

# High Availability Solution for Virtualized Local Disaster Recovery

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## Abstract

*Disaster recovery (DR) is an important element of the complex information technology (IT) systems. The availability of the IT for everything, from everywhere, at all time is a growing requirement. Effective IT strategies need to have both high availability (HA) and disaster recovery (DR). Nowadays, virtualized platforms have become the most popular option to deploy complex enough services. Software availability is one of the weakest links in system availability. Web servers have continuous execution of long duration and with rather varied workloads. Such characteristics make them potential candidates for a degenerative phenomenon called software aging. The work presented in this paper aims to offer the high availability solution against software aging of virtualized local disaster recovery (VLDR) by providing measurement based software rejuvenation. The idea behind our paper is two-fold. First, we present the framework seeks to maximize the number of services running simultaneously, while guaranteeing the resources needed by each service. Second, we estimate the time to aging-related failures and then which used as aging failure rates for measurement based software rejuvenation through a stochastic reward nets model. Finally, we perform the numerical analysis to evaluate the performance of the model.*

**Keywords:** availability, local disaster recovery, measurement based software rejuvenation, stochastic reward nets, virtualization.

## 1. Introduction

The need for high availability (HA) and disaster recovery (DR) in IT environment is more importance than other sectors of enterprises

[6]. The major reality of high availability (HA) cluster 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 [7]. The concern of disaster recovery, virtualization and high availability often into IT department's worry box'. Server virtualization and failover technology are capabilities that provide a high level of protection while keeping cost at minimum [11]. Disaster and its recovery processes involve unplanned interruption of service. Failures of computer systems are more often due to software faults than due to hardware faults. One of the causes of unplanned software outages is the software aging phenomenon. This phenomena becomes critical in 24x7 applications. A virtualization layer also called virtual machine monitor (VMM) is a software layer that abstracts the physical resources for use by the Virtual Machines (VMs).

Recently, software aging of VMMs is becoming critical because many VMs run on top of a VMM in one machine consolidating multiple servers and aging of the VMM directly affects all the VMs. In Proactive/Predictive rejuvenation, system metrics are continuously monitored and the rejuvenation action is triggered when a crash or system hang up due to software aging seem to approach [1]. It has been verified, to a greater extent, in those software processes that are in execution for long periods of time, being also influenced by variations in their workload. One of the promises of virtualization is the ability to allow applications to dynamically move from one physical server to another as the demands and resource availabilities change, without