Hospital Information Disaster Recovery System and Simulation Drills

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Abstract

Comprehensive and integrated Hospital information system has many advantages and can enhance clinical processes. Clinical data and application systems are critical properties of hospitals. Any problems causing unintended information service failure can result in disastrous consequences to clinical environment. Disaster recovery system (DRS) was developed for continuous information service even in disaster situation, medical record protection from hardware or data server failure, and seamless information service during primary server upgrade operation. Real-time updated and physical DR system was developed with Oracle Data guard solution. 13 times DR simulations were performed. Role transition times were 17.0±6.4 minutes. DRS showed short interruption time and it was very useful for primary system upgrade. Hospital disaster plan with DRS and regular drills are needed for real disaster situation.

Keywords:

Disaster recovery, Hospital information system, Electronic medical records

Introduction

Comprehensive and integrated Hospital information system HIS has many advantages and can enhance clinical processes. Clinical data (health records) and application systems are critical property of hospitals. Any problems causing unintended HIS service failure can result in disastrous consequences to clinical environment. Disaster recovery system (DRS) requires much investment, but the probability of using DRS is low. It is not easy to decide to establish DRS. But HIPAA (Health Insurance Portability and Accountability Act) requested that hospitals should have contingency plan including DRS.

This study is intended to report the development of DRS and experiences of DRS drills in Asan Medical Center (AMC), the Korea's largest referral hospital with about 2,700 inpatient beds. DRS was developed for continuous information service even in disaster situation, medical record protection from hardware or data server failure, and seamless information service during main server upgrade operation.

Methods

DRS project started July 29, 2005 and ended September 15, 2005. Software type DRS with Oracle Data Guard solution was used for all AMC information systems except picture archiving and communication system (PACS). DRS was consisted of primary database (DB), logical standby DB, and physical DR DB (remote standby DB). DR DB was synchronized with the primary DB by applying the redo log data. Each DB had 4 terabytes capacity.

Results

DR DB was installed to 8th floor of Asan Research and Education Building while primary and standby DB were located at 13th floor of West Building. Since DRS established, 13 times DR simulations were performed with switchover operation (a role reversal operation between the primary DB and DR DB) from February 12, 2006 to May 30, 2009. DR DB was used as active server for real-time redo log apply test (1 time), working time DR test (2 times), regular DRS checkup (6 times), DRS interface checkup (2 times), overall DRS checkup (1 time), and primary server upgrade (2 times). Active service times of DR DB were varied from 45 minutes to 23 hours. Tuxedo transactions were varied from 56,000 to 6,472,000. Most of switchover times (time needed for role transition) were within 15 minutes with some exceptions (17.0±6.4 minutes). Medical information team also prepared disaster plan and assigned detailed roles to team members. During overall DRS checkup test, this drill was also performed.

DRS showed short interruption time and it was very useful for active system upgrade. But hospital disaster plan with DRS and regular drills will be better needed for real disaster situation.

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