

## Lessen E-commerce project collapse by SFT Techniques

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**Abstract**

*Information technologies play a noteworthy promising role in the execution of E-Commerce projects. E-Commerce is one of the most growing global assignment of any emerging country. It transfers technology, business, and commercial transactions into a different context for users to increased transparency in community dealings. The success ratio of e-commerce project is expected high day by day with strident availability. Firstly the study focuses on E-commerce Projects and models. Secondly, it focuses on performance issues of E-commerce project. E-commerce projects failure is concentrated in the reference of project development. Later the study also emphasizes gaps between various bodies associated with E-commerce Project and proposed solution. The faults exist in and ascend for such project is very harmful to success ratio. The faults are not welcomed at any level of any type to pursue execution. To support this, further, it focuses on Software Faults Tolerance (SFT), its methods, techniques, and models. Finally, software faults tolerance multi-version techniques are embedded with E-Commerce projects for better performance and high availability.*

**Key Words**

*E-commerce, Fault, Software fault tolerance, SFT Techniques.*

## **Introduction**

E-commerce projects involve online sell-purchase. E-commerce is based on large numbers of computer & management subjects as e-payment; m-payment, e-banking, supply chain management, e-marketing, e-transaction processing, the e-data interchange (EDI), inventory systems and some other systems [1]. E-Commerce refers to manage various types of users, business groups, government departments & agencies for exchanging data & information [1]. It is a digital interaction between various entities. Generally, e-commerce significantly assists communications & transaction among companies and consumers (B2C), between one company and company (B2B), and between consumers & consumers (C2C) [2]. The broadly it includes B2B (Business to Business), B2C (Business to Consumer), C2C (Consumer to Consumer), C2B (Consumer to Business), B2A (Business to Administration), C2A (Consumer to Administration) [2]. The few of main features of E-commerce are providing better speed, services and more competent delivery of products. It also focuses on cost reduction and revenue increasing. At present, the internet is the most popular ways of the medium of e-commerce execution. [3]. It also emphasizes the transformation of the boundary level and other associations with technology for unremitting product delivery, service, population contribution and governance [4, 5]. E-commerce helps not only in faster buying and selling but also in easy product searching. There are no constraints of theoretical, geographic or location limits [6].

## **Software Fault Tolerance and Its Techniques**

In the process assuring system functions for the desired outcome even in a faulty environment, it is preferable to have Software fault tolerance (SFT), hardware or software [7]. SFT is based on diversity fundamentals. Software fault tolerance techniques are used for detection of faults, prevention of faults, and to remove the occurred faults. Fault prevention techniques protect the system from an incidence of faults [8]. Fault removal techniques remove faults after facing [9]. Software fault tolerance mostly includes two groups of techniques as Single version & Multi-version [10]. Single version SFT techniques use a single piece of software code. These techniques are as error detection, exception handling, data diversity, process pair, etc. [11,12]. Multi-version fault tolerance techniques are based on multiple versions or pieces of code as Recover Block and N-version Programming [11, 12].

## **Diversity**

Diversity can be applied at each phase of E-commerce project creation for better performance and reliability [13, 14]. The same piece of code is not suitable for diversity fundamental. If the system contains multiple copies of the same piece of code, the

effects are different. If the system contains multiple copies of novelty piece of code for same functionality would create a difference in supporting fault management. The further section supports design diversity with RcB and NVP for high reliability in an E-commerce project. Environment diversity is also approached for hardware fault tolerance.

*Recovery Blocks (RcB): The RcB structure is pure & dynamic diverse software fault tolerance techniques [15]. This technique includes more than one execution path along with variant inputs options. On the requirement of functionality, the most appropriate execution path is selected. If the selected path is able to produce the desired output without any doubt, the test passed successfully. Otherwise, it diverts on another path and the same process continues until the last selected path for successful execution. RcB provides the most suitable code option as the main block and less suitable as alternative one [15].*

*N-Version Programming: NVP structure builds with a different version of the code for the same functionality [16]. NVP is a static method in comparison of RCB. It uses follow a variant version of code to be executed in a faulty environment [16]. The basic NVP technique is pure & static diverse software fault tolerance techniques [16]. This technique includes more than a piece of code for the same functionality. As per system flow, it flows with concern piece of code. The code execution continues on different computers in parallel. If it is going to execute on the same device, it is in a sequential manner. After completion of execution of each version, the selection approach procedure applies on variant outputs. On the requirement of functionality, the most appropriate output is selected.*

### **E-Commerce Project Failure and It's Issues**

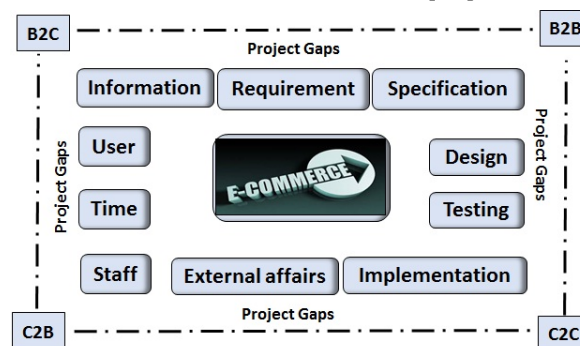
Failure of an E-commerce project can be categorized in various ways. The projects cannot succeed due to total failure or partial failure. The project started but could not serve desired outcomes are the example of partial failure. The project which is found incorrect from the initial period and output are far away from the expected objective are referred to as a total failure. Success and failure of E-commerce project depend on large numbers of parameters. But very shortly we can say succeed projects are producing desired objectives with expected output [17]. The success ratio of E-commerce project is increasing day by day. The initiated projects' target and objective must match with complete projects. Though certain issues mentioned below generate difficulty in it [18]. There are numbers of E-commerce projects which are successful but numbers of project faced partial or full failure.

### Issues of E-commerce projects

- ☐ Quality issues
- ☐ Staff and skills
- ☐ Processes
- ☐ Additional charges
- ☐ Unclear return and guarantee policies
- ☐ Supplementary resources
- ☐ Technology: frequently change technologies
- o Lack of security
- o Stateless servers
- o Digital payment failures

### The Issue of Project Gap

E-commerce projects' success and failure are also considered on the size of the gap between various entities associated with the current Specification, design, and implementation of it. It mainly focuses on how to simplify requirement specification, larger the design, and complexity in developing the functions & modules. The objectivity is not matching as per goal and lacking desired outcomes generated gap in function execution. The gap is lacking necessary effects for the successful execution of the project. Specifically, the bigger gap in these parameters may lead to bigger failure. The various gap may be unsafe to such project as requirement specification gap, data gap, design gap, data flow gap, function gap, functionality mapping gap, implementation gap, maintenance gap, user/customer gap, technological gap and many other. The gaps may create or increase the failure rate of E-commerce projects [19]. The projects can be affected by people, politics, emotions and culture and, rationality and objectivity. The factors like specification, design, and technology create an extensive effect on it. Failure of a system is also on the adoption of infrastructure and mindsets. A system designed for one state may not feasible for another state sometime. [19].



*Fig: 1 E-commerce Project Gap*

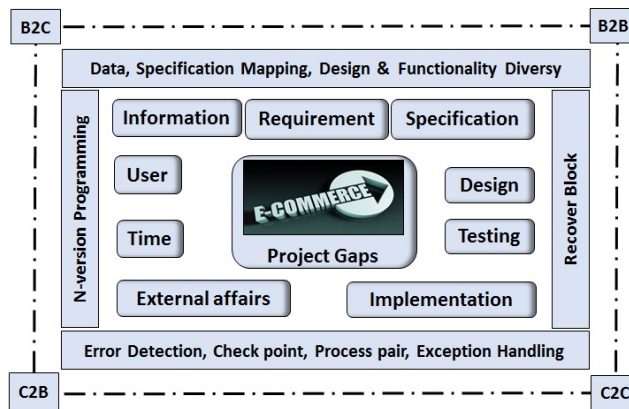
The gap can be internal or external. The internal gap for E-commerce system can be classified by function phase of its development. IRGap can arise due to improper flow of information and requirement matching. RSGap can arise due to lacking requirements gathering for project Specification. SDGap can arise due to the improper mapping of the specification to Designing. DDGap will be the result of deriving inadequate data flow by design. DFGap lead by data flow to functionality flow. FIGap can arise due to such functionality implementation. IRGap can arise due to insufficient implementation resource planning of the project.

TestGap can arise due to the lake of testing segments. SRGap is a gap of staff and regulation of project. The external Gap can be classified by external affairs of projects. PGAGap can be seen between project and government agencies or government organization. PGPGap can be seen between Project and government Processes or protocols. PERGap is associated with project and external resources. PCTGap is between the project and changing Technology. PUGap Refers gap between Project and User which in various practice. PTGap associated with project time for each phase of creation and each timeline to follow and many more.

### **Proposed SFT Techniques for E-Commerce Issues**

The proposed way for reduction of the issue is to minimize the gaps. As better data and information flow within the e-commerce project will help to reduce internal gaps. The better data and information flow with external entities will help to reduce external gaps. IRGap can be managed by the proper flow of information and requirement matching or by data diversity (an SFT Technique). We can have a structural requirement analysis to deal with such a gap. The collected information is enough to match the requirement of the project. It can be managed by generating checkpoint (an SFT Technique) at Requirement analysis.

RSGap can be managed by in-depth requirement gathering for the project to generate Specification structure of the project. SDGap can be managed by proper mapping of Specification to Designing. It is Design diversity fundament of SFT. The same gap can be managed by design diversity where we may approach variant design for the same tasks. DDGap will also be managed by design diversity. DFGap can be managed by error detection or exception mechanism. FIGap can be managed by functionality or objectivity checking. Recovery block or N-version Programming support such gap where it provides more than one piece of code to implement the functionality.

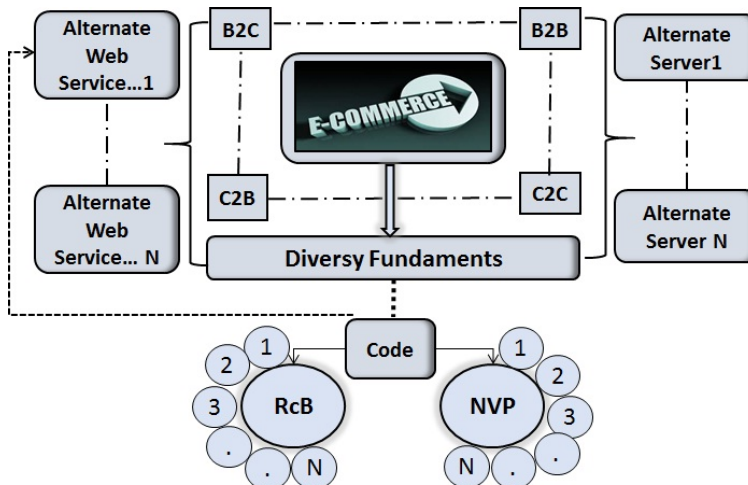


**Fig: 2 SFT solutions for E-commerce Gaps**

IRGap can be managed by the alternate resource at the time of failure which supports hardware fault tolerance concepts. PTGap can be managed by check point for project time for each phase of creation. It can also be managed by process pair (an SFT Technique). These are all possible ways and SFT technique to deal with related gaps. These are few of E-commerce projects failures and proposed SFT solution.

### Implementation

E-commerce projects are associated with the latest Customer Acquisition, Customer Engagement, and Customer Retention and of course technology nowadays. The external affairs are not in direct control but we can focus on internal affairs. To achieve high reliability and better performance, we can use the SFT mechanism. SFT supports environment, implementation and execution diversity. This is proposed effective techniques of fault tolerance for an e-commerce project.



**Fig: 2 E-commerce with H/W and Software diversity**

There are certain temporary deficits arisen initial stage at E-commerce project which lead design faults and unacceptable erroneous states in the environment. The failure code or

part of failure code will enable execution in restarted mode. If any piece of code, component or external affairs is inattentive or not in working state, we can use an alternative code, component or external affairs. As we have discussed in the earlier section, solution for an occurred gap with the diversion of flow execution and other diversions fundamental. The user interacted application like e-commerce projects need working continuously to answer in any way. The project will not bear a system failure. In this section, E-commerce projects are associated with SFT Multiversion techniques to work more reliably.

The E-commerce projects are divided into various functions, modules, components, and sections to support various Web services. Each of these is correlated with other. The fault occurred at one place may cause partial or full damage to another place. We can use some piece of information, data, code; a resource which assists to protect the system with variant inputs to assure desired output. To implement this concept we can use either Recovery Block or N-version Programming techniques or the combination of both. Each module internally uses RcB which work on different acceptance test. E-commerce execution starts with a primary path. If primary execution is according to the objective parameters, it turns to the next path. The RcB gives us many alternatives to the e-commerce module until a few extents. Using different versions of code for in different module, component, NVP is also robust. NVP began with the first version of part of a project. All modules are created with multiple copies. One of copy fails it will divert to the next one. On the time of fault occurrence, it chooses another version of the same piece code. The project will remain to continue even under a faulty environment with multiple version of the same set of code.

## **Conclusion**

The e-commerce projects' performance can improve with SFT techniques. SFT techniques are useful for increasing success ratio, better commercial transactions and achieve high availability. If we deal properly with issues of e-commerce projects, performance and availability will be higher. E-commerce projects are an important segment for emerging economic growth. The project evaluation and deployment planning properly are identically significant. We have discussed E-commerce, its issues and project failure gaps. We have suggested the most adaptable solutions with SFT techniques for managing faults. The Fault gaps are deliberated and allied with its solution. The SFT techniques and diverse approach will qualify an e-commerce project more compliant. The E-commerce failure rate can be decreased by applying software fault tolerance techniques. The RcB and N-version techniques are sturdily protecting the partial or full failure of a component at any consign of E-commerce Project.

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