Role of Technology Audit in IT projects

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*Abstract:*Technology Audit is the process by which IT organizations can ensure that no software projects goes into trouble because of Technology reasons. This can be very good tool to handle technology crisis in projects. This research paper describes detailed process of Technology Audit with some examples. Organizations can customize this process as per their requirement.

*Keywords:*Technology; Audit; IT projects; Software projects; IT Project Review

I. INTRODAUCTION

The importance of Quality Assurance (QA) audit is very well known in software developments projects. QA audit mainly focuses on process part of software development projects. There is need to audit technology part as well. So we are introducing concept of Technology Audits. In this Research paper we will focus on Technology Audits for software development projects [1].

Technology Audit mainly focuses only on Technology part of software development. Expert Technical Architects do the Technology Audits at the beginning of the project. This helps in identifying technology related risks at earlier stage of project and help in mitigating these risks. In this Research paper, we will discuss about identification of projects, process for conducting Technology Audit and tracking identified risks. This research paper also discusses various methods which help in conducting Tech Audit.

II. IDENTIFYING ELIGIBLE IT PROJECTS FOR TECH AUDIT

In IT consulting companies, there is central repository for all projects data. In IGATE, projects are created in PeopleSoft. Research & Innovation department has developed complete system for Technology Audits [1]. Once project is created in PeopleSoft, alert is generated. The automated system classifies projects as per project type (Development, Maintenance, Support, and Testing) and Billing Type (Fixed, Time Material) and Technology (Java, Dot Net, Mobility). Once project is selected as per defined criteria email is sent to Technology Audit team and project manager. This process will depend upon organization structure and it's specific to particular organization, we have just mentioned high level steps. This can be modified as per your organization requirements.

High level steps:

- Step 01: Send email to project manager to get more details of selected project.
- Step 02: Project manager fills data in automated system. Email is generated once data is filled.
- Step 03: Depending upon filled data, apply logic for selecting project. If project doesn't qualify then mark it in system. The Tech Audit system takes care of this and this is automated process.
- Step 04: If project is qualified for Tech Audit, have discussion with project manager to understand current status of project. Understand all technical details and anticipated risks. Explain the process to project manager and make sure he understands the process and has correct expectations from this Tech Audit.
- Step 05: Assign Technical Architect to the project – [Refer to process of maintaining Tech Auditor pool].

▪ Key points to remember while assigning Tech Auditor
 – Right Technology
 – Right Domain
 – Right location – we encourage face to face communication between project team and Tech Auditor

Since this process will depend upon organization structure and it's specific to particular organization, we have just mentioned high level steps [6]. This can be modified as per your organization requirements.

III.CONDUCTING TECH AUDIT

Now we have identified the eligible project and the right Tech Auditor, let's discuss in detail how to conduct Tech Audit for the project.

A. *Understanding major stages in ADM projects*

In typical ADM project following are major stages [3]:

1. Requirements Understanding
2. Design – High level and Detailed level

3. Implementation – Software Development
4. Testing
5. Installation/Deployment
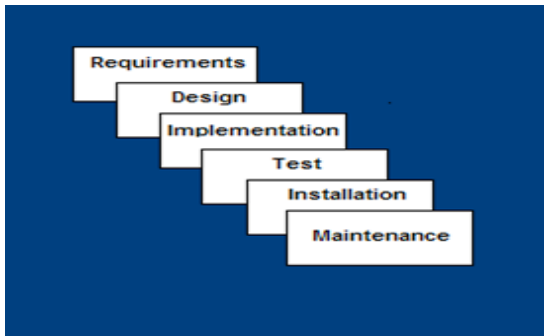6. Maintenance – post installation support

Figure 1: Stages in ADM project

B. Tech Audit steps in ADM cycle

Technology Audit is conducted at three different stages of SDLC [3]. This helps in identifying risks at earlier stages and concentrates on particular part in detail. Please refer to figure 02.

  i. Stage 01 : Planning
 ii. Stage 02 : Analyze
iii. Stage 03 : Design
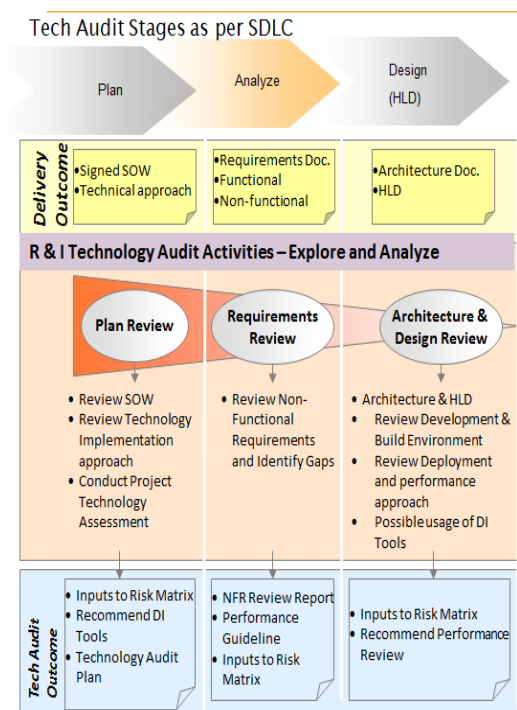
Source: IGATE Research

Figure 2: Technology Audit Stages

1) Tech Audit Planning Stage

At this stage project is just created. SOW is signed and high level technical approach is defined.

A. INPUT: Signed SOW, Technical Approach document, Any other technical documents if available
B. STEPS:
  1. Review SOW
  2. Review Technical approach
  3. Review other technical documents if available.
  4. Conduct project technology assessments
C. OUTPUT:
  1. Inputs to Risk matrix
  2. Recommended tools – internal and external (Refer to process of maintaining tool list)
  3. Technology Audit plan

2) Tech Audit Analyze Stage

At this stage requirement documents are ready and there is clarity on requirements. Though we review both functional and nonfunctional requirements, more importance is given to non-functional requirements. Developers tend to ignore Non-functional requirements.

A. INPUT: Requirements document (Functional and Nonfunctional)
B. STEPS:
  1. Review non-functional requirements and identify gaps
  2. Review critical functional requirements.
  3. Review all other supporting documents and identify gaps
C. OUTPUT:
  1. Inputs to Risk matrix
  2. Nonfunctional requirements review report.

3) Tech Audit Design Stage:

A. At this stage high level design document for project is ready. Our focus is to review high level design. Detailed level design may be referred but it is not compulsory for review.
   INPUT: Architecture document (HLD)
B. STEPS:
  1. Review architecture and HLD
  2. Review development and build environment
  3. Review deployment and performance approach
  4. Check possible usage of different tools which will help in improving productivity of project.
C. OUTPUT:
  1. Inputs to Risk matrix
  2. Recommendations for architecture improvements
  2. Recommended tools – internal and external
  [*Refer to process of maintaining tool list*]

At the end of this stage, detailed audit level report is created and shared with project team. The meeting is scheduled

between Tech Auditor and project team. All items in the audit reports are discussed. Once both parties agree with the report findings, the report is shared with BU leadership. This helps BU leadership to track technology related challenges faced by BU projects.

IV. IMPLEMENTING MITIGATION PLAN

It is very important that all finding and risks in the Tech Audit should be tracked. All risks should be mitigated properly. This helps in avoiding technical challenges at the end of project. It is responsibility of audit team to provide all necessary support for mitigation risks. Help can be taken from CoEs (Centre of Excellence) and other experts [6].

- Projects are expected to act on mitigation and communicate status on fortnightly basis to audit team.
- Any support in connecting with CoE SMEs, tool experts etc. to be provided by Audit team
- Once all risks are closed by project team, Tech Audit is closed.

V. BENEFITS OF TECHNOLOGY AUDIT FOR PROJECTS

Tech Audit helps project teams to think beyond execution part. It forces team to think at architecture level. Ultimate aim of Tech Audit is to provide the best possible technical solution to the client.

Following are key benefits:

- Independent and early Assessment of technology risks by qualified Technical Architects
- Sharp focus on technology matters with in-depth scan of 250+ checkpoints [2]
- Guidance / pointers on how these risks can be mitigated
- Identification of productivity, quality improvement tools and support, as applicable
- Support from Technology CoEs (e.g. Performance engineering, Database CoEs)
- Progress dashboard to Senior leadership on fortnightly basis
- Projects have to give their satisfaction rating on the audit value add.
- Projects are expected to act on mitigation and communicate status on fortnightly basis to audit team.
- Any support in connecting with CoE SMEs, tool experts etc. to be provided by Audit team

- Once all risks are closed by project team, Tech Audit is closed.

VI. STRUCTURE OF TECH AUDIT TOOL KIT

Tech Audit tool kit consists of four parts.

A. *Project Demography* –
It contains all basic project related information. Sample is shown in below diagram.

Source: IGATE Research

Figure 3: Technology Audit Kit - Project Demography

B. *Technology Audit Checklist:*
This is very important part of tech audit. This contains detailed description for each kind of non-functional requirements [8]. Organizations need to develop this list so that it suits their requirements.

Following are examples of non functional requirments.

Sr.No	Coverage Area	Sr.No	Coverage Area
1	SOW & Technical Approach	10	Security
2	Scope	11	Reliability
3	Requirements	12	Scalability
4	Architecture & Design	13	Flexibility
5	Coding	14	Availability
6	Development And Build Environment	15	Portability
7	Deployment And Performance Approach	16	Extensibility
8	Reusable Assets And Artifacts	17	Usability
9	Performance	18	Supportability

Typical structure of technology audit checklist is shown below:

Source: IGATEResearch

Figure4: TechnologyAuditKit-Checklist

C. Technology Audit Risk Report

This is the final report submitted by Tech Auditor. It has detailed description of technology risks faced by the project. It has also impact of risks if not mitigated by the project team. There is severity for each risk [5]–

1. Catastrophic
2. Highly Critical
3. Marginal
4. Negligible.

Also for each risk, technology auditor needs to mention probability of risk –

1. More than 50-50 chance
2. 50-50 chance
3. Less than 50-50 chance.

The project team needs to update mitigation plan with the mitigation dates.

Considering all these factors, Tech Auditor needs to give overall technology risk rating to the project. This is discussed in [Section IX].

Typical structure of technology audit risk report is shown below:

Source:IGATEResearch

Figure5: TechnologyAuditKit- RiskReport

D. RecommendedTools:

Fourth part of Technology Audit kit is recommended tools. Tech auditor recommends appropriated technology tools to the project team. For more details, please refer to [Section VIII].

VII. MAINTAINING TECHNOLOGY AUDITOR LIST

It is very important to maintain list of active Tech Auditors. Tech auditors are experienced technical architects in the organization. The key step to succeed in the Tech Audit is to assign right tech auditor to the project. You can assign more than one Tech Auditor to the project if needed. We need to track Tech Auditors technical and domain skills. Other factors like how many hours can auditor devote is also important.

Typical format for Tech Auditor repository is below.

Figure6: TechnologyAuditorList

VIII. MAINTAINING LIST OF TECHNOLOGY TOOLS LIST IN ORGANIZATION

Technology tools are driving factors to improve productivity of development team. There are various in house, open source and commercial tools. Tech auditor can recommend tools so that overall productivity of delivery team is improved.

Typical format for Technology list is shown below. This is flexible and you can modify as per your requirements.

Source:IGATEResearch

Figure 7:   Technology Tools List

IX. CLASSIFICATION OF RISKS AND DECIDING STATUS OF TECH AUDIT PROJECTS

Once Technology Auditor finishes tech audit, he needs to give rating to project. The rating is nothing but technology risk index for the project [4].

Therearethreerisks–

1. Lowrisk
2. Mediumrisk
3. Highrisk

The overall Risk status will be updated once project provides mitigation plan for these individual risks [7].

Source: IGATE Research

Figure 8: Technology Audit Risk Report

X. SUMMARY

Technology Audit is wonderful process which makes sure that no project in the organization goes into red because of Technology related problems. As technology risks are identified in initial phases of project, it helps delivery team to fix them quickly.

Technology audit can be used for almost everywhere for development and maintenance projects.

XI. ACKNOWLEDMENT

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