Advanced Software Testing

Using Reviews for Better Specs, Stories, and Code

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Advanced Software Testing

- A series of webinars, this one excerpted from *Advanced Software Testing: V2,* a book for test managers
- Reviews are a form of static testing, which is any test where the software being tested is not executed
- Static analysis, a subject of a previous webinar, is static testing with tools
- Reviews are a static test where we engage the human mind, and each reviewers' experience, to improve our work products

Review Types

- There are four general review types for software work products:
  - Informal: no real process (hallway chats, buddy tests, pair programming), yet useful, cheap, popular
  - Technical: documented and defined defect removal process, involving technical experts but not managers
  - Walkthrough: author "walks through" review item
  - Inspection: a trained moderator (other than the author) leads the inspection team (with defined roles) through a formal inspection process (rules, checklists, entry and exit criteria), which includes gathering defect removal metrics
- Hybrids often occur in practice
- Variations in names also occur

Review Types and Effectiveness

	Least	Average	Most
Requirements	20%	30%	50%
High-level design	30%	40%	60%
Functional design	30%	45%	65%
Detailed design	35%	55%	75%
Code	35%	60%	85%

If you started with 1,000 defects and followed worst practices in reviews (but at least did each of the five types), you'd go into testing with 166 defects. If you started with 1,000 defects and followed best practices (and did all five types), you go into testing with 3 defects.

Derived from Jones, esp. *Software Assessments, Benchmarks, and Best Practices*

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Management Reviews and Audits

Management reviews

- Monitor progress, assess status, make decisions
- Done by responsible managers, stakeholders, decision makers
- Check progress to plan and adequacy of procedures
- Assess project risks
- Identify action items, issues
- Participants must prepare
- Decisions documented

Audits

- Can be formal (and adversarial)
- Provide independent evaluation of compliance
- Done by lead auditor, and auditor team
- Auditors collect evidence through interviews, witnessing examining documents
- Results in observations, recommendations, corrective actions, pass/fail assessment

Case Study: Formal Management Review

Change Control Board Process

Scope: The Change Control Board will facilitate change requests...for initial release and changes to production released products.

Submit Change Request: Change requests should be submitted through Development or Program Management. A change request must…include… the following: Definition of the change... Areas impacted... Documentation to be updated... Priority... Dependencies... Estimated impact... Requested date

CCB Review:

Team Members: ...Development... Test... Support… Network Operations... Supply Chain...Program Management/Release Management... Finance... Marketing

Signature Criteria: ...

Attachment Requirements:...

Approved?:...

Implement Change:...

Principles of Reviews

- Reviews should happen as soon as possible
- Reviews require adequate preparation
- Review all important documents, including test documents
- Reviews precede (usually) and complement (not replace) dynamic tests
- Possible review results:
  - The document is okay as-is or with minor changes
  - The document requires some changes but not a re-review
  - The document requires extensive changes and a re-review

Roles in Reviews

- Essential roles and responsibilities
  - Manager
  - Moderator or leader
  - Author
  - Reviewers (who may be specialized)
  - Scribe or secretary or recorder
- Additional roles
  - Decision makers or stakeholders
  - Customer or user representatives
  - Reader

Technical Factors for Review Success

- Follow the process
- Record the costs and benefits
- Review early drafts or partial documents
- Have entry criteria
- Use organization-specific checklists
- Use more than one type of review
- Review or inspect all important documents
- Sample document for assessment
- Focus on content not format
- Continuously improve

Organizational Factors

- Ensure managers allow adequate time
- Careful with those metrics
- Allow time for rework of defects
- Involve right participants, properly trained
- Have a review forum
- Ensure the participants participate
- Apply the strongest techniques where needed
- Ensure a balanced review team
- Support process improvement
- Recognize improvements gained

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People Factors

- Educate stakeholders to expect defects
- Ensure positive experiences for authors
- Don't force the author to consent
- Welcome finding defects; eschew blame
- Ensure constructive, helpful and objective comments
- Encourage deep, not superficial, thought

Case Study: Defects Found in MRD Review

Mail

1.   When users lose their mailboxes automatically when their 30-day-intro expires, do they get a warning?

No longer a test problem, since the user must call to change service level. The telemarketer can give the warning. [CLOSED]

2.   If an account drops from Premium to Basic, and then decides to go back to Premium, can the sub-account mailboxes be recovered, or are they gone for good?

[TBD]

3.   Is email access from the web a requirement? A previous reply said that it was out of R1, but a subsequent email…indicates that its still under consideration.

[TBD]

Case Study: Reaction to MRD Review

- Not all issues resolved

- Development and Marketing proceeded with open questions

- 20-25% test inefficiency

- "Rather pay the extra money than learn how to write requirements"

- High rate of false positives and false negatives during system test

Case Study on Test Plan Reviews

- Sent two drafts of the test plan, with questions embedded
- The drafts served to stimulate discussion and resolution of issues, both in e-mails and in meetings
- Here's the e-mail that started the discussion, and next the information I got from one reviewer…

All---

Attached is the first draft of the Test Plan. It covers hardware (DVT & PVT) and software (Integration and System Test). There are more questions than answers here, at this point, but hopefully we can get most of the issues resolved at tomorrow's review meeting, at least sufficient to proceed.

Ken, as a next step, I'll be developing the budget and the detailed schedule this afternoon and tomorrow. Those will be based on this plan, so, if a first review suggests problems, let's talk ASAP.

Regards,
Rex

Case Study: One Reviewer's Response

I reviewed the plan in its latest form. I offer the following thoughts/suggestions:…

2. In the area of server testing, we should modify the test plan to test to a lower threshold than 500K users. We will not have the [hardware in the production environment initially to support 500,000 users] and we will likely cap out at 100K users. We may only have 25K mailboxes at the start as well…

4. Exit criteria. [The VP of Hardware Development and I] should come to some definition here. I believe we need to see some run time criteria under a system load of say 25K customers doing a combination of mail, browse, etc. where we have the system up and running for 24 hours continuously for [some] number of days. …I think we need at least 1 week…. [In addition], I'd like to understand the run time requirements for how long it takes to make pass through all the system test suites. How many passes do we have for the system test period.

5. [The definition of] "Must Fix" [for a defect] - I agree [that this is needed] and … I own this... I have a note written [to resolve this problem]…

8. Release Build Notes. You make a good point here that we have not been doing a good job [in terms of test release management]. We need to start providing builds and describing what code was dropped, what new features are available, and what defect fixes are dropped in each build.

Steps to Introduce Reviews

- Secure management support
- Educate managers about the business case
- Put structures in place
- Train
- Obtain participant support
- Do some pilot reviews
- Demonstrate the benefit
- Apply reviews to all (or at least the most important) documents

Return on the Review Investment

- You can use metrics to demonstrate business value of reviews
    - Money saved based on cost of fixing defects in reviews versus in system test versus in the field
    - Time-to-market saved by reducing system test failures
- Monitor and improve review processes
- See reviews and review process improvement as a long-term investment

Conclusion

- In this webinar, we've seen how to apply reviews to the find defects, discuss alternatives, and increase understanding of the system that you're building

- In our previous webinars, we looked at various advanced test techniques, including black box, white box, and static analysis

- Reviews allow us to complement these techniques with creative thinking before and while building software

- Reviews have the ability to save a great deal of money, among other benefits

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