

PROJECT MONITORING AND CONTROL

A Project Management Process Area at Maturity Level 2

Purpose

The purpose of Project Monitoring and Control (PMC) is to provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan.

Introductory Notes

A project's documented plan is the basis for monitoring activities, communicating status, and taking corrective action. Progress is primarily determined by comparing actual work product and task attributes, effort, cost, and schedule to the plan at prescribed milestones or control levels ~~within~~ the project schedule or ~~work breakdown structure (WBS)~~. Appropriate visibility of progress enables timely corrective action to be taken when performance deviates significantly from the plan. A deviation is significant if, when left unresolved, it precludes the project from meeting its objectives.

The term "project plan" is used throughout these practices to refer to the overall plan for controlling the project.

When actual status deviates significantly from ~~the~~ expected values, corrective actions are taken as appropriate. These actions may require replanning, which may include revising the original plan, establishing new agreements, or including additional mitigation activities ~~with~~ in the current plan.

Related Process Areas

Refer to the *Project Planning Capacity and Availability Management* process area for more information about ~~the project plan, including how it specifies the appropriate level of project monitoring, the measures used to monitor progress, and known risks and analyzing capacity and availability~~.

Refer to the Measurement and Analysis process area for *more* information about ~~the process of measuring, analyzing, and recording information providing measurement results~~.

Refer to the Project Planning process area for more information about developing a project plan.

Specific Goal and Practice Summary

- SG 1 Monitor ~~the~~ Project Against ~~the~~ Plan
 - SP 1.1 Monitor Project Planning Parameters
 - SP 1.2 Monitor Commitments
 - SP 1.3 Monitor Project Risks
 - SP 1.4 Monitor Data Management
 - SP 1.5 Monitor Stakeholder Involvement
 - SP 1.6 Conduct Progress Reviews
 - SP 1.7 Conduct Milestone Reviews
- SG 2 Manage Corrective Action to Closure
 - SP 2.1 Analyze Issues
 - SP 2.2 Take Corrective Action
 - SP 2.3 Manage Corrective Actions

Specific Practices by Goal

SG 1 Monitor ~~the~~ Project Against ~~the~~ Plan

Actual performance and progress of the project are monitored against the project plan.

SP 1.1 Monitor Project Planning Parameters

Monitor ~~the~~ actual values of ~~the~~ project planning parameters against the project plan.

Project planning parameters constitute typical indicators of project progress and performance and include attributes of work products and tasks, costs, effort, and schedule. Attributes of the work products and tasks include ~~such items as~~ size, complexity, service level, availability, weight, form, fit, ~~or and~~ function.

Parameters to be considered should include the frequency of monitoring. Frequency considerations may include the possible need for monitoring each service request or incident, and possibly even continuous monitoring for continuously delivered services.

Monitoring typically involves measuring ~~the~~ actual values of project planning parameters, comparing actual values to ~~the~~ estimates in the plan, and identifying significant deviations. Recording actual values of ~~the~~ project planning parameters includes recording associated contextual information to help understand ~~the~~ measures. An analysis of the impact that significant deviations have on determining what the corrective actions to take is handled in ~~the second~~-specific goal 2 and its specific practices in this process area.

Typical Work Products

1. Records of project performance
2. Records of significant deviations

Subpractices

1. Monitor progress against the schedule.

Progress monitoring typically includes the following:

- Periodically measuring the actual completion of activities and milestones
- Comparing actual completion of activities and milestones against the ~~schedule documented in the~~ project plan schedule
- Identifying significant deviations from the ~~project plan budget and~~ schedule estimates ~~in the project plan~~

2. Monitor the ~~project's~~ project's cost and expended effort.

Effort and cost monitoring typically includes the following:

- Periodically measuring the actual effort and ~~costs~~ expended and staff assigned
- Comparing actual effort, costs, staffing, and training to the ~~estimates and budget documented in the~~ project plan budget and estimates
- Identifying significant deviations from the ~~budget in the~~ project plan budget and schedule

3. Monitor the attributes of ~~the~~ work products and tasks.

Refer to the Measurement and Analysis process area for more information about developing and sustaining a measurement capability used to support management information needs.

Refer to the Project Planning process area for more information about ~~the~~ establishing estimates of work product and task attributes of work products and tasks.

Monitoring the attributes of ~~the~~ work products and tasks typically includes the following:

- Periodically measuring the actual attributes of ~~the~~ work products and tasks, such as size ~~or~~, complexity, or service levels (and ~~the~~ changes to ~~the~~ these attributes)
- Comparing the actual attributes of ~~the~~ work products and tasks (and ~~the~~ changes to ~~the~~ these attributes) to ~~the estimates documented in the~~ project plan estimates
- Identifying significant deviations from ~~the estimates in the~~ project plan estimates

4. Monitor resources provided and used.

Refer to the Capacity and Availability Management process area for more information about monitoring and analyzing capacity.

Refer to the Project Planning process area for more information about ~~planned~~ planning the project's resources.

Examples of resources include the following:

- Physical facilities
- Computers, peripherals, and software used in design, manufacturing, testing, and operation
- Networks
- Security environment
- Project staff
- Processes

5. Monitor the knowledge and skills of project personnel.

Refer to the Project Planning process area for more information about planning ~~for-needed~~ knowledge and skills ~~needed to perform the project~~.

Monitoring the knowledge and skills of ~~the~~ project personnel typically includes the following:

- Periodically measuring the acquisition of knowledge and skills by project personnel
- Comparing actual training obtained to that documented in the project plan
- Identifying significant deviations from estimates in the project plan

6. Document ~~the~~ significant deviations in ~~the~~ project planning parameters.

SP 1.2 Monitor Commitments

Monitor commitments against those identified in the project plan.

Typical Work Products

1. Records of commitment reviews

Subpractices

1. Regularly review commitments (both external and internal).
2. Identify commitments that have not been satisfied or ~~that~~ are at significant risk of not being satisfied.
3. Document the results of ~~the~~ commitment reviews.

SP 1.3 Monitor Project Risks

Monitor risks against those identified in the project plan.

Refer to the Project Planning process area for more information about identifying project risks.

Refer to the Risk Management process area for more information about identifying potential problems before they occur so that risk management-handling activities can be planned and invoked as needed across the life of the product or project to mitigate adverse impacts on achieving objectives.

Typical Work Products

1. Records of project risk monitoring

Subpractices

1. Periodically review the documentation of ~~the~~ risks in the context of the project's current status and circumstances.

An example risk whose status might change is a threat to the continuity of operations, or a change to the average mix of service request types coming from end users. If the risk has become more likely or the possible impact more severe, then corrective action may be necessary.

2. Revise the documentation of ~~the~~ risks, as additional information becomes available, ~~to incorporate changes.~~

As projects progress (especially those of long duration or continuous operation), new risks arise and it is important to identify, analyze, and plan the appropriate response (or mitigation) for these new risks. For example, software, equipment, and tools in use may become obsolete; or key personnel may gradually lose skills in areas of particular long-term importance to the project and organization. It is important to identify, analyze, and address these new risks.

3. Communicate ~~the~~ risk status to relevant stakeholders.

Examples of risk status include the following:

- A change in the probability that the risk occurs
- A change in risk priority

SP 1.4 Monitor Data Management

Monitor the management of project data against the project plan.

Refer to the Plan ~~for~~ Data Management specific practice in the Project Planning process area for more information about identifying ~~the~~ types of data ~~that should to~~ be managed and how to plan for their management.

~~Once the plans for the management of project data are made, the management of that data must be monitored to ensure that those plans are accomplished.~~

Data management activities should be monitored to ensure that data management requirements are being satisfied. Depending on the results of monitoring and changes in project requirements, situation, or status, it may be necessary to re-plan the project's data management activities.

Typical Work Products

1. Records of data management

Subpractices

1. Periodically review data management activities against their description in the project plan.

2. Identify and document significant issues and their impacts.

An example of a significant issue is when stakeholders do not have the access to project data they need to fulfill their roles as relevant stakeholders.

3. Document ~~the~~ results of data management activity reviews.

SP 1.5 Monitor Stakeholder Involvement

Monitor stakeholder involvement against the project plan.

Refer to the Plan Stakeholder Involvement specific practice in the Project Planning process area for more information about identifying relevant stakeholders and planning ~~the~~ appropriate involvement with them.

~~Once the stakeholders are identified and the extent of their Stakeholder involvement within the project is specified in project planning, that involvement must~~should be monitored to ensure that ~~the~~ appropriate interactions ~~are occurring~~occur. Depending on the results of monitoring and changes in project requirements, situation, or status, it may be necessary to re-plan stakeholder involvement.

Typical Work Products

1. Records of stakeholder involvement

Subpractices

1. Periodically review the status of stakeholder involvement.
2. Identify and document significant issues and their impacts.
3. Document the results of ~~the~~ stakeholder involvement status reviews.

SP 1.6 Conduct Progress Reviews

Periodically review the project's progress, performance, and issues.

A "project's progress" is the project's status as viewed at a particular time when the project activities performed so far and their results and impacts are reviewed with relevant stakeholders (especially project representatives and project management) to determine whether there are significant issues or performance shortfalls that must be addressed.

Progress reviews are project reviews ~~on the project~~ to keep stakeholders informed. These project reviews can be informal reviews and may not be specified explicitly in ~~the~~ project plans.

Typical Work Products

1. Documented project review results

Subpractices

1. Regularly communicate status on assigned activities and work products to relevant stakeholders.

Managers, staff members, customers, end users, suppliers, and other relevant stakeholders ~~within the organization~~ are included in ~~the~~ reviews as appropriate.

2. Review the results of collecting and analyzing measures for controlling the project.

The measurements reviewed include those collected for service parameter measures identified in project planning (e.g., availability, number of users) and may include those collected for measures of customer satisfaction.

Refer to the Measurement and Analysis process area for more information about ~~the process for measuring and analyzing project performance data~~ aligning measurement and analysis activities and providing measurement results.

3. Identify and document significant issues and deviations from the plan.
4. Document change requests and problems identified in any of the work products and processes.

Refer to the Configuration Management process area for more information about ~~how~~ tracking and controlling changes are managed.

5. Document the results of ~~the~~ reviews.
6. Track change requests and problem reports to closure.

SP 1.7 Conduct Milestone Reviews

Review the project's accomplishments and results of the project at selected project milestones.

Refer to the Measurement and Analysis process area for more information about providing measurement results.

Refer to the Project Planning process area for more information about milestone planning identifying major milestones.

Milestones are pre-planned events or times at which a thorough review of status is conducted to understand how well stakeholder requirements are being met. (If the project includes a developmental milestone, then the review is conducted to ensure that the assumptions and requirements associated with that milestone are being met.) Milestones may be associated with the overall project or a particular service type or instance. Milestones can thus be event based or calendar based.

Milestone reviews are planned during project planning and are typically formal reviews.

Progress reviews and milestone reviews need not be held separately. A single review can address the intent of both. For example, a single pre-planned review can evaluate progress, issues, and performance up through a planned time period (or milestone) against the plan's expectations.

Typical Work Products

1. Documented milestone review results

Subpractices

1. Conduct ~~reviews~~ milestone reviews with relevant stakeholders at meaningful points in the project's schedule, such as the completion of selected stages, ~~with relevant stakeholders~~.

Managers, staff members, customers, end users, suppliers, and other relevant stakeholders ~~within the organization~~ are included in ~~the~~ milestone reviews as appropriate.

2. Review ~~the~~ commitments, the plan, status, and risks of the project.
The reviews may include an analysis of measurements collected for customer satisfaction.
3. Identify and document significant issues and their impacts.
4. Document ~~the~~ results of the review, action items, and decisions.
5. Track action items to closure.

SG 2 Manage Corrective Action to Closure

Corrective actions are managed to closure when the project's project's performance or results deviate significantly from the plan.

SP 2.1 Analyze Issues

Collect and analyze ~~the~~ issues and determine ~~the~~ corrective actions necessary to address ~~the issues~~ them.

This analysis is performed for a different purpose and generally on different issues than the analysis performed as part of incident analysis, problem analysis, or change request analysis. However, the same or a similar mechanism may be used to analyze each of these types of issues and to manage them to closure. How best to implement a common solution for their analysis and management to closure depends on the risk of failing to handle each appropriately and the costs incurred by alternative solutions.

Typical Work Products

1. List of issues needing requiring corrective actions

Subpractices

1. Gather issues for analysis.

Issues are collected from reviews and the execution of other processes.

Examples of issues to be gathered include the following:

- Issues discovered throughwhen performing verification and validation activities
- Significant deviations in the project planning parameters from the estimates in the project plan
- Commitments (either internal or external) that have not been satisfied
- Significant changes in risk status
- Data access, collection, privacy, or security issues
- Stakeholder representation or involvement issues

- Repetitive deviations that accumulate before becoming significant, but whose resolution should be addressed
- Product, tool, or environment transition assumptions (or other customer or supplier commitments) that have not been achieved

2. Analyze issues to determine the need for corrective action.

Refer to the Project Planning process area for more information about corrective action criteria.

Corrective action is required when the issue, if left unresolved, may prevent the project from meeting its objectives.

SP 2.2 Take Corrective Action

Take corrective action on identified issues.

Typical Work Products

1. Corrective action plans

Subpractices

1. Determine and document the appropriate actions needed to address the identified issues.

Refer to the Project Planning process area for more information about ~~the~~developing a project plan ~~when replanning is needed~~.

Examples of potential actions include the following:

- Modifying the statement of work
- Modifying requirements
- Revising estimates and plans
- Renegotiating commitments
- Adding resources
- Changing processes
- Revising project risks

2. Review and get agreement with relevant stakeholders on the actions to be taken.
3. Negotiate changes to internal and external commitments.

SP 2.3 Manage Corrective Actions

Manage corrective actions to closure.

Typical Work Products

1. Corrective action results

Subpractices

1. Monitor corrective actions for their completion.
Refer to the Incident Resolution and Prevention process area for more information about monitoring the status of incidents to closure.
2. Analyze results of corrective actions to determine the effectiveness of the corrective actions.
3. Determine and document appropriate actions to correct deviations from planned results ~~for~~ from performing corrective actions.

Lessons learned as a result of taking corrective action can be inputs to planning and risk management processes.

~~Generic Practices by Goal~~

~~Continuous-Only~~

~~GG 1 — Achieve Specific Goals~~

~~The process supports and enables achievement of the specific goals of the process area by transforming identifiable input work products to produce identifiable output work products.~~

~~GP 1.1 — Perform Specific Practices~~

~~Perform the specific practices of the project monitoring and control process to develop work products and provide services to achieve the specific goals of the process area.~~

~~GG 2 — Institutionalize a Managed Process~~

~~The process is institutionalized as a managed process.~~

~~GP 2.1 — Establish an Organizational Policy~~

~~Establish and maintain an organizational policy for planning and performing the project monitoring and control process.~~

~~Elaboration:~~

~~This policy establishes organizational expectations for monitoring performance against the project plan and managing corrective action to closure when actual performance or results deviate significantly from the plan.~~

GP 2.2 — Plan the Process

Establish and maintain the plan for performing the project monitoring and control process.

Elaboration:

This plan for performing the project monitoring and control process can be part of (or referenced by) the project plan, as described in the Project Planning process area.

GP 2.3 — Provide Resources

Provide adequate resources for performing the project monitoring and control process, developing the work products, and providing the services of the process.

Elaboration:

Examples of resources provided include the following tools:

- Cost tracking systems
- Effort reporting systems
- Action item tracking systems
- Project management and scheduling programs

GP 2.4 — Assign Responsibility

Assign responsibility and authority for performing the process, developing the work products, and providing the services of the project monitoring and control process.

GP 2.5 — Train People

Train the people performing or supporting the project monitoring and control process as needed.

Elaboration:

Examples of training topics include the following:

- Monitoring and control of projects
- Risk management
- Data management

GP 2.6 — Manage Configurations

Place designated work products of the project monitoring and control process under appropriate levels of control.

Elaboration:

Examples of work products placed under control include the following:

- Project schedules with status
- Project measurement data and analysis
- Earned value reports

GP 2.7 — Identify and Involve Relevant Stakeholders

Identify and involve the relevant stakeholders of the project monitoring and control process as planned.

Elaboration:

Refer to Table 6.2 on page 95 in Generic Goals and Generic Practices for more information about the relationship between generic practice 2.7 and the Monitor Stakeholder Involvement practice in the Project Monitoring and Control process area.

Examples of activities for stakeholder involvement include the following:

- Assessing the project against the plan
- Reviewing commitments and resolving issues
- Reviewing project risks
- Reviewing data management activities
- Reviewing project progress
- Managing corrective actions to closure

GP 2.8 — Monitor and Control the Process

Monitor and control the project monitoring and control process against the plan for performing the process and take appropriate corrective action.

Elaboration:

Refer to Table 6.2 on page 95 in Generic Goals and Generic Practices for more information about the relationship between generic practice 2.8 and the Project Monitoring and Control process area.

Examples of measures and work products used in monitoring and controlling include the following:

- Number of open and closed corrective actions
- Schedule with status for monthly financial data collection, analysis, and reporting
- Number and types of reviews performed
- Review schedule (planned versus actual and slipped target dates)
- Schedule for collection and analysis of monitoring data

GP 2.9 Objectively Evaluate Adherence

Objectively evaluate adherence of the project monitoring and control process against its process description, standards, and procedures, and address noncompliance.

Elaboration:

Examples of activities reviewed include the following:

- Monitoring project performance against the project plan
- Managing corrective actions to closure

Examples of work products reviewed include the following:

- Records of project performance
- Project review results

GP 2.10 Review Status with Higher Level Management

Review the activities, status, and results of the project monitoring and control process with higher level management and resolve issues.

Staged-Only

GG3 and its practices do not apply for a maturity level 2 rating, but do apply for a maturity level 3 rating and above.

Continuous/Maturity Levels 3–5 Only

GG 3 Institutionalize a Defined Process

The process is institutionalized as a defined process.

GP 3.1 Establish a Defined Process

Establish and maintain the description of a defined project monitoring and control process.

GP 3.2 Collect Improvement Information

Collect work products, measures, measurement results, and improvement information derived from planning and performing the project monitoring and control process to support the future use and improvement of the organization's processes and process assets.

Elaboration:

Examples of work products, measures, measurement results, and improvement information include the following:

- Records of significant deviations
- Criteria for what constitutes a deviation
- Corrective action results

Continuous Only

GG 4 Institutionalize a Quantitatively Managed Process

The process is institutionalized as a quantitatively managed process.

GP 4.1 Establish Quantitative Objectives for the Process

Establish and maintain quantitative objectives for the project monitoring and control process, which address quality and process performance, based on customer needs and business objectives.

GP 4.2 Stabilize Subprocess Performance

Stabilize the performance of one or more subprocesses to determine the ability of the project monitoring and control process to achieve the established quantitative quality and process performance objectives.

Continuous-Only

GG 5 — Institutionalize an Optimizing Process

The process is institutionalized as an optimizing process.

GP 5.1 — Ensure Continuous Process Improvement

Ensure continuous improvement of the project monitoring and control process in fulfilling the relevant business objectives of the organization.

GP 5.2 — Correct Root Causes of Problems

Identify and correct the root causes of defects and other problems in the project monitoring and control process.

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