연구산출물 블라인드 처리 가이드라인

한국조선해양기자재연구원 공개채용은 「**평등한 기회, 공정한 과정을 위한 공공기관 블라인드 채용**」을 따르고 있습니다. 이에 지원서 작성 시 첨부하는 연구산출물 증빙자료 블라인드 처리방법에 대해 다음과 같이 안내드리며 반드시 유의사항을 숙지하시어 전형과정에서 불이익을 받지 않도록 유의 바랍니다.

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- 특허번호, 등록일자 및 발명의 명칭 등 기본정보

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Effects of dynamic isolation for full virtualized RTOS and GPOS guests

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HIGHLIGHTS

- We examine and analyze how a RTOS VM and a GPOS VM interact and influence each other.
- We analyze the explicit and implicit effects of dynamic isolation for vCPUs.
- The dynamic isolation shows low scheduling delay of RTOS and high throughput of GPOS.
- All of the proposed concepts are implemented on a full-fledged hypervisor.

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ABSTRACT

Industrial systems currently include not only control processing with real-time operating system (RTOS) but also information processing with general-purpose operating system (GPOS). Multicore-based virtualization is an attractive option to provide consolidated environment when GPOS and RTOS are put in service on a single hardware platform. Researches on this technology have predominantly focused on the schedulability of RTOS virtual machines (VMs) by completely dedicated physical-CPUs (pCPUs) but have rarely considered parallelism or the throughput of the GPOS. However, it is also important that the multicore-based hypervisor adaptively selects pCPU assignment policy to efficiently manage resources in modern industrial systems. In this paper, we report our study on the effects of dynamic isolation when two mixed criticality systems are working on one platform. Based on our investigation of mutual interferences between RTOS VMs and GPOS VMs, we found explicit effects of dynamic isolation by special events. While maintaining low RTOS VMs scheduling latency, a hypervisor should manage pCPUs assignment by event-driven and threshold-based strategies to improve the throughput of GPOS VMs. Furthermore, we deal with implicit negative effects of dynamic isolation caused by the synchronization inside a GPOS VM, then propose a process of urgent boosting with dynamic isolation. All our methods are implemented in a real hypervisor, KVM. In experimental evaluation with benchmarks and an automotive digital cluster application, we analyzed that proposed dynamic isolation guarantees soft real-time operations for RTOS tasks while improving the throughput of GPOS tasks on a virtualized multicore system.

1. Introduction

Traditional industrial computers consist of control processing software for simple missions. In recent years, industrial systems (e.g., consumer electronics, automobile, aeronautic sectors, smart phone, factory automation and grid computing) have been launched with more powerful devices, to interface to more networks and sensing devices. Moreover, a larger variety of application software is now required, with different levels of quality and service. This trend has also increased the number and volume of electronic units, as well as their power requirements. Thus, the job of software now includes not only hardware control but also information processing for sensing devices. In general, real-time operating systems (RTOS) are used as control processing software, since its tasks are mostly time-critical, whereas information processing software can be written on top of general purpose operating systems (GPOS) to maximize throughput. Those systems can be consolidated into a single system by multicore hardware and virtualization techniques. Some research can be found in industrial domains that require RTOS and GPOS applications to be simultaneously executed on a single multicore-based virtualized platform [1,2]. As illustrated in Fig. 1,

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simultaneously, performance of the mixed system significantly improved. All works were implemented in a well-known open source hypervisor, KVM.

In addition, the discussion section treats limitations of this research and areas of application for the future works. Nevertheless, our research introduced novel work to explore and achieved improvements in the operation of VMs in a multicore-based virtualization system with a RTOS and a GPOS running simultaneously.

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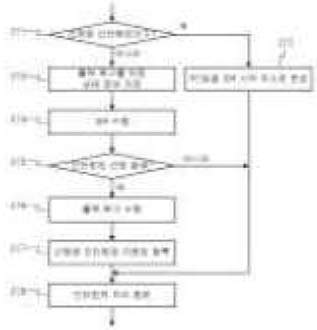
(54) 발명의 명칭 **센서 네트워크 에뮬레이션 장치 및 그 동작 방법**

(57) 요 약

센서 네트워크의 에뮬레이션 성능을 향상시킬 수 있는 센서 네트워크 에뮬레이션 장치 및 그 동작 방법이 개시된다. 먼저, 발생된 인터럽트가 선정된 인터럽트 이벤트인가를 판단하고, 발생된 인터럽트가 선정된 인터럽트가 아닌 경우 완벽 복구를 위한 상태 정보를 저장하고, ISR(Interrupt Service Routine)을 비동기적으로 수행한다. 따라서, 높은 정확성을 유지하면서 에뮬레이션의 수행 시간을 향상시킬 수 있고, 이를 통해 센서 네트워크 응용 프로그램의 개발 시간을 단축시킬 수 있다.

대 표 도 - 도4



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