Requirement Gathering and Tracking Process for Distributed Agile based Development

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Abstract: Requirement management is the most important as well as most neglected area of Software Engineering and Project management. 80% projects get fail due to poor requirement gathering and tracking follow ups. In Process models which are being followed in Software Development requirement gathering process is considered a task. Web development having fast iterations and quick releases mostly follows agile model. The pace and principles of agile development do not allow developers to maintain a proper set of requirement documentation. As per agile manifesto client and developers being in face to face communication minimizes the need of client requirement documentation. The focus is totally on the development and delivery to client in minimum time period. So documentation importance has not been realized in this scenario. But case is different in distributed agile based development, where development resources and client are globally at different locations without any direct and face to face communication. Thus there arises the need of maintaining minimum documentation related to client requirement and tracking to meet and fulfill the client requirements. Proper documentation helps developers to keep track of the client requirements so that they could not miss even a minor task. Therefore, light weight process needs to be introduced so that developers could follow the process of requirement gathering and tracking without putting extra time and effort during their fast paced development.

A light weight process for requirement gathering and tracking in distributed agile development is proposed in this research. The process proposed requires minimum resources and very small documentation besides the actual development process. This process improves the client's satisfaction and performance of the developers. It also bridges the communication gap between client and developers.

Keywords: Agile Manifesto, Requirement Tracking, Sub Processes, Scrum, Project Induction, Location Transparency.

1. Introduction

Agile development is widely being used in web application development. Unlike other Software Engineering process models agile model does not support proper documentation of the development tasks. The documentation of a large programming project is costly and tedious [10]. It is difficult to keep the many documents consistent and complete. One often finds some requirements that are not implemented and functions in the software that are not specified by the requirements.

Among all phases of the software development Requirement gathering is the most important phase. Most significantly for web applications, agile processes encourage

and embrace requirements change, which is desirable characteristic for web application development [1]. Performance of the development team, client satisfaction, project success and many other elements depend upon on this phase. The more effort you put in requirement gathering and their proper documentation the more smooth and result oriented next phases would be. Web site designers have expressed concerns that formal, cleaned up representations of early ideas cause end- users to focus on inappropriate details [4].

Different techniques in agile model like XP, Scrum, FDD support some documentation with limitations in globally distributed development environment. No proper support is provided by agile manifesto in distributed environment. A lot of models have been proposed that claims to be agile but none of them propose any proper process for requirement gathering and tracking and framework for minimum set of simple structured documentation. The evident compatibility between domain of web applications and characteristics of agile processes as e.g. expressed in Agile manifesto have been documented elsewhere [2, 3].

The Requirement Gathering and Tracking process suggested in this paper typically can be used in Global distributed development environment as well as support general agile model principles.

The process is kept very simple that provides complete support to the development team at each and every step. The documents produced through this process are completely verified and authenticated by the client as well. This small process in very short time gives very accurate estimate to the developers about the client's requirements, and a quick view of remaining tasks and deadlines.

2. Material and Methods

2.1 The Project Induction Process

The project startup is a very technical matter in development. Projects mostly start upon complete satisfaction of the client from the development resources. The whole project cycle in agile development is client centric. Multiple processes are involved while a new project starts as described.
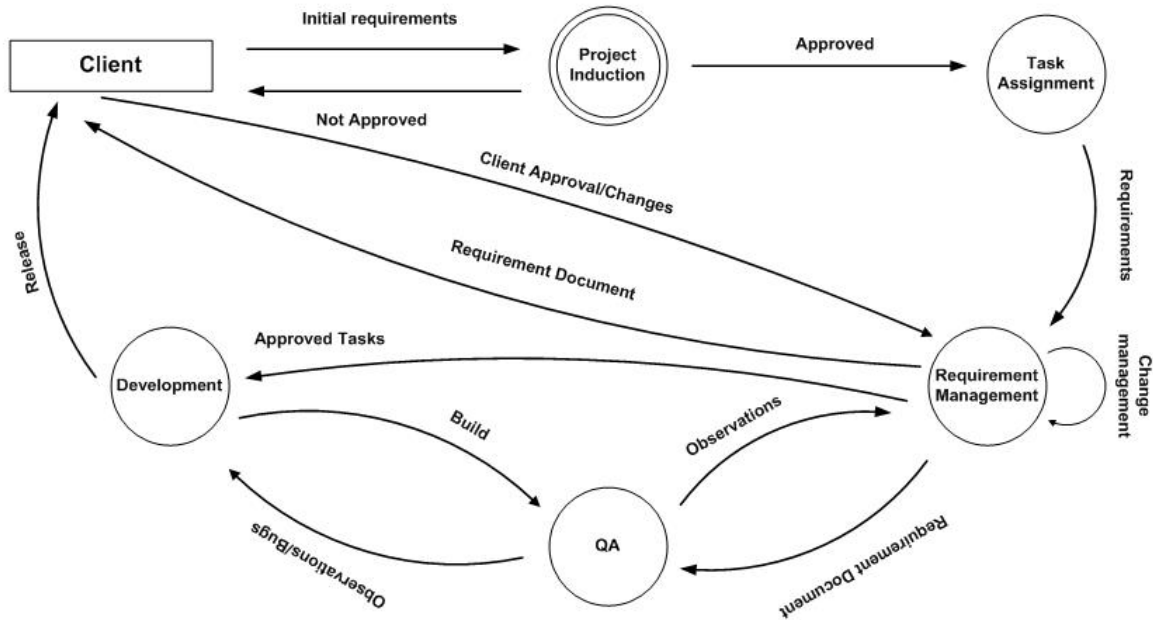
PROJECT INDUCTION PROCESS MODEL

Fig. 1

Client sends his initial requirements to the developer's team related to the project. If requirements are clear, achievable and development team has the needed resources, requirements are approved, task list and owner ship is decided otherwise client has been told.

Requirements are then forwarded in the process of requirement management where requirement document is prepared. A well structured requirement document is then sent to the QA for verification. QA observations are sent back for accommodating in the document which is then sent to the client. Upon Client's recommendations/changes in his requirements, requirement document is again updated. Finalized and approved requirements become tasks for the developer team and development process gets started. Internal builds with components of functionality are sent for QA who sends his observations and bugs report to the developers. After bug fixing the build is released to the client. Change management process continuously work throughout the development process. Accommodating changes from the client is the repetitive cycle of approval from the client.

The Project induction process model completes in a very short time and doesn't take more than a day to compile all the abstract requirements from client into a well formatted structured document to start the development. Approval from client is the key process that has been handled in the early phase before project starts. Client approval for each requirement, enhancement and changes is must to do because when client is offshore this coordination covers the communication gap.

2.2 The Requirement Gathering and

Tracking Process

Requirements volatility is an issue in software development life cycle which often originated from our incomplete knowledge about the domain of interest [7]. As the project starts and progresses towards completion requirement gathering, tracking and change management becomes important. Gathering those requirements is a non-scientific task, yet one that is crucial to the success of the software product [5]. The requirement gathering and tracking process (Fig.2) proposed here is a hand on model for requirement management.

REQUIREMENT GATHERING & TRACKING PROCESS
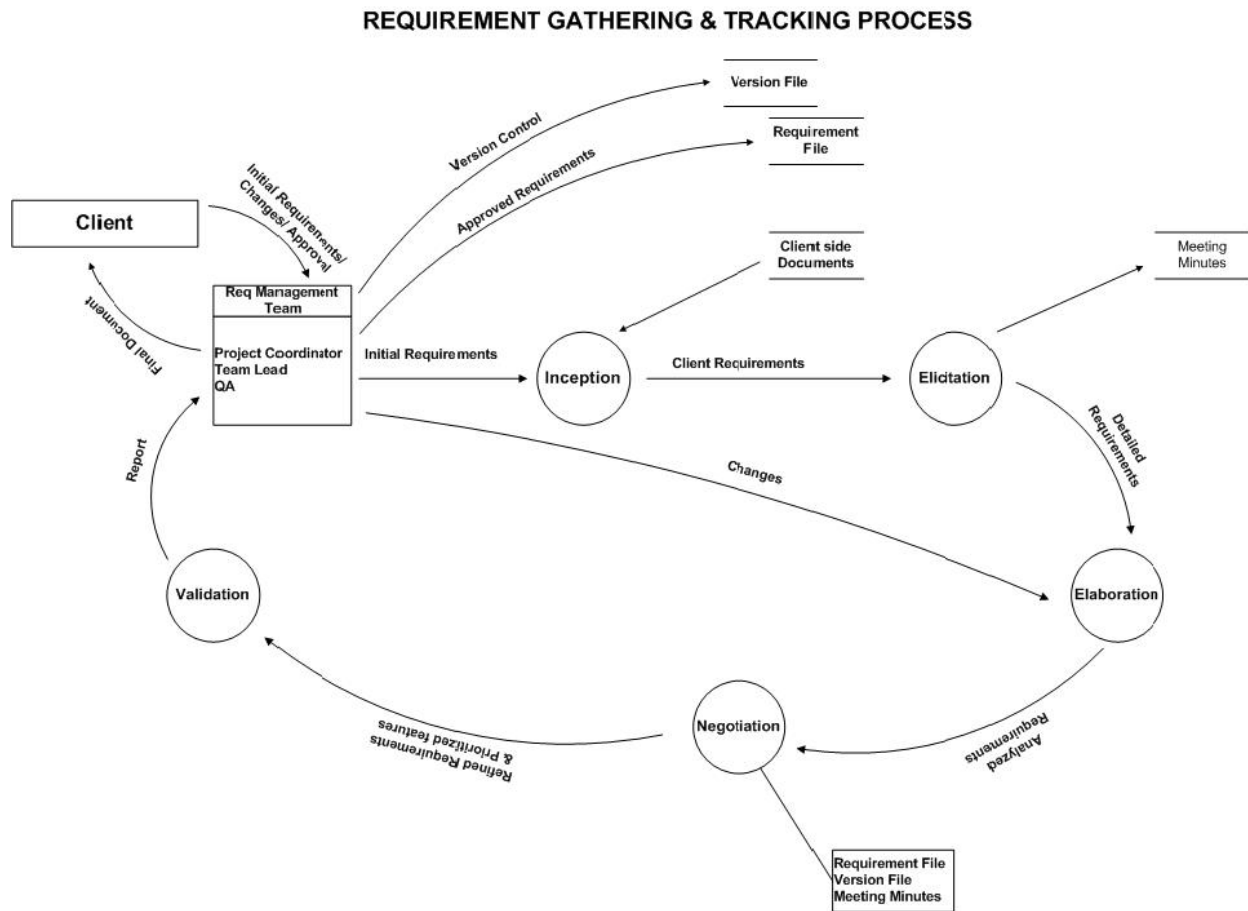
Large scale web application development based on agile model does have same team structure as other Software development projects following other process models. Hierarchical team structure that consists of Project Manager/Coordinator, QA persons, technical lead and developers are followed for large projects in spite of being agile.

Developers in this hierarchy do not find much time to spend on requirement management due to quick iteration.

A small team named as Requirement Management Team (RMT) is formulated to handle the whole process. RMT consists of Project Manager/Coordinator, Technical lead (senior developer) and a QA person.

RMT verifies and manages the changes in the client requirements with direct communication to the client. The whole

2.2.1 Inception

As client send initial requirements for starting a project, RMT checks the scope of the project and got some basic understanding of the client's problems and requirements. Help is mainly from client's provided documents of his existing system. A document containing client's initial requirements along with his issues is generated for detailed review.

2.2.2 Elicitation

After preliminary understanding of the client's requirements and project scope a conference call (structured meeting) with the client is held to discuss all the requirements in detail. Rest of the requirements, changes and plans are discussed and finalized on emails. A detailed requirement document is then produces at the end of requirement elicitation process.

2.2.3 Elaboration

Client requirement document is then technically analyzed with developer team as well. Requirements which are hard to achieve, ambiguous, alternative ways to achieve those requirements, any missing information is pointed out in a list to be discussed with the client. Changes made in the existing requirements during the development also get started from this phase.

2.2.4 Negotiation

Intelligent agents have the ability to identify, search, and collect desired information about various actions from multiple resources under changing conditions [8]. A conference

process was subdivided into further five processes derived from actual requirement gathering processes are described ahead.

call or on email list is discussed with the client, unnecessary features are removed and priorities are defined in coordination with the client. A final list is prepared to start development. During negotiation process all the previously maintained documents are referred for better understanding.

2.2.5 Validation

A basic QA cycle is performed to verify the client requirements so that there is nothing missed or ignored in the final list according to client's requirements. A validates list is provided to the RMT who gets final approval from the client and assigns tasks to the developers.

2.2.6 Requirement Management

Requirement Management comprises the duration of the whole process. The requirements phase can be broken up into four sub phases: requirements gathering, requirements analysis, requirements specification, and requirements verification [6]. All the changes made are documented to keep track of each build/release as a version control mechanism. Approved requirements are managed in a separate document file. Meeting minutes are made for each and every communication with the client for record and reference in future.

Changes required from client in existing functionality, features if receive are handled starting from elaboration process. After analyzing required changes suggestions, comments are discussed with the client in negotiation process. Plan to accommodate changes in existing cycle of development, re-prioritized features and tasks after

validation are communicated to the client. After go ahead from client it is incorporated in the existing development cycle. Tasks are re-assigned, some goes on hold depending upon the priority of the changes. Changes are fully made as well as previous tasks and this cycle keeps going on the same pattern till the project ends.

3. Results and Discussions

The Project Induction process is a very quick process that increases the productivity of the development process in terms of validated builds and releases to the client. Development team being located at one place speeds up the process of client approval and delivery to the client. The whole process mainly depends upon the requirement management process that is critical for whole process. Requirement management process proposed in this research is an enhancement of the project induction process which also accommodates the changes.

The overall performance of the requirement gathering and tracking process is very satisfactory. Complete analysis of the client requirements, structured and minimum documentation and change management are the properties of this process model which are not available in other agile techniques. All the agile techniques lack this process. Client satisfaction in a short time with quick solutions this model provides can't be achieved through other agile approaches. No such model has been devised so far that provides rich procedures for communication, requirement gathering and tracking in such an efficient manner.

The Requirement Gathering and Tracking process is another component which is basically a cycle for requirement management inside Project Induction Process. The life of this cycle is the total duration of the Project Induction Process. Different aspects of users' work situation such as relationships among users, a physical environment, and artifacts into the task structure provide the detailed contextual information for the actual use situation [9].

In short time it handles all the initial requirements, changes in the requirements and tracking of back log requirements without causing any delay is the net outcome of this process. In distributed environment it provides complete location transparency, scalability between development team and offshore client or some resource at client site as well. The whole process completes with minimum documentation which is very easy to refer and track as the development process progresses.

Unlike other agile models this model is fast, short duration and very responsive. It provides requirement tracking and change management even if the development process is in the middle or last stage. Its performance efficiency has been proved by applying it on different teams and a continuous improvement in their overall performance has been observed.

3.1 Change Management

The proposed process completely accommodates the changes from client during development. Changes from the client are received till the end of the project, so handling those changes during the project is a technical task. Changes received during the development phase sometimes affects many developed components and there needs to modify a lot of code also. Requirement Gathering and Tracking process proposed in this research caters

these changes in a technical manner so that existing code may affect minimum.

3.2 Time Management

The proposed process is very short duration and does not take more than a day or two. Requirements or changes are finalized and development starts quickly on final approval. Spending one or two days in requirement/change analysis saves so many days of development ahead. If proper requirement/change analysis is not performed, this causes developers to get stuck at some point that requires getting clarification from the client that leads to delay in delivery to client. Therefore, this short process completely analyzes each and every requirement before incorporating it to the actual development. Delays, risk of project failure gets minimize with this process.

3.3 Transparency in Distributed Agile development

Location transparency which is major bottleneck in distributed agile based development w.r.t client is achieved by this process. Development resources never feel that client is offshore through frequent, regular and quick communication with the client.

4. Conclusion

No such process has been designed that supports distributed agile development in an efficient manner. Still there needs improvements at certain levels in varying development environments. Some processes would further be mature to accommodate development of distributed applications. The process would be an enhanced framework for distributed applications in near future.

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