HIGH AVAILABILITY SOLUTION: RESOURCE USAGE MANAGEMENT IN VIRTUALIZED SOFTWARE AGING

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ABSTRACT

As businesses increasingly rely on IT for their mission-critical operations, continuous availability is a universal concern. Nowadays, virtualized platform has become the popular option to deploy complex enough services. Deployed services are expected to be always, available, but these long running services are especially sensitive to suffer from software aging phenomenon. Software aging of virtual machine monitors (VMMs) is becoming critical because performance degradation or crash failure of a VMM affects all virtual machines (VMs) on it. To counteract this issue, we deploy software rejuvenation methodology. To eliminate the service outage during software rejuvenation process, we combine the rejuvenation with live migration technology. Live VM migration enables a running VM on a host serer to move onto the other host server with very small interruption of the execution. Live VM migration depends on VMs placement and efficient resource available is required. The idea behind our paper is two-fold. First, we present the optimization of the resource usage as accepting as many services as in virtualized environment which support of VM live migration. Second, to demonstrate how much it can improve system availability, the stochastic Petri nets model a virtualized server system in case of using time based software rejuvenation for VMM is presented. Finally, we perform the numerical analysis to evaluate the model.

KEYWORDS

Availability, Clustering Technology, Software Aging, Software Rejuvenation, Stochastic Petri Nets, Virtualization.

1. INTRODUCTION

Availability has long been a critical issue for online computer systems whose failure can halt business process. This is particularly more pertaining to high demanded high available (HA) computing systems based on off-the-shelf components. Exhaustion of system resources, data corruption, and numerical error accumulation are the primary symptoms of the degradation, which may eventually lead to performance degradation of the software, crash/hang failure, or other undesirable effects. That degradation of software is known as software aging. Software aging has not only been observed in software used on a mass scale but also in specialized software used in high-availability and safety critical applications [3].

System Virtualization techniques are getting popular and gaining significant interest in the enterprise and personal computing spaces. The majority of today's high availability (HA) clusters is based on real physical hardware and virtualization is coming more and more popular nowadays, one has to think about possible combinations of virtualization and high availability clustering. Modern computers are sufficiently powerful to use VMs. Many fields, such as autonomic computing, server consolidation, security and education publish results that praise the benefits of

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