

## PROCESS AND PRODUCT QUALITY ASSURANCE

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A Support Process Area at Maturity Level 2

### Purpose

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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

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

- Objectively evaluating performed processes, and work products, and services against ~~the~~ 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

The Process and Product Quality Assurance process area supports the delivery of high-quality products and services by providing ~~the~~ 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.

The practices in the Process and Product Quality Assurance process area ensure that planned processes are implemented, while the practices in the Verification Service System Development process area ensure that ~~the~~ 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 ~~the~~ separate perspectives.

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 ~~this~~ objectivity. ~~However, another approach~~ may be appropriate in some organizations, ~~however~~, to implement the process and product quality assurance role without that kind of independence.

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 ~~embedded approach~~ 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 ~~in quality assurance~~. 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.

For example, ~~in 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 of QA~~.
- Checklists are available to support the ~~QA quality assurance~~ activity.
- Defects are recorded as part of the peer review report and are tracked and escalated outside the project when necessary.

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 ~~the~~ organizational policies. Those performing quality assurance participate in establishing ~~the~~ plans, processes, standards, and procedures to ensure that they fit ~~the project's project~~ needs and that they will be ~~useable~~ usable for performing quality assurance evaluations. In addition, ~~the specific~~ processes and associated work products ~~that will 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 project ~~requirements and~~ needs.

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

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

## Related Process Areas

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### SSD Addition

*Refer to the ~~Project Planning~~Service System Development process area for more information about ~~identifying processes and associated work products that will be objectively evaluated.~~*

*Refer to the ~~Verification~~process area for more information about ~~satisfying~~verifying selected service system components against their specified requirements.*

## 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

## Specific Practices by Goal

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### 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 ~~the~~ designated performed processes against ~~the~~ applicable process descriptions, standards, and procedures.***

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.

#### Typical Work Products

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

#### 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 ~~the~~ evaluations.  
The intent of this subpractice is to provide criteria, based on business needs, such as the following:
  - 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
3. Use the stated criteria to evaluate performed processes for adherence to process descriptions, standards, and procedures.
4. Identify each noncompliance found during the evaluation.
5. Identify lessons learned that could improve processes for future products ~~and services~~.

#### SP 1.2 Objectively Evaluate Work Products ~~and Services~~

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

#### 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.  
Work products may include services produced by a process whether the recipient of the service is internal or external to the project or organization.
2. Establish and maintain clearly stated criteria for the evaluation of selected work products.

The intent of this subpractice is to provide criteria, based on business needs, such as the following:

- 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
3. Use the stated criteria during ~~the~~ evaluations of selected work products.
  4. Evaluate ~~work products before they are delivered to the customer.~~
  5. ~~Evaluates~~selected work products at selected milestones~~periods~~ in their development~~lifetime as appropriate including before and during delivery to the customer.~~
  6. Perform in-progress or incremental evaluations of selected work products ~~and services~~ against process descriptions, standards, and procedures.  
If a service to be evaluated has a process description, then SP 1.1 covers the evaluation of that service against its process description. This specific practice would then instead focus on the service itself—its results, its impacts, etc.
  6. Identify each case of noncompliance found during ~~the~~ evaluations.
  8. Identify lessons learned that could improve processes for future products ~~and services.~~

## 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 ~~results of~~ trend analysis results.

When ~~local resolution of~~ noncompliance issues cannot be obtained~~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.

#### Typical Work Products

1. Corrective action reports
2. Evaluation reports
3. Quality trends

### Subpractices

1. Resolve each noncompliance with the appropriate members of the staff ~~whereif~~ possible.
2. Document noncompliance issues when they cannot be resolved ~~with~~in the project.

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

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

3. Escalate noncompliance issues that cannot be resolved ~~with~~in the project to the appropriate level of management designated to receive and act on noncompliance issues.
4. Analyze ~~the~~ noncompliance issues to see if there are ~~any~~ quality trends that can be identified and addressed.
5. Ensure that relevant stakeholders are aware of ~~the~~ results of evaluations and ~~the~~ quality trends in a timely manner.
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 ~~the~~ quality assurance activities.***

### 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 ~~suchso~~ that status and results are known.
2. Revise the status and history of ~~the~~ quality assurance activities as necessary.

## **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 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 problems in the process and product quality assurance process.*

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