of the proposed solution
- Escalation Results:** Results of the escalation
- Comments:** Any comments, including especially the context of the issue, deemed necessary to provide clarity on the issue.

Issue Management Process Metrics

This procedure has the following measurements. (Cost of issue does not include the cost of SCR):

- Plan versus actual date for each issue resolution
- Total accumulated number of issues
- Number of issues converted into scope change requests.
- Cost of each issue broken down by the organization bearing the cost.
- Schedule impact of each issue.
- Accumulated cost of all issues.
- Accumulated schedule impact of all issues

Configuration Management process

Purpose

The purpose of Configuration Management (CM) is to control project components at any given time and to prevent unauthorized changes to the completed project deliverables, processes or project documentation. CM keeps track and controls changes to these elements. It also maintains traceability and integrity of project elements. Configuration Management Planning produces the schedule of Configuration Management Reviews.

CM is mandatory in software maintenance projects. Many development platforms for software development projects have configuration management built into those platforms, so that much of what is described below may not be applicable. CM has limited use in electrical hardware, mechanical engineering, construction and other projects. In some cases, CM, as described here, may not be applicable at all.

CM Environment Structure

Some authors identify CM with Change Control in general, others with the project environment in particular. In this book, Change Control is viewed as a separate process and is described in detail in the corresponding section. Change Control is used by CM when a scope change is authorized and the completed project deliverables have to be modified.

CM is indeed a specific part of project environment, albeit limited in size. The environment is usually established before the beginning of a project, and CM is involved in using a part of that environment for CM purposes. For example, in a simplistic explanation for software projects, there are development, test and the completed modules libraries, also called stage libraries, in the software project areas. Developers use their individual development library areas while developing software modules and doing a unit test, then promote them to the test library in order to do an integrated test. They are not allowed to modify software in the test library. Rather, developers check out modules from the test library back to the development library for modifications and after completion 'promote' them again to the test library. When tests are completed, only a specifically assigned person, upon receiving authorization, is allowed promotion of tested modules from the test to stage library, which is a copy of

the production library without using actual production data. This arrangement prevents anyone from moving modified modules into the stage library without authorization. When the project is complete, all modules are moved by the authorized person from the stage to production library for Business as Usual (BAU) operations.

Authority	Development	Test	Stage	Production
		Test Library Path	Stage Library Path	Prod. Library Path
Create / Modify / Delete	Dev. Library Path1: Developer 1 Dev. Library Path2: Developer 2 Dev. Library Path3: Developer 3	No	No	No
Promote To	N/A	Developer 1 Developer 2 Developer 3	Name A	Name B

Table 8-3

The format of Table 8-3 may be used to list names of team members and their access authorities to libraries, identified by a path to their location:

The Authority column lists actions Create/Modify/Delete and Promote To, which identify what can be done with modules.

The Development column shows names of staff members authorized to create/modify/delete and promote modules. They are identified in the table by generic names Developer 1, Developer 2 and Developer 3. In the Promote To row N/A is indicated, which means there are no promotions to the development library. The Create/Modify/Delete row shows a path to the individual development library and the names of developers who are authorized to use that library. Here, Promoter 1 and Promoter 2 are staff members with promotion authorities to Stage and Production correspondingly. Since usually there are multiple developers, there are also multiple libraries in the development area.

Test, stage and production columns show a path to the test, stage and production libraries and names of team members who are authorized to create/modify/delete modules and promote modules to those libraries. No authority is granted to anybody to create, modify or delete modules in any library, except the development library. In the promotion column there are names of team members who are granted promotion authority to the test, stage or production libraries.

For tangible deliverables in projects other than software, instead of libraries, a special, locked area of warehouse is used for completed assembled products moved from the assembly and test areas.

CM Process Components

The CM process is shown on Fig 8-2. It has the following components:

1. Establish Configuration Control Board (CCB), (P3-1).
2. Develop CM Plan (P3-2).
3. Establish CM Baseline (P3-3).
4. Conduct CM Baseline Audit (P3-4).
5. Approve promotion to Stage/Production Libraries/Warehouse (P3-5).
6. Escalate (P3-6).
7. Correct Discrepancies (P3-7).

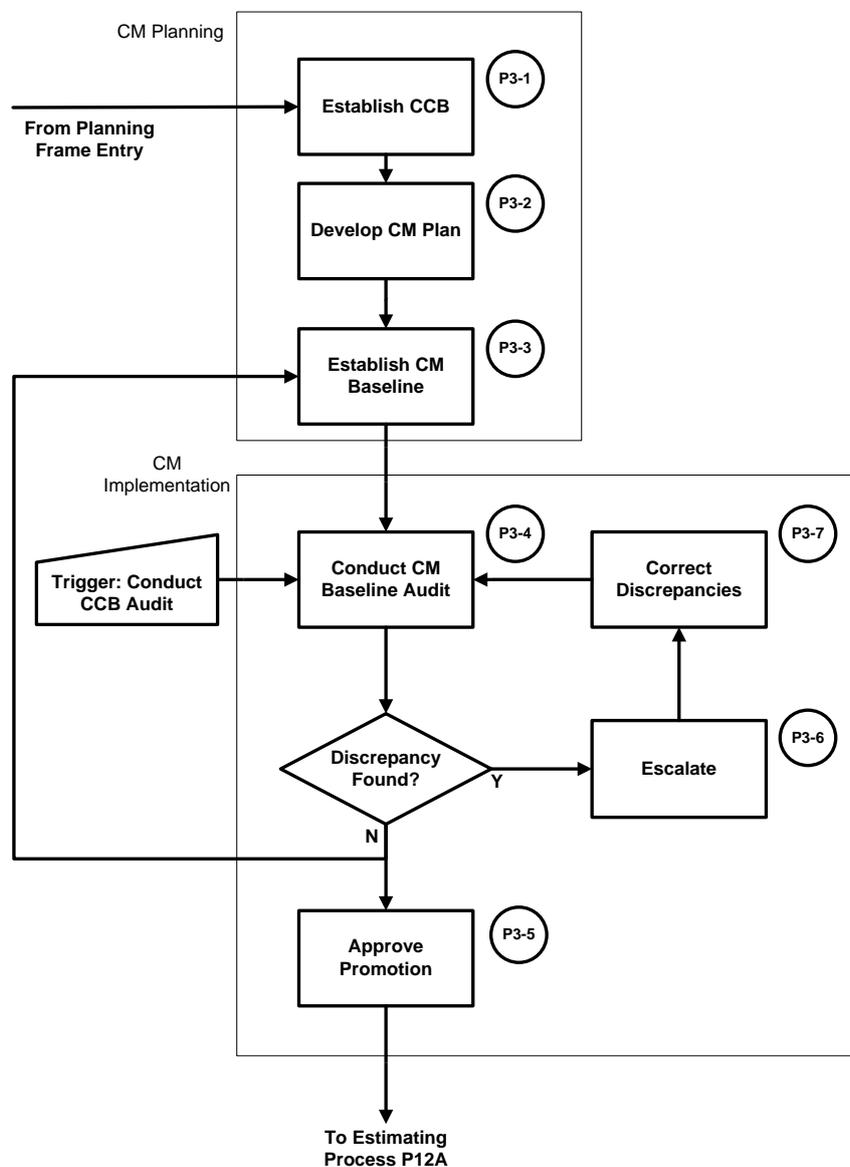


Fig 8-2

Establish Configuration Control Board (CCB) (P3-1)

The CCB function is to approve priority of required changes and their promotion to stage and production. For maintenance projects CCB usually consists of the Project Manager, the Client representative, the QA representative and also representatives of the stakeholders affected by the change. For development projects the promotion to stage is approved by the project manager or by the authorized person, while promotion to production is approved by the lead client. Approval authority must be documented in the CCB.

Develop CM Plan (P3-2)

For maintenance projects, the CM Plan is a separate document, which prioritizes all required changes and provides a schedule for each new release to production. Usually, changes are released to production in *batches*, rather than in a continuous stream. Based on the plan, the project manager prepares a separate project implementation schedule for each planned *batch* of changes.

In development projects, the project manager schedules only the CM baseline creation and baseline audits, which are added to the existing project schedule. In this case, the CM Plan does not have to be a separate document. The schedule of CM activities may be included in the overall project plan and the CM processes and documentation should be recorded in the PCB.

In both types of project, resources must be assigned to perform CM activities. The CM Plan lists responsibilities for module modifications, test, promotions, approvals, baseline creation and audits.

Establish CM Baseline (P3-3)

The CM Baseline is built differently for maintenance projects already in production and for current projects under development. For maintenance projects it is the list of all project modules in the production library. A new CM baseline is established after each CM Audit and documented in the PCB. For development projects, it is the list of completed modules added to baseline as they are moved into the stage library or warehouse (for tangible deliverables) the first time. The list in the CM Baseline contains the following information:

- Module name (name of program, database table, assembly, process, document, etc.)
- Module Type (Java program, C++ program, database table, document, assembly, subassembly, etc.)
- Module current version
- When last moved to production/stage/warehouse
- Location (Library name, warehouse etc.)

Conduct CM Baseline Audit (P3-4)

CM Audit is the comparison between the baseline and the current set of components. CM Audit must be regularly conducted. Any differences between baseline and current must be documented in the promotion history since the last baseline. If the differences found are not documented, it points out that unauthorized modifications were made to the already completed modules or assemblies.

If this is the case, the noncompliance must be escalated in process P3-6. The frequency of audits depends on the frequency of the deliverables updates. The audit should be done shortly before the scheduled production update or once every six months, if no production updates were made. After the successful audit, when the answer to the Control Point question (Discrepancy Found?) is NO, the flow returns to the process Establish CM Baseline P3-3 and a new baseline will be created and documented.

Approve promotion (P3-5)

Even though some team members are granted promotion authorities to stage and production libraries, no promotion to the Stage or Production Libraries or placement in the warehouse is allowed without CCB approval. A memo must be sent to the authorized person with a request to promote specific modules from test to stage library or from stage to production library. For projects which are not software-centric, approval must be granted to place the module, properly labeled and dated; in a warehouse. Corresponding approval must be granted and documented in the PCB.

Escalate (P3-6)

If the answer to the control point question (Discrepancy Found?) is YES, this means there are undocumented differences in modules found between the baseline and the actual modules during the audit, or the modules count does not match, and therefore, the issue must be escalated. The difference may be in different timestamps or version numbers of the module between the last approval and at the time of the audit. Different timestamps may point out that unauthorized changes may have been made to modules. Since libraries are dynamic and many promotions take place between two subsequent audits, all those promotions must be documented after their approval by CCB, which makes all changes traceable. During the escalation, the CCB, project manager and the technical manager are notified about the discrepancy. The technical manager will assign a team member to conduct an investigation and find the reason for non-compliance.

Correct Discrepancies (P3-7)

If it is found that there are undocumented changes to modules or unapproved promotions, corrective measures must be taken to reverse unauthorized actions in the current scenario and to assure this will not happen again in the future. If it is found that changes were made in accordance with approved SCR, but no CCB approval was received, then a CCB approval must be secured. Otherwise, all changes must be

reversed. The CCB board and the Technical Manager will be notified by the investigator. When problems are resolved, the new CM baseline audit must be conducted again using the process P3-4.

CM Metrics

The following metrics must be collected and documented in the PCB:

- CM Plan versus actual effort and dates for all CM activities
- Number of promotions to each of stage and production libraries
- Variations from baseline and noncompliance detected during audit

CM Documentation

The following CM documentation must be stored in the PCB:

- Names and contact information of all CCB members
 - CCB promotion approval documents
 - Promotion history to the stage and production libraries
 - CM Plan and schedule of releases to client
 - CM Baseline
 - CM Baseline Audit
 - CM Metrics
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About the Author



Dan Epstein

New York, USA



Dan Epstein combines over 25 years of experience in the project management field and the best practices area, working for several major Canadian and U.S. corporations, as well as 4 years teaching university students project management and several software engineering subjects. He received a master's degree in electrical engineering from the LITMO University in Leningrad (today St. Petersburg, Russia) in 1970, was certified as a Professional Engineer in 1983 by the Canadian Association of Professional Engineers – Ontario, and earned a master's certificate in project management from George Washington University in 2000 and the Project Management Professional (PMP®) certification from the Project Management Institute (PMI®) in 2001.

Throughout his career, Dan managed multiple complex interdependent projects and programs, traveling extensively worldwide. He possesses multi-industry business analysis, process reengineering, best practices, professional training development and technical background in a wide array of technologies. In 2004 Dan was a keynote speaker and educator at the PMI-sponsored International Project Management Symposium in Central Asia. He published several articles and gave published interviews on several occasions. In the summer of 2008 he published "Methodology for Project Managers Education" in a university journal. His book, *Project Workflow Management - The Business Process Approach*, written in cooperation with Rich Maltzman, was published in 2014 by J. Ross Publishing.

Dan first started development of the Project Management Workflow in 2003, and it was used in a project management training course. Later this early version of the methodology was used for teaching project management classes at universities in the 2003–2005 school years. Later on, working in the best practices area, the author entertained the idea of presenting project management as a single multithreaded business workflow. In 2007–2008 the idea was further refined when teaching the project management class at a university. Since 2009, Dan has continued working full time in Project Management. Dan can be contacted at dan@pm-workflow.com.