<Organization>

Peer Review Process Description

Version 1.0 draft1
<date>
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Table of Contents

1. Overview

In a peer review, co-workers of a person who created a software work product examine that product to identify defects and correct shortcomings. A review:

- verifies whether the work product correctly satisfies the specifications found in any predecessor work product, such as requirements or design documents
- identifies any deviation from standards, including issues that may affect maintainability of the software
- suggests improvement opportunities to the author
- promotes the exchange of techniques and education of the participants.

All interim and final development work products are candidates for review, including:

- requirements specifications
- user interface specifications and designs
- architecture, high-level design, and detailed designs and models
- source code
- test plans, designs, cases, and procedures
- software development plans, including project management plan, configuration management plan, and quality assurance plan

This document defines an overall peer review process. It includes procedures for conducting inspections and two types of informal peer review, a walkthrough and a passaround, as well as guidance for selecting the appropriate approach for each review.

2. Work Aids

The following peer review work aids are available from *<location>*:

- Inspection Summary Report
- Issue Log
- Typo List
- Inspection Moderator's Checklist
- Inspection Lessons Learned Questionnaire
- defect checklists for several types of software work products

3. Risk Assessment Guidance

To judge which software components (or portions of components) to review and what type of review method to use, consider the following risk criteria:

- components that use new technology, techniques, or tools
- key architectural components

- complex logic or algorithms that are difficult to understand but must be accurate and optimized
- mission-, security-, or safety-critical components with dangerous failure modes
- components having many exception conditions or failure modes
- exception handling code that cannot easily be tested
- components that are intended to be reused
- components that will serve as models or templates for other components
- components that affect multiple portions of the product
- complex user interfaces
- components created by less experienced developers
- code modules having high cyclomatic complexity
- modules having a history of many defects or changes

Work products that fit in one or more of these categories are considered high risk. A product is considered low risk if an undetected error will not significant affect the project's ability to meet its schedule, quality, cost, and feature objectives. Use inspections for high-risk work products, or the high-risk portions of large products, and for major work products that are about to be baselined. Less formal reviews are acceptable for other work products

4. Participants

Table 1 suggests project roles who might review different work products. Not all of these perspectives need to be represented. In general, a work product should be reviewed by:

- the author of any predecessor document or specification
- someone who must base their subsequent work on the work product
- peers of the author
- anyone responsible for a component to which the work product interfaces

Attendance by anyone with supervisory authority over the author is by invitation of the author only.

Table 1. Review Participants for Different Types of Work Products.

Work Product Type	Suggested Reviewers
Architecture or High-Level Design	architect, requirements analyst, designer, project manager, integration test engineer
Detail Design	designer, architect, programmer, integration test engineer
Process Documentation	process improvement group leader, process improvement working group members, management-level process owner, practitioner representatives who will use the process
Project Plans	project manager, program manager, business sponsor, marketing or sales representative, technical lead, quality assurance manager

Requirements Specification	requirements analyst, project manager, architect, designer, system test engineer, quality assurance manager, user or marketing representative, documentation writer, subject matter expert, technical support representative
Source Code	programmer, designer, unit test engineer, maintainer, requirements analyst, coding standards expert
System Technical Documentation	author, project manager, maintainer, programmer
Test Documentation	test engineer, programmer (unit testing) or architect (integration testing) or requirements analyst (system testing), quality assurance representative
User Interface Design	user interface designer, requirements analyst, user, application domain expert, usability or human factors expert, system test engineer
User Manual	documentation writer, requirements analyst, user or marketing representative, system test engineer, maintainer, designer, instructional designer, trainer, technical support representative

5. Inspection Procedure

Participants The roles and responsibilities shown below pertain to the inspection process. All participants are inspectors, in addition to any specialized role they might have. At least three participants, including the author, are required for an inspection. If only three people participate in an inspection, the moderator shall also serve as recorder or reader. The author may not serve as reader, moderator, or recorder.

Role	Responsibilities
Author	- Creator or maintainer of the work product to be inspected. Initiates the inspection process by asking the peer review coordinator to assign a moderator. - States his or objectives for the inspection. - Delivers work product and its specification or predecessor document to moderator. - Works with moderator to select inspectors and assign roles. - Addresses items on the Issue Log and Typo Lists. - Reports rework time and defect counts to moderator.
Moderator	- Uses Inspection Moderator's Checklist as a work aid. - Plans, schedules, and leads the inspection events. - Works with author to select inspectors and assign roles. - Assembles inspection package and delivers it to inspectors at least 3 days prior to the inspection meeting. - Determines whether preparation is sufficient to hold the meeting. If not, reschedules the meeting. - Facilitates inspection meeting. Corrects any inappropriate behavior. Solicits input from inspectors as reader presents each section of the work product. Records any action items or side issues that arise during the inspection. - Leads inspection team in determining the work product appraisal. - Serves as verifier or delegates this responsibility to someone else. - Delivers completed Inspection Summary Report to the organization's peer review coordinator.
Reader	Presents portions of the work product to the inspection team to elicit comments, issues, or questions from inspectors.
Recorder	Records and classifies issues raised during inspection meeting.
Inspector	Examines work product prior to the inspection meeting to find defects and prepare for contributing to the meeting. Records preparation time. Participates during the meeting to identify defects, raise issues, and suggest improvements.
Verifier	Performs follow-up to determine whether rework has been performed appropriately and correctly.
Peer Review Coordinator	Custodian of the project's inspection metrics database. Maintains records of inspections conducted and data from the

	Inspection Summary Report for each inspection. Generates reports on inspection data for management, process improvement team, and peer review process owner.

Entry Criteria

❏ The author selected an inspection approach for the product being reviewed.
❏ All necessary supporting documentation is available
❏ The author has stated his or her objectives for this inspection.
❏ Reviewers are trained in the peer review process.
❏ Documents to be inspected are identified with a version number. All pages are numbered and line numbers are displayed. The documents have been spell-checked.
❏ Source code to be inspected is identified with a version number. Listings have line numbers and page numbers. Code compiles with no errors or warning messages using the project's standard compiler switches. Errors found using code analyzer tools have been corrected.
❏ For a re-inspection, all issues from the previous inspection were resolved.
❏ Any additional entry criteria defined for the specific type of work product are also satisfied.

Planning

Task	Responsible
1. Give moderator the work product to be inspected and supporting documents, such as specifications, predecessor documents, or pertinent test documentation.	Moderator
2. Determine whether work product satisfies inspection entry criteria.	Author
3. Based on the size and complexity of the work product, determine how many inspection meetings will be required.	Moderator and Author
4. Select inspectors and assign roles to individuals. Gain agreement from the other inspectors to participate.	Moderator and Author
5. Determine whether an overview meeting is required.	Author
6. Schedule the inspection, and possibly overview, meetings and distribute a meeting notice.	Moderator
7. Distribute the inspection package to the participants at least 3 working days prior to the inspection meeting.	Moderator or Author

Overview

Task	Responsible
1. Describe the important features of the work product to the rest of the inspection team. State inspection objectives.	Author
2. Evaluate the assumptions, history, and context of the work product.	Inspectors

Preparation

Task	Responsible
1. Ask Individual inspectors to prepare with specific objectives in mind, such as: checking the consistency of cross-references; checking for interface errors; checking traceability to, and consistency with, predecessor specifications; or checking	Moderator and Author

	conformance to standards.	
2.	Examine the work product, to understand it, find defects, and raise questions about it. Use the appropriate defect checklist to focus attention on defects commonly found in the type of product being inspected. Use other analysis methods to look for defects as appropriate.	Inspectors
3.	Log minor defects found, such as typographical errors or style inconsistencies, on the Typo List. Deliver this to the author at or prior to the inspection meeting.	Inspectors

Inspection Meeting

	Task	Responsible
1.	**Open the Meeting:** Introduce the participants (if necessary) and state their roles, state the purpose of the inspection, and direct inspectors to focus their efforts toward finding defects, not solutions. Remind participants to address their comments to the work product under review, not to the author.	Moderator
2.	**Establish Preparedness:** Ask each inspector for his or her preparation time and records the times on the Inspection Summary Report. If preparation is insufficient, reschedule the meeting.	Moderator
3.	**Present Work Product:** Describe portions of the work product to the inspection team.	Reader
4.	**Raise Defects and Issues:** Point out concerns, potential defects, questions, or improvement opportunities after the reader presents each section.	Inspectors
5.	**Record Issues:** Capture the information in Table 2 on the Issue Log for each issue raised. State aloud what was recorded to make sure it was recorded accurately.	Recorder
6.	**Answer Questions:** Respond briefly to any specific questions raised, and contribute to defect detection based on special understanding of the work product.	Author
7.	**Make Product Appraisal:** After all meetings scheduled for a given inspection are complete, decide on the work product appraisal, selecting from the options in Table 3. If the inspectors disagree, assign the most conservative appraisal offered by any of the inspectors.	Inspectors
8.	**Sign Inspection Summary Report:** All participants sign the Inspection Summary Report to indicate their agreement with the inspection outcome.	Inspectors
9.	**Collect Inspection Feedback.** Ask the inspectors to evaluate the inspection and suggest improvements, using the Inspection Lessons Learned Questionnaire.	Moderator

Table 2. Information to Record for Each Defect Found.

Column	Description
Origin	development phase in which the defect was introduced
Type	• missing (something needs to be there but is not) • wrong (something is erroneous or conflicts with something else) • extra (something unnecessary is present) • usability • performance • non-defect issue (question, point of style, suggestion, clarification needed)
Severity	• major (could cause product failure or cost significantly more to correct in the future) • minor (non-fatal error, cosmetic problem, annoyance, or a workaround is available)
Location	page and line or section number where the defect is located
Description	concise description of the issue or possible defect

Table 3. Possible Appraisals of Inspected Work Products.

Appraisal	Meaning
Accepted As Is	Modifications may be required in the work product, but verification of the modification is not necessary.
Accept Conditionally	Defects must be corrected, and the changes must be verified by the individual named on the Inspection Summary Report.
Re-inspect Following Rework	A substantial portion of the product must be modified, or there are many changes to make. A second inspection is required after the author has completed rework.
Inspection Not Completed	A significant fraction of the planned material was not inspected, or the inspection was terminated for some reason.

Rework

Task	Responsible
1. Correct defects and typos found, resolve issues raised, and modify work product accordingly. Mark issues list to indicate action taken.	Author
2. Correct any other project documents based on defects identified in the inspected work product.	Author
3. Record any uncorrected defects in the project's defect tracking system.	Author
4. If rework verification is not needed, report the number of major and minor defects found and corrected and the actual rework effort to the moderator.	Author
5. Record the actual rework effort on the Inspection Summary Report.	Moderator

	Task	Responsible
Follow-Up	1. Confirm that the author has addressed every item on the Issue Log. Determine whether the author made appropriate decisions as to which defects not to correct and which improvement suggestions not to implement.	Verifier
	2. Examine the modified work product to judge whether the rework has been performed correctly. Report any findings to the author, so rework can be declared complete, incorrect rework can be redone, or items that were not originally pursued can be addressed.	Verifier
	3. Report the number of major and minor defects found and corrected and the actual rework effort to the moderator.	Author
	4. Check whether the exit criteria for the inspection and for the peer review process have been satisfied. If so, the inspection is complete.	Moderator
	5. Check the baselined work product into the project's configuration management system.	Author
	6. Deliver Inspection Summary Report and counts of defects found and defects corrected to peer review coordinator.	Author

Deliverables
1. Baselined work product
2. Completed Inspection Summary Report
3. Completed Issue Log
4. Completed Typo Lists
5. Counts of defects found and defects corrected

Exit Criteria
❏ All of the author's inspection objectives are satisfied.
❏ Issues raised during the inspection are tracked to closure.
❏ All major defects are corrected.
❏ Uncorrected defects are logged in the project's defect tracking system.
❏ The modified work product is checked into the project's configuration management system.
❏ If changes were required in earlier project deliverables, those deliverables have been correctly modified, checked into the project's configuration management system, and any necessary regression tests were passed.
❏ Moderator has collected and recorded the inspection data.
❏ Moderator has delivered the completed Inspection Summary Report and defect counts to the peer review coordinator.

7. Walkthrough Procedure

Participants	The author selects the participants in a walkthrough. No specific roles are assigned.
Entry Criteria	❏ The author selected a walkthrough review approach for the product being reviewed. ❏ The author has stated his or her objectives for the review.

Tasks

Task	Responsible
1. Select review participants, obtain their agreement to participate, and schedule a walkthrough meeting.	Author
2. Distribute work product to reviewers prior to the meeting.	Author
3. Describe the work product to the reviewers during the meeting in any appropriate way. Lead discussion on the topics of interest or concerns about the work product.	Author
4. Present comments, possible defects, and improvement suggestions to the author.	Reviewers
5. Based on reviewer comments, perform any necessary rework of the work product.	Author

Deliverables	Modified work product
Verification	No verification of rework is required. Changes are made at the author's discretion.
Exit Criteria	❏ The author has made any appropriate changes in the work product.

8. Passaround Procedure

Participants	The author selects the participants in a passaround. No specific roles are assigned. However, it can be beneficial to ask individual reviewers to examine the work product from specific perspectives, such as checking internal cross-references, confirming interface definitions, checking conformance to standards, or identifying grammatical and typographical errors.
Entry Criteria	❏ The author selected a passaround review approach. ❏ The author has stated his or her objectives for the review. ❏ The document has been spell-checked.

Tasks

Task	Responsible
1. Either distribute a physical or electronic copy of the work product to each reviewer, or create a file to which all reviewers have read/write access.	Author
2. Notify reviewers that work product is available and indicate the date by which review comments are to be provided.	Author
3. Either hand-write comments directly on the work product, or enter comments into the work product file, using a revision marks convention or an annotation feature of the tool being used. If working with an individual copy of the work product, deliver the work product with comments to the author after completing the review.	Reviewers
4. After the final date of the review period, remove work product from the shared file location and examine added comments.	Author
5. Based on reviewer comments, perform any necessary rework of the work product.	Author
6. If a shared file was used to accumulate comments, delete each comment from the work product as it is resolved. Leave any comments that require discussion in the work product until agreement is reached on actions to be taken.	Author

Deliverables	Modified work product
Verification	No verification of rework is required. The author is responsible for making appropriate decisions on issues and for correctly performing any rework.
Exit Criteria	❏ The author has addressed all review issues raised.

9. Measurements

The moderator shall collect the data items in Table 4 from each inspection. These data items are used to calculate the process metrics in Table 5 and to monitor and improve the inspection process. The moderator shall record the data items in the appropriate spaces on the Inspection Summary Report and Issue Log and report them to the organization's peer review coordinator. The peer review coordinator shall maintain these metrics in a repository and produce periodic reports of summary data for practitioners and managers.

<add section to describe tools and procedures for peer review coordinator to enter inspection data into the repository and generate reports>

Table 4. Data Items Collected From Each Inspection.

Data Item	Definition
Effort.Planning	total labor hours spent by the moderator and author in planning, scheduling meetings, assembling, duplicating, and distributing materials, and any other related tasks
Effort.Overview	total labor hours spent by the participants in an overview meeting, if one was held
Effort.Preparation	total labor hours spent by the inspectors and author preparing for the inspection
Effort.Rework	total labor hours the author spent correcting defects in the initial deliverable and making other improvements; include verification time from the follow-up stage
Time.Meeting	duration of the inspection meeting in hours
Defects.Found.Major, Defects.Found.Minor	total number of major and minor defects found by the inspection team; do not include non-defect issues raised, such as questions, requests for clarification, points of style, or items from the Typo Lists
Defects.Corrected.Major, Defects.Corrected.Minor	total number of major and minor defects corrected during rework
Size.Planned, Size.Actual	total physical lines of code (not including comments and blank lines) or number of document pages that were planned for inspection and that were actually inspected
Number.of.Inspectors	number of active participants in the inspection meeting
Inspection.Appraisal	inspection team's decision about disposition of the inspected work product (accepted as is, accepted conditionally, re-inspect following rework)

Table 5. Metrics Calculated From Inspection Data Items.

Metric	How Calculated
Defect.Density	Defects.Found.Total / Size.Actual
Defects.Found.Total	Defects.Found.Major + Defects.Found.Minor
Defects.Corrected.Total	Defects. Corrected.Major + Defects. Corrected.Minor
Effort.Inspection	Effort.Planning + Effort.Overview + Effort.Preparation + Effort.Meeting +Effort.Rework
Effort.per.Defect	Effort.Inspection / Defects.Found.Total
Effort.per.Unit.Size	Effort.Inspection / Size.Actual
Percent.Inspected	100 * Size.Actual / Size.Planned
Percent.Majors	100 * Defects.Found.Major / Defects.Found.Total
Rate.Inspection	Size.Actual / Time.Meeting
Rate.Preparation	Size.Planned / (Effort.Preparation / Number.of.Inspectors)
Rework.per.Defect	Effort.Rework / Defects.Corrected.Total

10. Process Maintenance

Submit suggestions for improvements to be made in this peer review process to *<organization>*'s peer review process owner.

11. Revision History

Name	Date	Reason For Changes	Version
		original draft	1.0 draft 1