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Making Quality Assurance work

Vivian van Gansewinkel, Erik van Veenendaal and Mark van der Zwan of Improve Quality Services share their practical experience and lessons learned

In practice quality assurance is often perceived as being theoretical and having little or no added value. This is especially true for the engineer's opinion. We have been working in the area of quality assurance for many years and are convinced quality assurance does have added value provided the right approach is taken. The recommendation and practical experiences that are discussed in this paper are mainly derived from implementing TMM and the CMM key process area "Software Quality Assurance" in industrial organisations.

What is Quality Assurance?

This question in itself could easily take up a full article. Many definitions and organisational structures for quality assurance exist. IEEE 610 defines QA as *"a planned and systematic pattern of all actions necessary to provide adequate confidence that an item or product conforms to established technical requirements"*. According to this broad definition, testing is part of quality assurance. The CMM defines QA with a more limited scope *"a set of activities to evaluate the process by which software work products are developed and/or maintained"*. Within the CMM QA is clearly focussed on software process quality and is distinguished from testing, being mainly concerned with product quality. This is also the view the authors have taken in the context of this paper; thus we discuss recommendations for added-value quality assurance on processes. Often one of the main activities within process QA is (internal) auditing focused on compliance verification. We probably all have at least once in our career experienced an internal audit executed by QA that showed things we already knew and stated that we were not fully working according to the (not very practical) company standards. As a result many engineers have a somewhat negative opinion on auditing (and QA). However using the practical recommendations in this paper QA auditing will have added value!

The auditing and QA process discussed in this paper is also applicable to those who are involved in test process improvement and using the Test Maturity Model (TMM1) as their reference model. The TMM prescribes that within each process area (eg test planning, test techniques and methods) independent audits should be carried out to verify compliance and the effectiveness and efficiency of the way of working.

Auditing

The audit process typically involves a number of phases (see figure).

Start-up: A request for an audit is received and the audit assignment and objectives are discussed with stakeholders (eg management, project team) and documented.

Planning and preparation: The auditor prepares the audit by creating an audit plan and gathering the documentation needed. The plan states amongst others the applicable standards and identifies the person(s) that will be interviewed and the documents that will be studied.

Execution: The auditor perform the audit, based on the audit plan and available documentation, and note all findings, non-conformances and risks. The audit execution phase also consists of interviewing the identified project members and management.

Analysis: After the interviews and document study the auditor analyses the findings and non-conformances found to derive conclusions, risks and recommendations.

Reporting and feedback: Based upon the analysis an audit report is prepared. The audit report is explained in a meeting or by means of a presentation to the project team.

Follow-up: At the due date of the action points, the auditor verifies whether they are solved, by contacting the owners of each action point.

The audit process overview
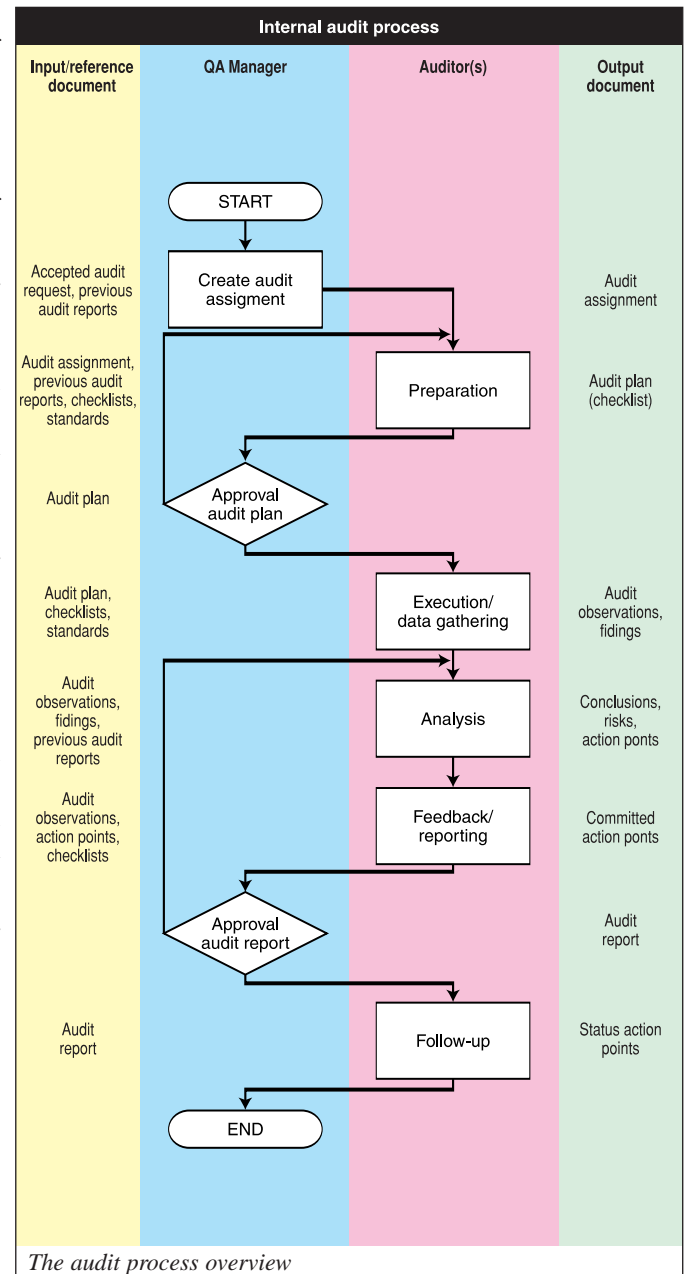
Management involvement

To assure an effective audit process it is essential to have management involved in every phase of the audit, from creating the audit assignment, participating in the interviews until being present during the feedback meeting. They are in fact the key stakeholders and only with adequate management awareness and support the audit process will be successful. In essence auditing is a management tool that provides business and project management with visibility regarding the project activities and status. Management also has to make a clear

statement and play an active role with respect to the need for internal audits to improve the development processes. When management is also interviewed and sometimes receives recommendations themselves, the project team will see that an audit is not an evaluation solely on their work within the project.

Audit team expertise

Another key to a successful audit is expertise: audit and domain expertise. Often this means that an audit team consists of two persons; an independent QA-auditor and an internal peer expert. A peer expert is a colleague of another project within the organisation, who is regarded by his colleagues to be an expert on the processes and deliverables to be audited. The independency aspect, compliance verification and the audit process are the responsibility of the QA-auditor. The peer expert is familiar with standards and best practices and can compare these to the audited project. His knowledge is respected and the recommendations for improvements are based on his practical experiences and therefore more easily accepted. As a result the audit is no longer perceived as a theoretical evaluation. In addition to the peer expertise, thorough auditing expertise should be provided by the QA-auditor, eg expertise on interviewing, document reviewing, reporting and people skills. In our experiences, auditees were interested in highly practical recommendations regarding their project and are looking for information on the best practices within the organisation. The combination of audit and domain expertise has given us the ability to provide concrete answers to the project.

A committed assignment

As stated before, management involvement is essential for success. But management is only one of the "customers" of the audit. The other major stakeholder is the audited project. One simple and effective way to get the customers involved is a one-page assignment stating the goals of the audit. These goals must be formulated as questions that need to be answered to fulfil the needs of management and/or the project. The right and interesting questions must be derived from a start-up interview with the stakeholders. A QA manager may of course propose a process or product to be audited, but should never take the lead in this matter. An audit should always be customer driven and answer the questions that are relevant to the project and/or management. The perfect start for creating such customer focus is the described interview followed by a documented assignment committed by all stakeholders.

Short lead-time

The lead-time of an audit seems to be a simple measurable characteristic. It is the time between the moment the audit assignment is committed and the audit report is finalised. The more subjective lead-time, perceived by the audited team, is however far more important. This is the time between the team noticing that a team member is being interviewed and the moment the team receives its first practical improvement suggestions. This is the core lead-time and it should be as short as possible with a maximum of 2 weeks. If the lead-time is much longer the audit conclusions and recommendation will often have been overtaken by real-life project dynamics and thus have little or no added value. The whole set of interviews and (possibly multiple) feedback sessions must therefore be scheduled in detail before the first interview is held. If the schedule shows that a lead-time of 2 or perhaps 3 weeks is not achievable, one should reconsider the audit assignment. Again, the goal of the audit should be crystal clear to set the minimal required number of interviews and the thoroughness of document studies. If a full report is needed the first feedback session with major attention points will still be perceived as the apotheosis of the audit. All activities that are not directly related to this meeting are to be suspended until after the meeting to keep the core lead-time as short as possible.

Concrete recommendations

An audit has to provide practical recommendations for improvement, foremost to the audited team, project members and management. These recommendations should be attainable by the team within the upcoming time frame and have to address the real problems the project is facing (not just focus on compliance issues). In fact the knowledge of auditors is reflected in the quality level of the recommendation. An auditor (eg the peer expert) with in-depth knowledge on test management can provide practical hints and tips on the test approach, whereby an auditor with no or little knowledge will probably make comments on non-compliance issues to the standard test plan. It is recommended to split the audit recommendation into three, clearly distinguished, groups, project recommendations, compliance recommendation and process recommendations whereby the focus should be on the first group. It is important to have a high level of management involvement at this point since resulting action points will often put a claim on project resources. These recommendations or action points need therefore to be discussed and formally approved by management.

Adequate reporting and feedback

When writing the audit report make sure you know what your target audience (eg project team, management) wants. Do they really want a fully elaborated and well-founded twenty-five pages report documenting all findings and interview results? What is needed to make the right decision? In many organisations we experienced that a three-page management summary including the major findings, conclusions, risks and recommendations is enough. Sometimes even a PowerPoint presentation is sufficient. After all, it's only an internal audit. It is highly recommended to not only write a report, but also to have an open feedback meeting with all stakeholders to discuss the outcome and agree on possible action points. This is most often much more effective and convincing. Finally make sure that your report or presentation also identifies so called "best practices" that can be used by other project teams and thus stimulates inter project learning and communication.

Track action points

During the feedback session the importance of the recommendations is explained and management, project-team and auditors will agree on which recommendations have priority during the follow-up of the audit. The recommendations should then be translated into clear action points, with an action holder and due date. Resources should be made available to work on the action points. These action points then can easily be tracked by the auditor or another member of the QA team, and after reaching the due date, the action holders will be asked to elaborate on the status of the action point. If such a tracking mechanism is not in place there is a danger project pressure will again take over and (project) improvement activities are "forgotten". Everyone involved in the audit is kept informed on the status of the follow-up and if necessary appropriate actions can be taken.

Customer focused

In essence all the recommendations have one central theme: "customer focused". Only focus on these issues that matter, know what you are talking about and provide practical and added-value recommendations in a short time frame. The recommendations stated in this paper are a vehicle to make quality assurance and internal auditing work; to support projects and provide visibility to management in stead of perceived nagging with non-compliances to standards. This is especially true for less mature organisations; at higher maturity levels standards are improved and therefore accepted and recognised as being best practices making compliance verification a meaningful activity.

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See Professional Tester Volume 3 Issue 1 and 2 for more information on the TMM PT