

## Continuous Functioning of Soft System Bus Based Centralized Persistent Computing System

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### ABSTRACT

Persistent Computing Systems (PCSs) were proposed as a new generation of reactive systems to provide reliable and secure computing services continuously and persistently to their users anytime and anywhere during running, maintenance, upgrade, reconfiguration and even during various attacks. Soft System Bus Based systems (SSB-based System) were proposed to implement PCSs to be built by connecting components of the system using the SSB and can provide continuous functioning and dynamic adaptability that are the two most fundamental features of PCSs. Though an implementation method of SSB-based systems exists for distributed systems, there was none for centralized systems. This paper proposes an implementation method of SSB-based systems for centralized persistent computing systems (SSB-based CPCs), that satisfies the two fundamental features. The paper gave an analysis of various events which obstruct continuous functioning of a system at first, and then presented requirements for and a design of SSB-based CPCs. The paper also presented our experimental results to measure the rate of continuous functioning, correctness and time delay and showed that the components can provide high continuous functioning with correct output where delays vary for each event.

### KEYWORDS

Persistent Computing Systems, Soft System Bus (SSB), SSB-based Systems, Centralized

Persistent Computing Systems, Continuous functioning, Dynamic Adaptability.

### 1 INTRODUCTION

Modern society is more and more dependent on various computing systems that are required to provide their services continuously. Therefore, the systems should have continuously available, reliable, and secure functioning. Modern computing systems like ubiquitous computing, autonomous computing, evolutionary computing, anticipatory reasoning reactive systems [9], many software systems belonging middleware are required to provide services in anytime and from anywhere basis. Traditional computing systems often have to stop its running and service when it has some trouble, it is attacked, and it needs to be maintained, upgraded, or reconfigured. As a result, no traditional computing systems can run continuously without stopping their services [5, 6, 8]. In recent years, some research area has growing attention to develop computing systems with consideration of fault-tolerant systems, pervasive middleware, self-adaptive systems [2, 4, 15]. However, those research areas have concentration for large-scale distributed system applications only. They do not draw any





































