

PROCESS AND PRODUCT QUALITY ASSURANCE

A Support Process Area at Maturity Level 2

Purpose

The purpose of Process and Product Quality Assurance (PPQA) is to provide staff and management with objective insight into processes and associated work products.

Introductory Notes

The Process and Product Quality Assurance process area involves the following activities:

- Objectively evaluating performed processes, work products, and services against applicable process descriptions, standards, and procedures
- Identifying and documenting noncompliance issues
- Providing feedback to project staff and managers on the results of quality assurance activities
- Ensuring that noncompliance issues are addressed

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The Process and Product Quality Assurance process area supports the delivery of high-quality products and services by providing project staff and managers at all levels with appropriate visibility into, and feedback on, processes and associated work products throughout the life of the project.

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The acquirer evaluates critical acquirer work products, acquirer processes, results of supplier process quality assurance, and supplier deliverables. For example, process and product quality assurance ensures that the solicitation package was developed using standard processes agreed to by the organization and that it conforms to all applicable policies. The acquirer may review results of supplier quality assurance activities for selected supplier processes to ensure that the supplier is following its own processes.

Typically, selected supplier processes are critical processes, such as engineering or verification processes, where the supplier is required through the supplier agreement to follow project-specified standards. In exceptional cases, the acquirer may directly perform process and product quality assurance for selected supplier processes. The acquirer and supplier periodically share quality assurance issues and findings that are of mutual interest.

The practices in the Process and Product Quality Assurance process area ensure that planned processes are implemented, while the practices in the Acquisition Verification process area ensure that

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specified requirements are satisfied. These two process areas may on occasion address the same work product but from different perspectives. Projects should take advantage of the overlap in order to minimize duplication of effort while taking care to maintain separate perspectives.

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Objectivity in process and product quality assurance evaluations is critical to the success of the project. (See the definition of “objectively evaluate” in the glossary.) Objectivity is achieved by both independence and the use of criteria. A combination of methods providing evaluations against criteria by those not producing the work product is often used. Less formal methods can be used to provide broad day-to-day coverage. More formal methods can be used periodically to assure objectivity.

- Examples of ways to perform objective evaluations include the following:
- Formal audits by organizationally separate quality assurance organizations
 - Peer reviews, which may be performed at various levels of formality
 - In-depth review of work at the place it is performed (i.e., desk audits)
 - Distributed review and comment of work products

Traditionally, a quality assurance group that is independent of the project provides objectivity. However, another approach may be appropriate in some organizations to implement the process and product quality assurance role without that kind of independence.

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For example, in an organization with an open, quality-oriented culture, the process and product quality assurance role may be performed, partially or completely, by peers; and the quality assurance function may be embedded in the process. For small organizations, this might be the most feasible approach.

If quality assurance is embedded in the process, several issues must be addressed to ensure objectivity. Everyone performing quality assurance activities should be trained. Those performing quality assurance activities for a work product should be separate from those directly involved in developing or maintaining the work product. An independent reporting channel to the appropriate level of organizational management must be available so that noncompliance issues can be escalated as necessary.

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For example, when implementing peer reviews as an objective evaluation method, the following issues must be addressed:

- Members are trained and roles are assigned for people attending the peer reviews.
- A member of the peer review who did not produce this work product is assigned to perform the quality assurance role.
- Checklists are available to support the quality assurance activity.
- Defects are recorded as part of the peer review report and are tracked and escalated outside the project when necessary.

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Quality assurance should begin in the early phases of a project to establish plans, processes, standards, and procedures that will add value to the project and satisfy the requirements of the project and organizational policies. Those performing quality assurance participate in establishing plans, processes, standards, and procedures to ensure that they fit project needs and that they will be usable for performing quality assurance evaluations. In addition, processes and associated work products to be evaluated during the project are designated. This designation may be based on sampling or on objective criteria that are consistent with organizational policies, project requirements, and needs.

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When noncompliance issues are identified, they are first addressed in the project and resolved there if possible. Noncompliance issues that cannot be resolved in the project are escalated to an appropriate level of management for resolution.

This process area applies primarily to evaluations of project activities and work products, but it also applies to other activities and work products, such as training organizational support groups. For these activities and work products, the term project should be appropriately interpreted.

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- Deleted: of a project, but it also applies to evaluations of nonproject activities and work products
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It also applies to the reviews of supplier process quality results as defined in the supplier agreement. For example, the supplier agreement can require the supplier to provide detailed appraisal results of mandatory, acquirer-scoped CMMI for Development appraisals of supplier processes.

Related Process Areas

Refer to the Solicitation and Supplier Agreement Development process area for more information about specifying evaluation of selected supplier processes and work products.

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Refer to the Agreement Management process area for more information about managing conformance to supplier agreements.

Refer to the Acquisition Verification process area for more information about the verification of acquirer work products.

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Refer to the Acquisition Technical Management process area for more information about evaluating the technical solution.

Specific Goal and Practice Summary

- SG 1 Objectively Evaluate Processes and Work Products
 - SP 1.1 Objectively Evaluate Processes
 - SP 1.2 Objectively Evaluate Work Products and Services
- SG 2 Provide Objective Insight
 - SP 2.1 Communicate and Ensure the Resolution of Noncompliance Issues
 - SP 2.2 Establish Records

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Specific Practices by Goal

SG 1 Objectively Evaluate Processes and Work Products

Adherence of the performed process and associated work products and services to applicable process descriptions, standards, and procedures is objectively evaluated.

SP 1.1 Objectively Evaluate Processes

Objectively evaluate designated performed processes against applicable process descriptions, standards, and procedures.

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Objectivity in quality assurance evaluations is critical to the success of the project. A description of the quality assurance reporting chain and how it ensures objectivity should be defined.

The description of the quality assurance reporting chain is extended to include the relationship between the acquirer and suppliers. It is important to ensure that acquirer and supplier processes comply with applicable statutory and regulatory requirements.

The acquirer evaluates the project's execution of acquirer processes, including interactions with suppliers, and reviews evaluation reports provided by suppliers to determine if they follow their processes. There should be sufficient process quality assurance to detect noncompliance issues as early as possible that may affect the acquirer's or supplier's ability to successfully deliver products to the customer.

Through the supplier agreement, the acquirer should retain the right to audit supplier processes if there is an indication that suppliers are not following acceptable processes.

Typical Work Products

1. Evaluation reports
2. Noncompliance reports
3. Corrective actions

Typical Supplier Deliverables

1. Reports resulting from evaluations carried out by the supplier
2. Noncompliance reports
3. Corrective actions

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Subpractices

1. Promote an environment (created as part of project management) that encourages employee participation in identifying and reporting quality issues.
2. Establish and maintain clearly stated criteria for evaluations.
3. Use the stated criteria to evaluate performed processes for adherence to process descriptions, standards, and procedures.
The supplier regularly provides process evaluation reports as defined in the supplier agreement.
4. Identify each noncompliance found during the evaluation.
Analyze results of monitoring selected acquirer processes to detect issues as early as possible that may affect the supplier's ability to satisfy requirements of its agreement.
5. Identify lessons learned that could improve processes for future products and services.

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<#>What will be evaluated!
<#>When or how often a process will be evaluated!
<#>How the evaluation will be conducted!
<#>Who must be involved in the evaluation!

SP 1.2 Objectively Evaluate Work Products and Services

Objectively evaluate designated work products and services against applicable process descriptions, standards, and procedures.

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In addition to objectively evaluating critical acquirer work products, the acquirer uses objective acceptance criteria to evaluate supplier deliverables throughout the project lifecycle. The acquirer's acceptance criteria for supplier deliverables are consistent with project objectives and sufficient to allow the supplier to satisfactorily demonstrate that the product conforms to contractual requirements.

Refer to the Acquisition Verification process area for more information about verifying selected work products.

Typical Work Products

1. Evaluation reports
2. Noncompliance reports
3. Corrective actions

Subpractices

1. Select work products to be evaluated based on documented sampling criteria if sampling is used.
2. Establish and maintain clearly stated criteria for the evaluation of work products.
3. Use the stated criteria during evaluations of work products.
4. Evaluate work products before they are delivered to the customer.
5. Evaluate work products at selected milestones in their development.

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<#>What will be evaluated during the evaluation of a work product!
<#>When or how often a work product will be evaluated!
<#>How the evaluation will be conducted!
<#>Who must be involved in the evaluation!

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- 6. Perform in-progress or incremental evaluations of work products and services against process descriptions, standards, and procedures.
- 7. Identify each case of noncompliance found during evaluations.
- 8. Identify lessons learned that could improve processes for future products and services.

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SG 2 Provide Objective Insight

Noncompliance issues are objectively tracked and communicated, and resolution is ensured.

SP 2.1 Communicate and Ensure the Resolution of Noncompliance Issues

Communicate quality issues and ensure the resolution of noncompliance issues with the staff and managers.

Noncompliance issues are problems identified in evaluations that reflect a lack of adherence to applicable standards, process descriptions, or procedures. The status of noncompliance issues provides an indication of quality trends. Quality issues include noncompliance issues and trend analysis results.

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When noncompliance issues cannot be resolved in the project, use established escalation mechanisms to ensure that the appropriate level of management can resolve the issue. Track noncompliance issues to resolution.

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Noncompliance issues of both the acquirer and supplier are tracked and resolved.

Typical Work Products

- 1. Corrective action reports
- 2. Evaluation reports
- 3. Quality trends
- 4. Acquirer feedback to suppliers

Typical Supplier Deliverables

- 1. Corrective actions

Subpractices

- 1. Resolve each noncompliance with the appropriate members of the staff where possible.

The acquirer involves suppliers when resolving noncompliance issues, as appropriate.

- 2. Document noncompliance issues when they cannot be resolved in the project.

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Examples of ways to resolve a noncompliance in the project include the following:

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- Fixing the noncompliance
- Changing the process descriptions, standards, or procedures that were violated
- Obtaining a waiver to cover the noncompliance

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3. Escalate noncompliance issues that cannot be resolved in the project to the appropriate level of management designated to receive and act on noncompliance issues.

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4. Analyze noncompliance issues to see if there are quality trends that can be identified and addressed.

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5. Ensure that relevant stakeholders are aware of results of evaluations and quality trends in a timely manner.

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6. Periodically review open noncompliance issues and trends with the manager designated to receive and act on noncompliance issues.

7. Track noncompliance issues to resolution.

SP 2.2 Establish Records

Establish and maintain records of quality assurance activities.

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Typical Work Products

1. Evaluation logs
2. Quality assurance reports
3. Status reports of corrective actions
4. Reports of quality trends

Subpractices

1. Record process and product quality assurance activities in sufficient detail so that status and results are known.
2. Revise the status and history of quality assurance activities as necessary.

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Process and Product Quality Assurance (PPQA)

Generic Practices by Goal

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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 process and product quality assurance 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 process and product quality assurance process.

Elaboration:

This policy establishes organizational expectations for objectively evaluating whether processes and associated work products adhere to the applicable process descriptions, standards, and procedures; and ensuring that noncompliance is addressed.

This policy also establishes organizational expectations for process and product quality assurance being in place for all projects. Process and product quality assurance must possess sufficient independence from project management to provide objectivity in identifying and reporting noncompliance issues.

GP 2.2 Plan the Process

Establish and maintain the plan for performing the process and product quality assurance process.

Elaboration:

This plan for performing the process and product quality assurance process can be included in (or referenced by) the project plan, which is described in the Project Planning process area.

GP 2.3 Provide Resources

Provide adequate resources for performing the process and product quality assurance process, developing the work products, and providing the services of the process.

Elaboration:

Examples of resources provided include the following tools:

Evaluation tools

Noncompliance tracking tool

GP 2.4 Assign Responsibility

Assign responsibility and authority for performing the process, developing the work products, and providing the services of the process and product quality assurance process.

Elaboration:

To guard against subjectivity or bias, ensure that those people assigned responsibility and authority for process and product quality assurance can perform their evaluations with sufficient independence and objectivity.

GP 2.5 Train People

Train the people performing or supporting the process and product quality assurance process as needed.

Elaboration:

Examples of training topics include the following:

Application domain

Customer relations

Process descriptions, standards, procedures, and methods for the project

Quality assurance objectives, process descriptions, standards, procedures, methods, and tools

GP 2.6 Manage Configurations

Place designated work products of the process and product quality assurance process under appropriate levels of control.

Elaboration:

Examples of work products placed under control include the following:

- Noncompliance reports
- Evaluation logs and reports

GP 2.7 Identify and Involve Relevant Stakeholders

Identify and involve the relevant stakeholders of the process and product quality assurance process as planned.

Elaboration:

Examples of activities for stakeholder involvement include the following:

- Establishing criteria for the objective evaluations of processes and work products
- Evaluating processes and work products
- Resolving noncompliance issues
- Tracking noncompliance issues to closure

GP 2.8 Monitor and Control the Process

Monitor and control the process and product quality assurance process against the plan for performing the process and take appropriate corrective action.

Elaboration:

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

- Variance of objective process evaluations planned and performed
- Variance of objective work product evaluations planned and performed
- Schedule for objective evaluations

GP 2.9 Objectively Evaluate Adherence

Objectively evaluate adherence of the process and product quality assurance process against its process description, standards, and procedures, and address noncompliance.

Elaboration:

Refer to Table 6.2 on page 95 in Generic Goals and Generic Practices for more information about the relationship between

generic practice 2.9 and the Process and Product Quality Assurance process area.

Examples of activities reviewed include the following:

- Objectively evaluating processes and work products
- Tracking and communicating noncompliance issues

Examples of work products reviewed include the following:

- Noncompliance reports
- Evaluation logs and reports

GP 2.10 Review Status with Higher Level Management

Review the activities, status, and results of the process and product quality assurance 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 process and product quality assurance process.

GP 3.2 Collect Improvement Information

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

Continuous/Maturity Levels 3 - 5 Only

Elaboration:

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

- Evaluation logs
- Quality trends
- Noncompliance report
- Status reports of corrective action
- Cost of quality reports for the project

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 process and product quality assurance 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 process and product quality assurance process to achieve the established quantitative quality and process-performance objectives.

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 process and product quality assurance 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

Continuous Only

problems in the process and product quality assurance process.