Monograph: Experiences and Advances in Software Quality
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Monograph of next issue (December 2009)

"Privacy and Identity Management"
(The full schedule of UPGRADE is available at our website)
Quality Going for Gold

Derek Irving and Margaret Ross

This paper will discuss the proposed changes in the TickIT scheme - TickITplus. These changes are currently out for consultation, following development over a period of several years. The reason for reconsidering the TickIT scheme stems from the need to be able to identify and differentiate between companies, as the level of quality process needs to improve both for clients and suppliers. The concept of higher levels of quality process has been established for many years with CMM and now with the CMMI models. The paper will consider the proposed four levels of TickITplus, Bronze, Silver, Gold and Platinum. The current TickIT scheme is similar in principle to the Bronze level so that current TickIT auditors will be able to perform audits at this grade after some initial retraining. Further training will be necessary to develop expertise in the TickITplus model and in order to audit at the higher assessment levels. Currently the documentation for the TickIT scheme comprises guidance material together with the criteria for the TickIT auditors. The TickIT Guide has been updated and maintained by the JTISC as TickIT has evolved, but this committee will be expanding the documentation to cover both guidance and requirements for the TickITplus scheme. Extension of the TickITplus scheme could provide opportunities for extending the scope of an audit visit to include other standards such as service management and IT security. This could minimize the cost and disruption for clients that are being audited against the various standards.

1 Introduction

TickIT was developed in the early 1990s to provide quality assurance guidance in the software development field. It was a sector scheme based on BS 5750, which was later superseded by ISO 9001, which used trained auditors with software development experience. The TickIT Guide, which was frequently updated, gave guidance to IT systems developers, suppliers, purchasers and auditors. Although the scheme is still functioning, with many TickIT certificated organizations in the UK and elsewhere, the need for an update has been recognized.

Many software development companies have TickIT certification and the simple "pass/fail" approach of the underlying ISO 9001:2000 standard does not give potential clients any way of differentiating between them. Some major clients have been considering their own version of capability model, with second party audits, which is expensive for them and for their suppliers.

It is becoming increasingly common for joint audits to be carried out for related standards in order to save both time and money.

A project was therefore initiated in late 2007 which both updates and extends the original scheme. This is TickITplus,[1] which is being developed by the Joint Industry TickIT Steering Committee (JTISC), which is sponsored by the BCS, BSI and Intellect. The authors are members of this committee.

The content of the paper has been derived largely from TickITplus, A New Approach to IT Certification, issue 2. This was initially developed to support a series of seminars to explain scheme to auditors, practitioners and other interested parties.

2. General Concepts of the Scheme

IT activities in organizations have been expanded and converged for over fifteen years. The development of software is no longer the only area of concern. Other activities and disciplines such as service management, information

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security and IT infrastructure are also now potentially critical to organizations. The CMMI approach to capability assessments has become well established as a more sophisticated approach to determining the maturity of the processes of organizations. Although it is generally well regarded, it is still very expensive and does not come within the surveillance and regulation infrastructure of ISO 9001 certification.

TickIT had a considerable impact in the early 1990s on the software engineering community in the UK and it was made mandatory by several major purchasers. At that time, TickIT certification was treated as a requirement where software development was identified as part of the scope statement, but the relaxation of this rule, the widening scope of IT, and a more general move away from the benefits of a straightforward ISO 9000 certification, have had the effect of diminishing the importance of TickIT to many users. With this loss of confidence, comes the inevitable pressure on costs and if the benefits were no longer there, ISO 9001 and TickIT certification might not be justified.

There are many differences between TickIT and TickITplus. It is not just a minor adjustment of the original TickIT scheme but a whole new approach to the issue of enabling, measuring and certifying quality assurance in the IT arena: for developers, suppliers of IT products and services, for their customers, auditors and for the suppliers of certification services.

The project to develop TickITplus is run by the Joint TickIT Industry Steering Committee (JTISC), which is made up of a number of key stakeholders from all aspects of IT activity. It is sponsored by the BCS, Intellect and the BSI, and in addition the project has had UK Government funding.

2.1 Process Capability

A major change is the introduction of process capability assessment into certification. Instead of the CMMI approach, ISO/IEC 15504: Process Assessment, is being used as the method of determining process capability and organizational maturity.

This is a five level approach which has been adapted for TickITplus to provide four grades of assessment: Bronze, Silver, Gold and Platinum (see Table 1).

<table>
<thead>
<tr>
<th>ISO 15504 Capability Level</th>
<th>TickITplus Capability Level</th>
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<tbody>
<tr>
<td>Level 1: Performed process</td>
<td>Level 2: Managed process</td>
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<tr>
<td>Level 2: Managed process</td>
<td>Bronze</td>
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<tr>
<td>Level 3: Established process</td>
<td>Silver</td>
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<tr>
<td>Level 4: Predictable process</td>
<td>Gold</td>
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<tr>
<td>Level 5: Optimizing process</td>
<td>Platinum</td>
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Table 1: Capability Levels according to TickITplus.

Bronze – which equates to level 2: Managed, is considered broadly equivalent to the existing TickIT and is the level at which the transition from the old to the new scheme will be made. Platinum – equating to level 5: Optimizing, is regarded as the pinnacle, and achievable only by relatively few top class organizations.

2.2 Extended Coverage of Standards

Software engineering no longer holds the central position it once had. In many IT organizations, service management and security are also very important. There are certification schemes for these areas, but these could involve further audits.

TickITplus allows optional inclusion of additional key IT standards, which can be covered by the same assessment method.

Initially, three optional Standards will be available:

These standards are in addition to core ISO 9001 requirements, with the optional clause 7 additions applied according to scope as at present. It is also planned to make available other standards, such as IEC 61508 dealing with system safety, or BS 25999 for business continuity management. These would be declared in the scope statement and form part of the assessment, but would not have the same level of compliance implied as the Requirements Standards.

2.3 Formal Requirement for Process Improvement

This is another key aspect of TickITplus. While a requirement for improvement is a clear feature of ISO 9001, TickITplus builds it into the auditing process itself. Depending on grade, improvements will have to be planned, implemented, reviewed and assessed. At the Platinum level, failure to maintain and act on improvement plans would lead to a potential downgrading.

2.4 Non-certified TickITplus

One of the ways to make certification more attractive as an option is to increase the user community so that taking this step has more relevance across a wider grouping.
There is also a shortage of good practice information backed up by available quality material. By making a large part of the scheme documentation available for download free or at low cost, it is intended to increase the appeal and popularity of the scheme. Added to this, the scheme will encourage organizations to develop and self assess their processes, utilizing good practice in a defined framework. Assessments by approved but non-accredited assessors will also be an option. Having adopted either or a combination of these assessment approaches, the formal scheme would make provision for a fast track approach to full certification.

2.5 Requirements Based Scheme
At present, TickIT is known as a "sector scheme". This means it adds on to basic ISO 9001 certification an additional structure of qualified auditors, a training infrastructure, and guidance material. Nothing about TickIT, other than the need to use registered TickIT Auditors, is mandatory. This has always been seen as a limitation which restricts the benefits of the scheme. TickITplus brings mandatory requirements across the scheme’s activities and grades. An organization can only reach and sustain a given grade if they have been formally audited as having fully achieved the requirements for that grade. The assessments will be based on quantifiable evidence of performance.

2.6 Scheme Regulation
There is a greater degree of central regulation planned for TickITplus. BSI and the International Register of Certified Auditors (IRCA) [5] are still planned to be involved in aspects of document production and auditor registration, but the scheme itself will remain under the overall control of the JTISC committee. Auditor registration will be treated as a specialist qualification, additional to ISO 9001, with external training providers and independent examinations. Certification bodies will work under UK Accreditation Service (UKAS) [6] accreditation to deliver the defined scheme across different grades and requirements. The documentation for the scheme, its rules and regulations governing how all those involved will contribute to its function, will be under the overall control of JTISC.

2.7 Revised Qualifications and Types of Registration
Part of the focus of TickITplus is to improve both auditor performance and status. Grades aligned with the four performance grades will be introduced and a new category of "Practitioner" will be introduced; this either for internal staff such as quality managers or for independent consultants. In line with the need to extend the scope of TickITplus into a much broader remit, the structure of qualifications under the SFIA model [7] will be introduced in a number of "Skills Profile" areas by which auditors and practitioners will be categorized, SFIA (Skills Framework for the Information Age) is an industry structure model, developed by the UK Government, the BCS and other bodies, which covers all types of IT related occupations and lists the knowledge and skills required at level. These skills profiles will be used to define the allocation of auditors to assessments. The selected skills profile areas will be:
- Legal and compliance,
- Service management,
- Systems and software development,
- Project and programme management,
- Corporate strategy planning and management,
- Information management and security,
- IT systems engineering and infrastructure.

In addition there will be a core body of knowledge covering quality, contractual issues, procurement and general management areas. As the auditors reach higher grades, they will be expected to increase both their general knowledge and attain specialist skills and qualifications.

2.8 Training Provision
The training provision will be focused around the key roles of the Auditor and Practitioner and more be offered at different levels as related to the appropriate assessment grading required. Registration of training providers will be provided and monitored by JTISC. It is expected that there will also be specialist training needed, such as for ISO/IEC 20000 or other standards. The focus of the TickITplus training plans will be on requirements of the scheme. Examinations will be separately controlled and delivered independently of the training providers.

To ensure that the latest information is available, there will be a TickITplus website with the current registration details, support Information, and downloadable material. It will also include information about a proposed user club which will provide regular forums and a vehicle for the dissemination of knowledge and exchange of experience between members.

2.9 Process Engineering Support
Although a feature of ISO 9001, the area of process definition and management will be new for many people. In order to support users and to provide a consistent content and format for the assessment, the scheme will provide a core Base Processes Library (BPL). This will be based around the basic definitions and structure in ISO/IEC 12207 and ISO/IEC 15288, in addition to other processes as needed. This will define the processes and their elements that are required to generate a compliant Process Reference Model (PRM), which is a key requirement of the scheme which all users will need to develop. There will also be key references to all the included Requirements Standards covered. This will define the mandatory process areas needed to comply with the selected scope and assessment grade. In order to aid the building of Process Model and to insure consistency, Scope Profiles, following the same format of the Skill Profiles described previously, will be used as the basic building blocks of the scope definition. The Base Processes Library will also be used in the generation of a Process Assessment Model (PAM), used by the auditors. The Base Processes Library will be maintained...
by TickITplus and its use in the scheme will be mandatory.

2.10 Process Capability Assessment
Process assessment is based on attributes as defined by ISO/IEC 15504-2. These vary as grades increase. In order to conform to a specific TickITplus grade, capabilities in a range of relevant scope-determined processes need to be demonstrated. The weighting given to these processes is determined by the type, which may be one of the following:
- Type A, which is mandatory, mandated by ISO 9001.
- Type B, which is mandated by selected scope and Requirements Standards.
- Type C, which is dependent on the supporting scope.
- Type M, which is maturity measurement, mandated by ISO/IEC 15504 at Gold and Platinum level.

The Base Processes Library provides the information on which processes and which of their attributes are required at the particular level and scope. Provision within the assessment methods will provide for the limitations on cost and requirements of small organizations, especially at the Bronze grade. Assessment and cost will increase for the higher grades.

2.11 Grade Progression
While adopting the grade approach defined in ISO/IEC 15504 provides organization maturity, TickITplus provides a clear progression route for both small and large organizations.

The first stage for many organizations will be a self-assessment. This will involve the ability for the organizations to use the tools and scheme techniques while retaining all normal in-house activities and working at the organization’s own pace. The next stage would be independent assessment, short of full certification although using registered assessors and having a formal recognition of achievement. This grade may also be used as a pre-assessment for later full certification.

The Bronze assessment is fully accredited certification to ISO 9001 and uses formal assessment methods from ISO/IEC 15504 together with a reduced sampling approach. All the mechanisms of TickITplus will apply, but with a reduced level of process assessment. This will be the normal entry grade to the TickITplus scheme. This is further extended under the transition arrangements operating for the existing TickIT certified organizations.

Assessments from Silver to Platinum are fully accredited certification to ISO 9001 and fully compliant with ISO/IEC 15504 at levels 3, 4 and 5.

Various fast-track approaches will be available for those organizations wishing to achieve a graded full certification and have met certain criteria at the self or independently assessed levels.

2.12 Migrating to TickITplus
The grades for TickITplus have been aligned to make the transfer from TickIT as straightforward as possible. Once the scheme has been accredited at Bronze level, there will be a nominal one year period for existing TickIT certified organizations to transfer to the new scheme, subject to a degree of discretion by their Certification Body. This will initially be an optional ungraded TickITplus. This will offer accredited certification and meet basic process requirements and a further three-year assessment period to fulfill the requirements for TickITplus Bronze grade. Hence existing TickIT certified organizations will have a minimum of four years to fully comply with requirements if they are to remain in the scheme.

New entrant organizations, or those returning after a break in certification, will need to meet the full Bronze or higher level requirements at the initial audit. However achievement at Platinum level requires an assessment and improvement history under full TickITplus. This will not be eligible for a direct entry.

While progression upgrades will be encouraged, they will be optional. Organizations at the Bronze level will be able to remain at that grade. Over time Silver is expected to become the predominant grade with relatively few organizations reaching the Platinum level. Those attaining Gold level are expected to be interested in progressing in time to Platinum.

All existing TickIT auditors will be eligible to transfer to TickITplus Bronze grade after taking the initial training course and satisfying the examination requirements. This needs to be done within three years following scheme accreditation, after which the existing TickIT auditor registration will cease. There will be no compulsion for auditors to pass beyond the Bronze grade.

The target launch date for TickITplus as an initial, non-accredited scheme is by 2010. At this time there will be auditors able to assess at the Bronze and Silver grades. Formal Foundation and Intermediate training courses will be available soon after that, together with the necessary examinations. Sufficient scheme documentation will be in place and the website established. It is then planned for formal accreditation to follow within six months at which point the termination of the existing TickIT certification will commence. Further information about the scheme and its progress will be available constantly at the TickITplus website.

3 Future Green Issues
There is a greater awareness of greening issues, particularly relating to computing. There has been considerable publicity indicating that the carbon footprint of the use of IT by industry is similar to that generated by the aircraft industry. There is evidence from various surveys that senior management have raised green issues high on their major concerns at Board level, particularly for large organizations. The benefits of addressing greening issues have been clearly identified, relating to the reputation of the organization, as well as preparation for potential legislation and to minimize cost. There is an awareness that data centres of large organizations have been responsible for the high cost of power usage and the waste of generated heat. Environ-
mental standards such as ISO 14000 [8] and five level models [9] could in the future form part of a future enhancement of the TickIT plus scheme.

Small businesses could benefit by considering their green credentials, not only as potential financial savings but also to improve their reputation and credibility with their employees, the wider public, and their current and potential customers.

This move towards green computing for SMEs could be motivated by the potential pressure from larger organizations, who wish to be able to confirm that their suppliers and sub-contractors are also adopting green computing practices. This process has led to smaller organizations adopting quality standards, such as TickIT, in many cases under direct pressure from large organizations who refused to deal with companies that could not prove that their computing practices followed the appropriate quality standard.

References