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REQUIREMENTS MANAGEMENT

~~Project Management~~ Process Area at Maturity Level 2

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Purpose

The purpose of Requirements Management (REQM) is to manage requirements of the project's products and product components and to identify inconsistencies between those requirements and the project's plans and work products.

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Deleted: All development projects have requirements. In the case of a project that is focused on maintenance activities, the changes to the product or product components are based on changes to the existing requirements, design, or implementation. The requirements changes, if any, might be documented in change requests from the customer or users, or they might take the form of new requirements received from the requirements development process. Regardless of their source or form, the maintenance activities that are driven by changes to requirements are managed accordingly.¶

Introductory Notes

Requirements management processes manage all requirements received or generated by the project, including both technical and nontechnical requirements as well as requirements levied on the project by the organization.

In particular, if the ~~Acquisition~~ Requirements Development process area is implemented, ~~the resulting~~ processes will generate ~~customer and contractual~~ requirements to be managed by requirements management processes. When the Requirements Management ~~and the Acquisition~~ Requirements Development process areas are ~~both~~ implemented, their associated processes may be closely tied and performed concurrently.

The project takes appropriate steps to ensure that the agreed-on set of requirements is managed to support the planning and execution needs of the project. When a project receives requirements from an approved requirements provider, ~~these~~ requirements are reviewed with the requirements provider to resolve issues and prevent misunderstanding before requirements are incorporated into ~~project~~ plans. Once the requirements provider and the requirements receiver reach an agreement, commitment to the requirements is obtained from project participants. The project manages changes to requirements as they evolve and identifies inconsistencies that occur among plans, work products, and requirements.

Part of ~~managing~~ requirements is ~~documenting~~ requirements changes and ~~their~~ rationale and ~~maintaining~~ bidirectional traceability between source requirements and all product and product component requirements. (See the definition of "bidirectional traceability" in the glossary.)

~~Throughout the process areas, where we use the terms product and product component, they are intended to include service and service component and should be interpreted in that way.~~

Related Process Areas

Refer to the **Acquisition** Requirements Development process area for more information about transforming stakeholder needs into **customer** requirements and **allocating** requirements **to supplier deliverables**.

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Refer to the **Project Planning** process area for more information about how project plans reflect requirements and **must** be revised as requirements change.

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Refer to the **Configuration Management** process area for more information about baselines and controlling changes to requirements **documents**.

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Refer to the **Project Monitoring and Control** process area for more information about tracking and controlling activities and work products that are based on requirements and taking appropriate corrective action.

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Refer to the **Risk Management** process area for more information about identifying and handling risks associated with requirements.

Specific Goal and Practice Summary

SG 1 Manage Requirements

- SP 1.1 **Understand** Requirements
- SP 1.2 Obtain Commitment to Requirements
- SP 1.3 Manage Requirements Changes
- SP 1.4 Maintain Bidirectional Traceability of Requirements
- SP 1.5 Identify Inconsistencies Between Project Work and Requirements

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Specific Practices by Goal

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SG 1 Manage Requirements

Requirements are managed and inconsistencies with project plans and work products are identified.

The project maintains a current and approved set of requirements over the life of the project by doing the following:

- Managing all changes to requirements
- Maintaining relationships among requirements, project plans, and work products
- Identifying inconsistencies among requirements, project plans, and work products
- Taking corrective action

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Refer to the **Project Monitoring and Control** process area for more information about taking corrective action.

Requirements management typically includes directly managing changes to customer and contractual requirements developed by the acquirer and overseeing the supplier's requirements management

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Refer to the **Requirements Development** process area for more information about ensuring that the requirements reflect the needs and expectations of the customer. ¶

Requirements Management (REQM)

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process. Requirements changes may result in changes to the supplier agreement.

SP 1.1 Understand Requirements

Develop an understanding with requirements providers on the meaning of requirements.

To avoid requirements creep, criteria are established to designate appropriate channels or official sources from which to receive requirements. Those receiving requirements conduct analyses of them with the provider to ensure that a compatible, shared understanding is reached on the meaning of requirements. The result of these analyses and dialog is an agreed-to set of requirements.

Typical Work Products

1. Lists of criteria for distinguishing appropriate requirements providers
2. Criteria for evaluation and acceptance of requirements
3. Results of analyses against criteria
4. An agreed-to set of requirements

Subpractices

1. Establish criteria for distinguishing appropriate requirements providers.
2. Establish objective criteria for the evaluation and acceptance of requirements.

Lack of evaluation and acceptance criteria often results in inadequate verification, costly rework, or customer rejection.

Examples of evaluation and acceptance criteria include the following:

- Clearly and properly stated
- Complete
- Consistent with one another
- Uniquely identified
- Appropriate to implement
- Verifiable (testable)
- Traceable

3. Analyze requirements to ensure that established criteria are met.
4. Reach an understanding of requirements with requirements providers so that project participants can commit to them.

SP 1.2 Obtain Commitment to Requirements

Obtain commitment to requirements from project participants.

Refer to the Project Monitoring and Control process area for more information about monitoring the commitments made.

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As the project matures and requirements are derived, all activities or disciplines will receive

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The previous specific practice dealt with reaching an understanding with requirements providers. This specific practice deals with agreements and commitments among those who must carry out activities necessary to implement requirements. Requirements evolve throughout the project. As requirements evolve, this specific practice ensures that project participants commit to the current and approved requirements and the resulting changes in project plans, activities, and work products.

Changes to requirements may lead to changes in supplier agreements. These changes must be agreed on by the acquirer and supplier after appropriate negotiations.

Typical Work Products

1. Requirements impact assessments
2. Documented commitments to requirements and requirements changes

Typical Supplier Deliverables

1. Supplier requirements impact assessments

Subpractices

1. Assess the impact of requirements on existing commitments.
2. Negotiate and record commitments.

Changes to existing commitments should be negotiated before project participants commit to a requirement or requirement change.

The acquirer negotiates commitments with the customer and supplier before committing to requirement changes.

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IPPD Addition¶

When integrated teams are formed, the project participants are the integrated teams and their members. Commitment to the requirement for interacting with other integrated teams is as important for each integrated team as its commitments to product and other project requirements.¶

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SP 1.3 Manage Requirements Changes

Manage changes to requirements as they evolve during the project.

Refer to the Configuration Management process area for more information about maintaining and controlling the requirements baseline and making requirements and change data available to the project.

During the project, requirements change for a variety of reasons. As needs change and as work proceeds, changes may have to be made to existing requirements. It is essential to manage these additions and changes efficiently and effectively. To effectively analyze the impact of changes, it is necessary that the source of each requirement is known and the rationale for the change is documented. The project may, however, want to track appropriate measures of requirements volatility to judge whether new or revised controls are necessary.

If contractual requirements defined in the supplier agreement are affected by the changes, the supplier agreement also must be aligned with the changed requirements.

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Typical Work Products

1. Requirements change requests
2. Requirements change impact reports
3. Requirements status
4. Requirements database
5. Requirements decision database

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Typical Supplier Deliverables

1. Requirements change requests
2. Requirements change impact reports

Subpractices

1. Document all requirements and requirements changes that are given to or generated by the project.
2. Maintain a requirements change history, including the rationale for changes.
Maintaining the change history helps track requirements volatility.
3. Evaluate the impact of requirement changes from the standpoint of relevant stakeholders.
4. Make requirements and change data available to the project.

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SP 1.4 Maintain Bidirectional Traceability of Requirements

Maintain bidirectional traceability among requirements and work products.

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The intent of this specific practice is to maintain the bidirectional traceability of requirements. (See the definition of "bidirectional traceability" in the glossary.) When requirements are managed well, traceability can be established from a source requirement to its lower level requirements and from those lower level requirements back to their source requirements. Such bidirectional traceability helps determine whether all source requirements have been completely addressed and whether all lower level requirements can be traced to a valid source.

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Requirements traceability can also cover relationships to other entities such as intermediate and final work products, changes in design documentation, and test plans. Traceability can cover horizontal relationships, such as across interfaces, as well as vertical relationships. Traceability is particularly needed in conducting the impact assessment of requirements changes on project activities and work products.

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The supplier maintains comprehensive bidirectional traceability to requirements defined in the supplier agreement by the acquirer, and the acquirer verifies that traceability. The acquirer maintains bidirectional

traceability between customer requirements and contractual requirements.

Typical Work Products

1. Requirements traceability matrix
2. Requirements tracking system

Typical Supplier Deliverables

1. Comprehensive requirements traceability matrix managed by the supplier as required by the supplier agreement

Subpractices

1. Maintain requirements traceability to ensure that the source of lower level (derived) requirements is documented.

Traceability from customer to contractual requirements is maintained by the acquirer. Traceability from contractual requirements to derived or additional requirements is maintained by the supplier.

2. Maintain requirements traceability from a requirement to its derived requirements and allocation to functions, interfaces, objects, people, processes, and work products.

3. Generate a requirements traceability matrix.

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A comprehensive traceability matrix, tracing from customer requirements to contractor requirements is maintained by the acquirer. A comprehensive traceability matrix, tracing from contractual requirements to lower level requirements is maintained by the supplier.

SP 1.5 Identify Inconsistencies Between Project Work and Requirements

Identify inconsistencies between project plans and work products and requirements.

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Refer to the Project Monitoring and Control process area for more information about monitoring and controlling project plans and work products for consistency with requirements and taking corrective actions when necessary.

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This specific practice finds inconsistencies between requirements and project plans and work products and initiates corrective actions to resolve them.

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Corrective actions taken by the project to resolve inconsistencies may also result in changes to project plans and supplier agreements.

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Typical Work Products

1. Documentation of inconsistencies between requirements and project plans and work products, including sources and conditions.
2. Corrective actions

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Subpractices

1. Review project plans, activities, and work products for consistency with requirements and changes made to them.
2. Identify the source of the inconsistency.
3. Identify changes that must be made to plans and work products resulting from changes to the requirements baseline.
4. Initiate corrective actions.

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Goal¶

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Continuous Only

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Requirements Management (REQM)

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 requirements management 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 requirements management process.

Elaboration:

This policy establishes organizational expectations for managing requirements and identifying inconsistencies between the requirements and the project plans and work products.

GP 2.2 Plan the Process

Establish and maintain the plan for performing the requirements management process.

Elaboration:

This plan for performing the requirements management 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 requirements management process, developing the work products, and providing the services of the process.

Elaboration:

Examples of resources provided include the following tools:

Requirements tracking tools

Traceability tools

GP 2.4 Assign Responsibility

Assign responsibility and authority for performing the process, developing the work products, and providing the services of the requirements management process.

GP 2.5 Train People

Train the people performing or supporting the requirements management process as needed.

Elaboration:

Examples of training topics include the following:

Application domain

Requirements definition, analysis, review, and management

Requirements management tools

Configuration management

Negotiation and conflict resolution

GP 2.6 Manage Configurations

Place designated work products of the requirements management process under appropriate levels of control.

Elaboration:

Examples of work products placed under control include the following:

Requirements

Requirements traceability matrix

GP 2.7 Identify and Involve Relevant Stakeholders

Identify and involve the relevant stakeholders of the requirements management process as planned.

Elaboration:

Select relevant stakeholders from customers, end users, developers, producers, testers, suppliers, marketers, maintainers, disposal personnel, and others who may be affected by, or may affect, the product as well as the process.

Examples of activities for stakeholder involvement include the following:

- Resolving issues on the understanding of the requirements
- Assessing the impact of requirements changes
- Communicating the bidirectional traceability
- Identifying inconsistencies among project plans, work products, and requirements

GP 2.8 Monitor and Control the Process

Monitor and control the requirements management 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:

- Requirements volatility (percentage of requirements changed)
- Schedule for coordination of requirements
- Schedule for analysis of a proposed requirements change

GP 2.9 Objectively Evaluate Adherence

Objectively evaluate adherence of the requirements management process against its process description, standards, and procedures, and address noncompliance.

Elaboration:

Examples of activities reviewed include the following:

- Managing requirements
- Identifying inconsistencies among project plans, work products, and requirements

Examples of work products reviewed include the following:

- Requirements
- Requirements traceability matrix

GP 2.10 Review Status with Higher Level Management

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

Elaboration:

Proposed changes to commitments to be made external to the organization are reviewed with higher level management to ensure that all commitments can be accomplished.

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 requirements management process.

GP 3.2 Collect Improvement Information

Collect work products, measures, measurement results, and improvement information derived from planning and performing the requirements management 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:

- Requirements traceability matrix
- Number of unfunded requirements changes after baselining
- Lessons learned in resolving ambiguous requirements

Continuous Only

GG 4 Institutionalize a Quantitatively Managed Process

The process is institutionalized as a quantitatively managed process.

Continuous Only

GP 4.1 Establish Quantitative Objectives for the Process

Establish and maintain quantitative objectives for the requirements management 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 requirements management 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 requirements management 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 requirements management process.