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Enhancement in V- model for Component Based Development

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Abstract
In Component based software development, one of the commonly used methodology is V-shaped development model. The focus of this study was to enlighten the major drawbacks of an existing immature change controlling and up grading mechanism in V-model for Component based software development projects. In previous model approach, if any change request occurs from customer or by any means while developing the system, the process has to be re-started from scratch. Secondly, the up gradation mechanism for developed and implemented system after deployment is improper. While having these lacks, extra cost, time and other resource are not saved. In this study, a new agent-based approach is introduced that implements a continuous monitoring and collaboration activities with all phases of development during the whole project life cycle. This strategy covers the gaps of this model efficiently regarding software quality assurance, time saving and it provides proper support to meet new change requirements during and after the software development. This addition not only extends the acceptability and maturity of this model to accomplish complex projects in time but also makes the deliverable more accurate.
Keywords: Component based development, Up-gradation mechanism

1. Introduction

1.1 Background

Software engineering is a “branch of system's engineering which helps to analyze, organize, design, implement and provide the maintenance of software systems”. It deals with technical features of constructing software systems as well as the monitoring problems such as managing programming teams, arranging and formation. This field has become more requiring and necessary with the passage of time. Software engineers provide reliable and effectual software results for complicated and actual issues. One of the central methods is component based software engineering (CBSE), is a field of software engineering that deals with reuse-based method to elaborate, appliance and comprise loosely coupled and independent components into systems. It is a well-known and different technique from other techniques to improve systems in which software systems can only be developed, and employed from scratch. In component based development (CBD), different developers use different language, techniques, set patterns to intervene into a demanding software system. This method is more effective, competent and time saving as paralleled to other conventional and outdated methods but demands a lot of work to make it standardized. In this phase of development and progression complications are increasing day by day. But in spite of all that complications, it has become more necessary to move toward new technology and usage of new methods. Organizing software component systems frameworks are turning into a basic test because of the invention of Cloud Computing system that makes it credible to swiftly run complicated dispersed and scattered programming structures on-interest on a virtualized structures at a small amount of the cost contrasted with a couple of years back. At the point when the capacity of software development fragments expected to run the application developers, and their interdependencies turn out to be unreasonably mind confusing, making it impossible to be materially and tangibly supervised, it is essential for the framework manager to employ unusual state languages for shaping the usual unimportant framework requirements, and after that depend on devices that accordingly amalgam the low-level sending actions significant to truly know a right and finish framework strategy that accomplishes such requirement (Lascu et al., 2015).In the majority of the model-and segment-based programming advancement processes for care and other vehicular applications, models of the conduct of each on-board capacity are created and progressively advanced to achieve the usage of every hub then again Electronic Control Unit (ECU). In this improvement and modification handle, the transactions required for every hub are concluded, and a message set for each on-board system is categorized. Also, timing parameters what's more, necessities for every message are set up” (Mubeen et al., 2014).Component based development (CBD) is the building of programming frameworks out of prepackaged nonexclusive components. The impetus that has made these four components wires into the current CBD development is the developing acknowledgment by the product business and all the more imperatively its clients. Quality is the one issue that stands amongst us and the acknowledgment of the CBD goals. It appears not to have unfolded yet on the business that parts without a draconian state of mind to quality at all phases of the procedure might be more regrettable than the shades of malice they are attempting to cure (Kaur and Mann, 2010).Component-based development offers an alluring option for building Web-based endeavor application frameworks. CBSE works by creating what's more, developing programming from chose reusable programming components, then amassing them inside fitting programming models. By advancing the utilization of programming components that business merchants or in-house engineers fabricate, the component-based programming development

approach guarantees expansive scale programming reuse (Aberdour, 2007).Researcher for the most part concur that engineers make programming components fundamentally so they can be reused in different programming frameworks. They additionally for the most part acknowledge that a component is a unit of autonomous arrangement that communicates with its surroundings through its very much characterized interfaces while epitomizing its execution. The component-based programming development life cycle contrasts from customary programming development .from multiple points of view. The component-based programming framework outline stage incorporates new exercises, for example, choice what's more, production of programming models, also as determination and customization of an arrangement of programming components (Rawashdeh and Matalkah, 2006).

1.2 V model

V-model is dependent upon component-based programming methodology. This model balanced to section built procedure. V-model is comprehensively used similarly as a and only various associations, typically considerable affiliation for building and executing brain boggling, long-life items, to example, autos, robots et cetera. In this model the system starts clinched alongside an ordinary way right notwithstanding fabricating and prerequisites detail, as shown by that skeleton specific. Done a non-part built headway approaches, done which the system might proceed for that unit plan, use also testing phases. Different should standard methodologies clinched alongside which transform might proceed with unit outlining, unit headway those further taking care of that are repetitively activities , this model we basically survey Also select those pre-created segments Also manufacture a schema by incorporating the individuals segments. This wills extra a tonal about extra cosset What's more period. To parallel about these critical advantages, this model need a couple Hindrances In addition. The greater part basic need aid there might be no suitableness a component open should decide during this really minute prerequisites and picked part might not fulfill each a standout amongst our necessities.

1.2.1 .1 Requirement Analysis and Specification

This is the primary period of this model that is used to distinguish the problem remove the user and framework necessities and depicts every possible procedure that could meet each one of those prerequisites. In a component-based development method, it is exceptionally essential to examine whether these necessities can be satisfy with COTS components or not. It indicates that expert must be fully careful and know about the components that can choose. Since it may not be occurred dependably that fitting constituents can be found, there is a danger that the new components, must implement. There might be one plausibility to achieve full focal points of component-based methodology is to organize the user needs and requirements, and change the basics to make utilize the current COTS components.

1.2.1.2 System and Software Architecture Design

Framework and programming engineering outline acknowledged with the availability of COTS components. It is considered that it is anything but hard to apply the COTS components executed in various progressions and phase, however in actual; it is totally unlike from those suppositions. To undertake the interoperability and coordination between various components are exceptionally wearisome. There is a particular design system of every model to use that particular structure. It directly affects context and program design compositional outline. For example, if a component model is based on a customer server engineering style, all things considered the application will need to use that particular style; generally the required yield can't without much of a stretch be accomplished. This will put a few confinements on the framework outlining process. Therefore, the outline procedure unequivocally associated with the availability of the required COTS components.

1.2.1.3 Unit Testing and Integration

While creating component-based framework, a framework can be manufactured by direct coordination of COTS components. In a flawless item, the sections amassed and attempted. Then again, the part tests in separation are not sufficient. Habitually, arrange units will be completed right now a couple portions and possibly a paste code.

1.2.1.4 System Verification and Validation

This stage is used to consolidate the testing and check of as of late collect system. The customary test and check techniques are implemented. An essential problem in component-based technique is to realize the oversight, specifically when sections are of Black box sort and agreed by different merchants.

1.2.1.5 Operation Support and Maintenance

At this phase, additional or adjusted component passed on into the structure. In most of the circumstances a present part will be balanced or another type of the same fragment will be joined into the structure. This suggests the system must affirm either properly or by amusement challenging. In a component-based change, there are on a very basic level less attempts in programming; be that as it may, the affirmation and testing necessitate stunningly more tries.

1.2.2 Major Drawbacks

This model is used for long life and complex projects. These projects are time and quality conscious. Mostly these projects include real time projects. Authors extracted two most important flaws in V-model that are

discussed below.

1.2.2.1 *Immature change solicitation approach*

It has a restricted procedure; there is no mature and efficient change management system. If any change is needed in amid the advancement of undertaking, then as per its unbending and minimum adaptability administration stream, the entire procedure re-began starting with no outside help along documentations which oblige additional time, exertion and assets.

1.2.2.2 *Improper upgrading mechanism*

As we know that V-model is an existence cycle procedure model. It implies that it can be utilized just aimed the development of task. It has no instrument to meet new changes after implementation. In future, after usage of the system, in the event that we expected to include new module that require the genuine coding, than V-model is neglect to bolster it.

2 Literature Review

Crnkovic et al., explained that in recent year, component based software development has become an established strategy. It is used in many fields of development like distributed systems, web-based applications, desktop applications and graphical applications. All models have same basic steps, but for long term and complex projects like car and robot development, V-model is best in concern of reliability, defining and implementation of testing at each stage and quality assurance. It has some drawbacks like most serious is the late discovery of errors due to lack in the requirements phase and its improper mechanism of managing these changes which cause the excess of resources and time.Munassar et al., (2010) stated that the software development process presents a description of a method includes some particular phases like product Specification, Designing, Validation, Evolution and maintenance. The development models have advantages and disadvantages. As the extension of the waterfall model, V-Shaped life cycle has a sequential path, for the execution of processes. Each phase must be fully completed before going towards the next phase. There is more focused on testing strategies. This model has a rigid and less flexible structure and lack of change request control strategy. Koziolek et al., (2010) explained that in Component based software development, performance prediction and measurement techniques helps software architect to evaluate the system, based on component performance, created by component designer and developers. The development model enable deriving performance metrics like response time, output, and resource utilization. We can compare these values and their predictions to the performance requirements of the system. If the prediction results show that the given requirements cannot be fulfill with the given design, then the model needs improvements in its architecture. Andrew (2011) stated that Software development is to build useful software solutions, not generating the books of documents. The V-Model helps the development teams to apply focus towards which documents are useful, why and how much content is appropriate for each phase. This model has a complete process of quality assured development from scratch to user acceptance. On the other hand, late discovery of errors due to lack of perfection in requirements phase. It has improper and inefficient procedure of managing this change which causes the excess use of resources and time. Balauria et al., (2011) stated that Component Based software development is an idea to develop system by selecting already developed components and assemble them into a new system. Various component technologies such as Component Object Request Broker Architecture (CORBA), Component Object Model (COM), and Enterprise JavaBeans (EJB) are used to develop the CBD system. Each plays its vital role regarding platform and language compatibility to make CBSE most suitable choice of most developers. Yang *et al*., (2012) stated that the development procedure for conventional intelligent electronic devices commonly used V-development model for specifying requirements, designing, coding, unit testing, integration, verification and validation. At the age of rapidly changing requirements of the user in projects, a proper validation is needed to take place in each phase; a better mechanism for change controlling is needed in v-model to fulfil the requirements.

3 METHODS AND MATERIAL

Authors examined about CBSE in detail, its methodologies and their part in the practical working of CBSE. The V-model is also studied in detail and depict a few actualities like inflexibility, firmness , no backing to meet changes amid and after the conveyance of venture that make it deficient for long-life quality frameworks advancement and maintenance. Since, our principle centre of exploration was to distinguish impediment confronted while change administration and redesigning phases of V-model.

A questionnaire survey is conducted by the authors to evaluate the findings and recorded the results taken from different professionals and software houses in Pakistan. . Authors drew a few members who are understudy so they must select in PhD or Master's degree to verify that we circulate the overview survey to the experts utilizing light-footed strategies and experts utilizing customary systems. Results were extracted from surveys and calculated by using statistical methods and aggregate result by using SPSS. It concludes results from all aspects like reliability, Time, Resources, security, efficiency, cost management.

4 RESULTS AND DISCUSSION

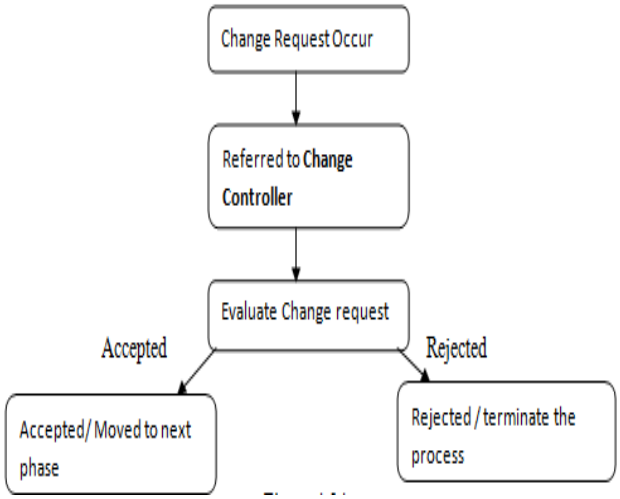
Authors introduced overview results and investigated information to continue further for exploration discoveries. Here, this part organized as tails, results should be finished up all the research comes about and give a hitter system to include new client change request and expansion of modules.

4.1 Modified Change Control Approach

There ought to be a change control component that works in such a route, to the point that if at any phase of the procedure, a change solicitation happen, first we ought to dissect that the change is about which level and what is going to change to quantify possibly it can be oversee or not. Than go to that specific phase/ sub-level and meet the change ask for rather to restart the entire process once more. This is all done by an intermediating and standby "Change Controller" that remains in contact to all phases.

4.1.1 Phase 1 (Change Request Evaluation)

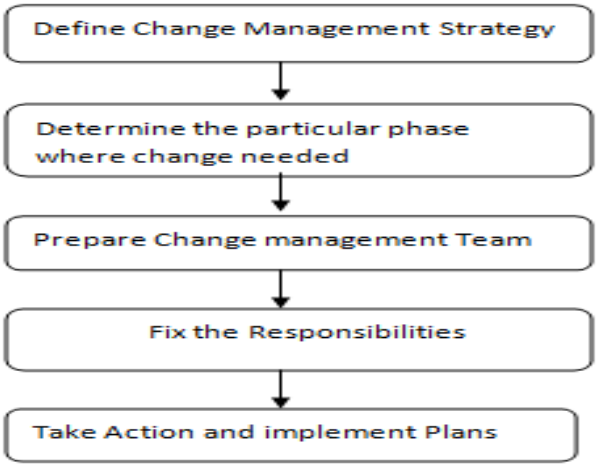
The principal stage is gone for getting prepared. It answers the inquiry: what amount of change management is required for this particular project. The principal stage gives the situation mindfulness that is discriminating for powerful change administration shown in figure.



- This phase is a foundation of whole study.
- All the change requests must forward to change controller.
- It remains in contact to all the phases and sub activities of the development phases.
- It will monitor all activities for any misconduct.
- CA examines the request that either the change is able to proceed or not on the basis of schedule, cost and other resources.
- It will remain in-active till the change is not requested by the management.
- If any change needed during development, a change request generated.
- Change controller will examine analyze the request and make sure that the request will not conflict to the software architecture and organizational conduct.
- If it against the criteria, the request will rejected.
- If it fulfill the needs and meet the defined criteria, it will be accepted, and ready for further proceeding.

4.1.2 Phase 2 (Implement Action Plan)

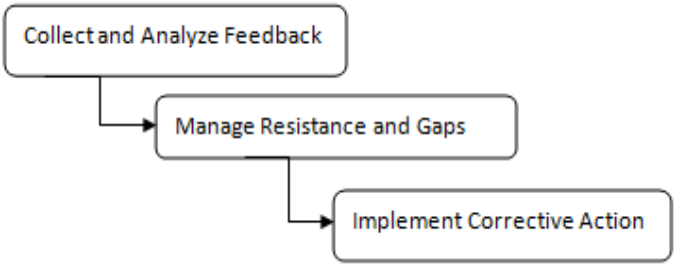
After acceptance from change controller, a change management plan conducted as per situation and following activities will perform.



- If the request is valid, Change Controller will find out that the change resemble to which phase.
- Then CA will refer that request proposal to that particular phase instead of restart the process from scratch.
- Case in point if a change is needed in relations of database, than we ought to just redesign the LLD stage not the entire procedure. it will diminish the time compass and spare a ton of expense and exertion.
- The following output are extracted from this stage:
    - Change attributes profile
    - Authoritative qualities profile
    - Change administration method
    - Change administration team structure
    - Support appraisal, structure and roles
    - Communication arrangement
    - Support guide
    - Preparing arrangement
    - Instructing arrangement
    - Resistance administration arrangement

4.1.3 Phase 3 (Feedback for Change Accomplished)

Just as discriminating however frequently ignored, the third stage helps venture groups make particular activity gets ready for guaranteeing that the change is supported. In this stage, task groups create measures and systems to check whether the change has grabbed hold, to the check whether workers are really doing their employments the new route and to praise achievement



4.2 Modified Updating mechanism

On the off chance that we need to meet any adjustment in the created framework after usage, than rather to specifically cooperate with segment pool to choose and coordinate part, restart the procedure from the earliest starting point by checking its dependability and software architecture possibilities. Since if there is no segment that can coordinates with framework, there may be outlining, reconciliation issues. The advantages of our proposals are that if any segment obliges improvement we can create and confirm it and will be incorporated to the framework, records and configuration construction modeling will be upgraded and new checked segments can be coordinated to the framework

5 Conclusions

In this paper we examined CBSE, its methodologies and their part in the practical working of software

development. we likewise portray the V-life cycle procedure model, quickly clarify its working criteria and depict a few actualities like inflexibility, firmness , no backing to meet changes amid and after the conveyance of venture that make it deficient for long-life quality frameworks advancement and upkeep. Keeping in view those results and requirements for time and resources saving, a new agent based approach is introduced that will keep track the change requests and supervises all the activities done to make change happen. New modified updating mechanism will support proper documentation and increase the chances to find and select the batter module from COTS. This will save not only the time but also money and other resources and make the method more reliable .The goal of this exploration is to enhance the fundamental guidelines and strategy to meet the new needs of client. It will not simply enhance the fundamental usefulness additionally enhance the proficiency of the model. Presently arrangements, a great deal of time and exertion will spare.

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