EFFECTIVE UBICOM METHODOLOGY: A FRONTIER OF UBIQUITOUS COMPUTING

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ABSTRACT
In the modern era each and every perspective of social application and their quality of work are enhancing. People are mostly rely on communication system to convene their messages and thoughts. Its means communication system play a vital in our society and people require a reliable communication system to communicate anyone, anytime, anywhere. In this paper we focus Ubiquitous system and its internal components; for continuity of research the new methodology of design is proposed to improve the quality of product at its application stage. Here author clarify the theoretical concept of UC in a well suited manner and reduce the complexity behind the concept of UC. Author also proposes new methodology for ubiquitous system regarding the configuration and design of UC environment. A Simulation tool is used to verifying the proposal and focused the importance of configured item in the deployment of UC system. At last the work is concluded via capturing the actual reason behind the failure of deployed UC.

KEYWORDS: *Ubiquitous Computing, Methodology, Configuration, Failure, Lemma.*

I. INTRODUCTION

Mobile and pervasive computing signify key evolutionary steps in a line of research dating back to the mid-1970s. Fig.1 illustrates this evolution from a systems-centric point of view. In this figure if we move from left to right various problems are encountered. Moreover, the solutions of various previously-encountered problems become more complex. It is easy to design and implement a distributed system than a mobile computing system of comparable sturdiness and maturity; a pervasive computing system is even more challenging.

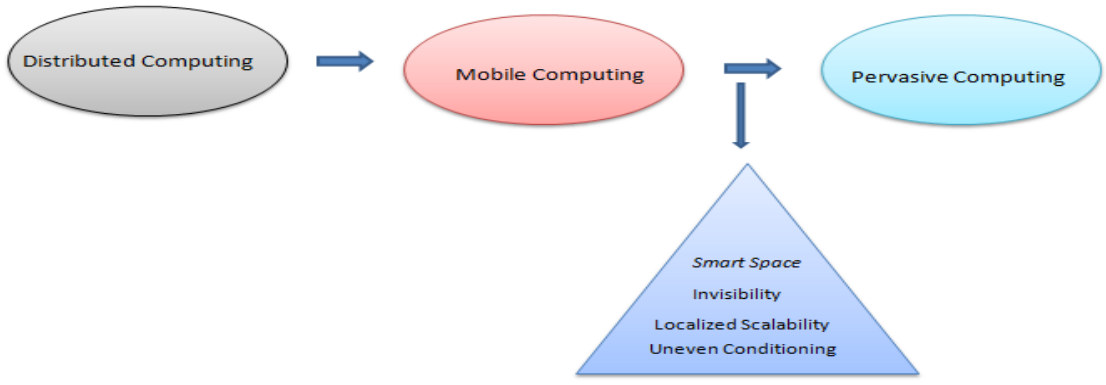

Fig. 1: Evolution of Mobile and Pervasive Computing from Distributed Systems

In the early 1990s, this was a dream too far ahead of its time - the hardware technology needed to achieve its imply did not exist. It is only now, nearly 20 years later, that the computing and wireless communications technologies needed for its awareness are becoming easily available. As Fig.1 shows, pervasive computing shares various research themes in general with mobile computing. It also addresses four key issues:

- **Smart Spaces**: building infrastructure embedded with computing infrastructure brings together two worlds that have been dislodge until now. The blending of these worlds enables mutual sensing and control of these worlds.
- **Invisibility**: the ideal expressed by Weiser is completed is appearance of pervasive computing technology from a user's consciousness. In practice, areas on able approximation to this ideal is minimal user distraction. If a pervasive computing environment continuously meets user expectations and rarely presents him with surprises, it allows him to interact most at a sub conscious level.
- **Localized Scalability**: the amount of interaction increases between user's personal computing space and its environment, if smart spaces grow in sophistication. This has severe bandwidth, energy and diversion implications for a wireless mobile user. One of the crucial problems in pervasive computing is of scalability. The current ethos of the internet, which many believe heralds the "death of distance" directly oppose the inverse square laws of nature, which states, good system design has to achieve capability by sternly decreasing interaction between distant entities.
- **Masking Uneven Conditioning**: consistent diffusion of pervasive computing technology into the infrastructure is many decades away. In the interim, there will persist huge differences in the "smartness" of different environments. This huge dynamic range of "smartness" can be grating to a user, disparaging from the goal of making pervasive computing technology invisible. One way to reduce the amount of variation seen by a user is to have his personal computing space compensate for "dumb" environments. As a trivial example, a system that is capable of disconnected operation is able to mask the absence of wireless coverage in its environment.

There are five subsection of the paper as: Introduction, Ubiquitous Computing System, Effective ubicom methodology, Result Discussion and Conclusion & Future Scope. The Section of Ubiquitous Computing System describes the communication system for 24*7 in social environment. After the basic discussion of ubiquitous system author has identified the problem in existing ubiquitous system and defined the problem in proper manner to accomplish the research methodology for controlling the discussed problem. A novel ubicom methodology has been proposed in this section for effective deployment of ubiquitous environment. To measure and compute the reality of proposal author uses various simulator and their output are explain in result section. Last section concludes the overall work and future scope of the effective ubicom methodology.

II. UBIQUITOUS COMPUTING SYSTEM

Ubiquitous means existing or being everywhere, every time for everyone. Computing is any goal-oriented activity. It contain of designing, developing, structuring, and managing various kinds of information making computer systems behave intelligently. System can be defined as an decisive configuration that consists of interrelated and interdependent elements. These elements constantly persuade one another (directly or indirectly) to maintain their activity and the existence of the system, in order to achieve the goal of the system. By Ubiquitous computing we will not only be connected always, from everywhere, but we are approaching a time where smart devices will take actions by predicting user inputs. It is a short distance from mobility to ubiquitous computing. Mobility took computers from the desktop and put them on your lap and in your palm and pocket. Ubiquitous computing sends information seamlessly into your environment, where numerous tiny devices monitor you, connect with you, and even think for you. "Anywhere and anytime just with a blink of your eyes" this certainly seems to define the ultimate motto of pervasive computing [2,3].

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Fig. 2: Ubiquitous System

Hence, **Ubiquitous Computing System** can be define as learning environments in which we all can have access to a variety of digital devices and services, including computers connected to the Internet and mobile computing devices, whenever and wherever they need them. Our notion of ubiquitous computing, then, is more focused on many-to-many than one-to-one or one-to-many, and includes the idea of technology being always available but not itself the focus of learning [4,5]. Privacy advocates are concerned about the "big brother is watching you" aspects of pervasive computing, but from a practical standpoint, most researchers feel it will improve efficiency [6].

2.1. Characteristics of UC [7]

1) Invisible
Architecture can take more capabilities by the invisible benefit of the ubiquitous computing, smart environment will be attached with the computing technologies that will not invisible.
2) Socialization
Smart building can take more amount of social response from occupants, so , in this way interaction becomes more social in nature.
3) Decision-Making
As it is evident from the name itself that decision making help the occupants to make better decision. Good architectural design make “smart environment” helpful.
4) Emergent Behaviour
Building becomes more kinetic in form, their constructed design come together to group behaviours that make them more adaptive.
5) Information Processing
Information is being processed from crunching data. It is type of nervous system in which information get processed and every part gaining a whole new meaning.
6) Enhancing Experience
The need of the occupants will be fulfil by the smart environments where architectural space will be goal oriented. Ubiquitously embed themselves in our environments, sensors and actuators.
7) Convergence
Interconnectivity allows new type of sharing that will filter many mundane task.

III. EFFECTIVE UBICOM METHODOLOGY

To enable communication everywhere and anytime to all the systems surrounding human require more research in Ubiquitous System. We focus Ubiquitous system and its internal components; for continuity of research the new methodology of design is proposed to improve the quality of product at its application stage. We propose a novel theorem to accomplish the performance of configured item designed through the concept of Re. We use configuration management tools to simulate the failure

analysis and capture the reason behind the fault. The testing is performed from unit testing to integration testing for configured item and system for their acceptance. The performance of existing methodology is compared with the proposed configuration methodology and discusses the result. Each individual step of measurement is followed through the proposed theorem and hence we shall prove that the resultant performance is far better than the existing.

Lemma 1:

"Replacement of ICs can be control via up gradation of CI's"

Explanation: Every time replacement of internal component of the system requires the huge amount to control the operation. One of the alternative options to overcome the above said problem is to upgrade the configured item [8].

Lemma 2:

"Amalgamation of all network services configure the strong communication network in all perspective"

$$\text{Combo packet} = \{\text{Wifi, Ad Hoc } \ldots\} \quad \text{------ (i)}$$

Explanation: A ubiquitous environment uses either the wifi or wireless network to provide the communication between objects. Sometimes there may be a network problem arises during the communication, which result in difficulty in passing the message from one object to another. A new perspective arises, when a entity tries to communicate with other entity in ubiquitous environment, a combo packet of network may be established (that contains all the possible types of network services wifi, adhoc etc.) to control the problem during a communication of ubiquitous entities.

Lemma 3:

"The integration of Verified and tested unit modules of services are most important in the deployment of the system"

Explanation: Each individual module is configured according to the tested and verified CI's that results in desired ubiquitous environment. The integration testing followed by unit testing & verifying items that are used to deploy the overall systems by using the concept of system level testing.

Principal/Theorem

Continues up gradation of CI's into ubiquitous network having combo packet of all network services such wifi , adhoc , wireless, etc. provide the effective ubiquitous environment 24*7 communication services in all condition, if integration is performed through verification and validation of unit module then only powerful deployment of the system take place.

$$\text{Th 1} = \{L1 + L2 + L3\} \quad \text{----- (ii)}$$

IV. RESULT DISCUSSION

We are tested different electronics component s by using different prediction methods at same temperature as 25^0 C and in same environment condition as GB Ground to captured the mean time between failure of the system and failure rate in per million hour. We find out that rate of failure for connector, fuse and IC memory is differ in various prediction method that shows occurrence to fail the system during the process of work.

Table 1. Reliability Prediction of Configured Items

S. No	Item Code	SR Prediction Method	MTBF (Hours)	Failure Rate (Failure Per Million Hours)
1	Connector	Mil-217-E1 Part Stress	594312475.69	1.683e-003
		Mil-217-F1 Part Count	526315780.60	1.900e-003
		Mil-217-F1 Part Stress	594312475.69	1.683e-003
		Mil-217-F2 Part Count	952380880.75	1.050e-003
		Mil-217-F2 Part Stress	1441695250.49	6.936e-004
		Alcatel	594312475.69	1.683e-003
		Siemens Sn 29500-1	99999992.92	0.0100
2	Fuse	Mil-217-E1 Part Stress	100000002.24	0.0100
		Mil-217-F1 Part Count	99999992.92	0.0100
		Mil-217-F1 Part Stress	100000002.24	0.0100
		Mil-217-F2 Part Count	99999992.92	0.0100

		Mil-217-F2 Part Stress	100000002.24	0.0100
		Alcatel	100000002.24	0.0100
		Siemens Sn 29500-1	39999999.00	0.0250
3	IC Memory	Mil-217-E1 Part Stress	29242271.59	0.0342
		Mil-217-F1 Part Count	42645237.14	0.0234
		Mil-217-F1 Part Stress	91247012.11	0.0110
		Mil-217-F2 Part Count	42645237.14	0.0234
		Mil-217-F2 Part Stress	91247012.11	0.0110
		Alcatel	244411654.05	4.091e-003
		Siemens Sn 29500-1	406006915.31	2.463e-003

In this way we find out that our proposed lemma 1(L1) is appropriate to predict the reliability via failure rate and availability of configured item that is used to build the internal component and integrated them to a system. The tested configured item may be changed, if up gradation is required for improving the quality of internal component as well as whole system

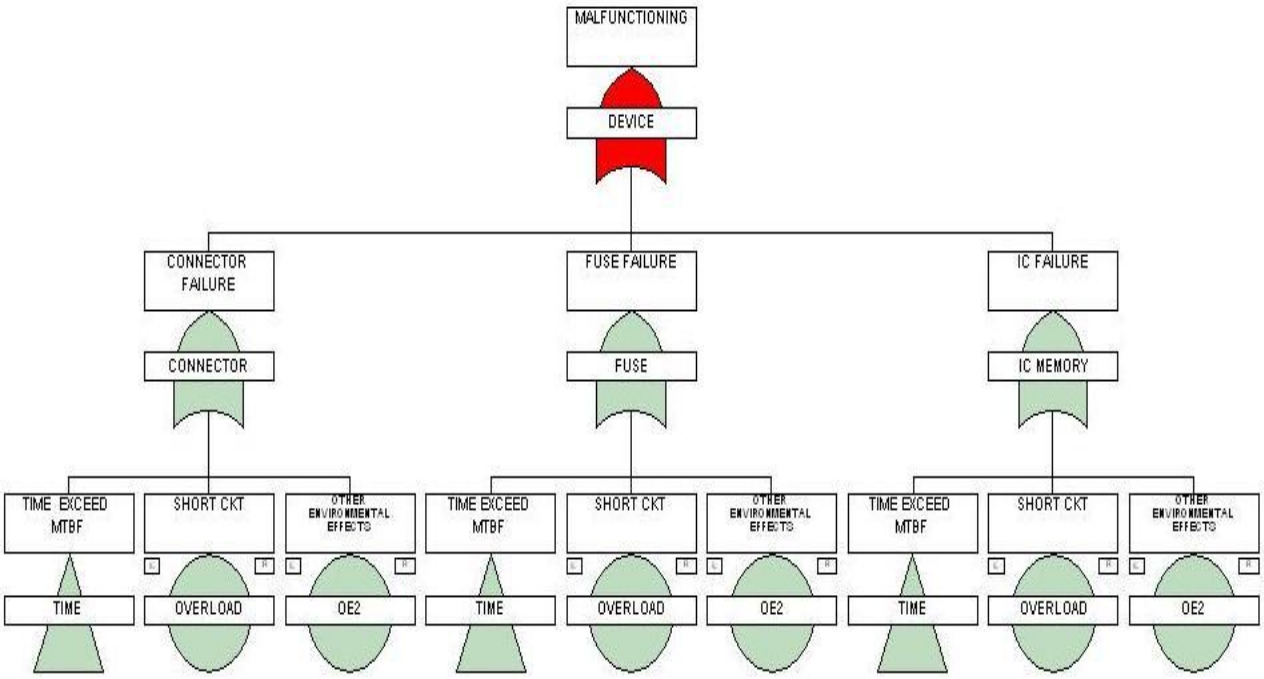

Fig. 3 Fault Tree Analysis of Considered Electronics Items

After the computation of failure time and time to repair, we investigate the reason behind the failure of internal components, which may cause the presence of fault during the cycle of configured item activities. Measure causes are shown via fault tree analyser, that contains three reason of failure as: Exceed The Time of MTBF, SHORT CKT, OE2(Other Environmental Effects).

Table 2. Traditional v/s Proposed Methodology

S.No	ITEMS	Traditional	Proposed Methodology
1	Configuration management (expenditure)	HUGE	MINIMAL
2	Quality Integration	Requires new system	Only up gradation requires
3	Network Connection	Minimum (only wifi)	Maximum (wifi, adhoc, wireless etc)
4	Availability of Services	Less	More
5	Module verification and validation	More overhead	Less overhead

V. CONCLUSIONS & FUTURE SCOPE

In this paper we discuss Ubiquitous Computing and its theoretical concept. We test different electronic components i.e. Connector, Fuse and IC- memory and simulate the result. Here we also had done the fault tree analysis of different electronic item. Hence we conclude that are proposed methodology works fine. The proposed methodology is more effective in the deployment process of ubiquitous system. Neighbour industry organization are invited to continuing enhanced this approach till the communication demand of society did not satisfied.

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