# Karachi Stock Exchange



## Stable, highly available infrastructure supports transaction-intensive Oracle database

## Overview

Karachi Stock Exchange (KSE), the largest Unisys customer in Pakistan, began using Unisys ES7000 CMP technology to run its locally developed trading application, which was the first step in moving from a UNIX/RISC platform to an open architecture based on a Microsoft Windows and Intel platform. After running its trading application successfully, KSE decided to completely switch over to Windows and Intel, and selected Unisys ES7000 64-bit technology to run its database application based on Oracle. KSE has seen a 100-percent increase in the amount of transactions per minute (tpm) its trading application can write since implementing the Unisys, Oracle, Microsoft and Intel platform.

## Situation

Named the "world's best-performing stock exchange" in 2002, the Karachi Stock Exchange (KSE) manages trading in 685 listed companies with a capitalization of more than $25 billion. Founded in 1947, this successful stock exchange has grown

## Challenge

Implement a clustered Oracle database to run mission-critical database based on Oracle Real Applications Cluster (RAC) technology and the Microsoft Windows Server 2003 operating system.

## Solution Components

*Unisys Components*
Unisys ES7000 servers

*Oracle Components*
Oracle Real Application Cluster (RAC)
Oracle 9.20

*Microsoft Components*
Microsoft Windows Server 2003, Enterprise Edition

*Storage Components*
EMC CLARiiON CX400 disk

*Other Components*
Intel Itanium 2 processors

## Benefits

▶ 100-percent increase in produced transactions per minute (tpm)

▶ Reduced response time from more than two minutes to one second

▶ Increased number of concurrent users that can be supported from 300 to 1000 and still have room for more users

## Platform Highlights

Unisys ES7000 servers employing Intel Itanium 2 processors and running Microsoft Windows Server 2003, Oracle 9.20 database and Oracle RAC software are supporting 64-bit computing for Karachi Stock Exchange's (KSE) database application. As a result of implementing cost-effective ES7000 servers, KSE has experienced better response times and more efficient utilization of its applications.

**UNISYS**     **ORACLE**     **Microsoft**

rapidly and adopted a technology-centered approach to support its businesses. Its management places an emphasis on the continual development and improvement of its automated trading environment to maintain smooth and reliable operations.

After experiencing tracking issues and poor response times in terms of inquiries for outstanding orders and the writing of confirmed orders onto database servers, IT executives at KSE saw a need to implement a more reliable and scalable solution. Its previously deployed IBM RS6000 servers could neither handle the 500,000 orders that KSE was taking daily nor support KSE's requirement of connecting more than 2,000 terminals.

## Solution

KSE's main business objective was to synchronize its database with its newly developed trading application, which can match more than 400 trades per second. KSE developed its own trading application and database based on Oracle and the Microsoft Windows Server 2003 operating system. After a successful implementation of the initial system, KSE deployed two Unisys ES7000 servers employing 64-bit Intel Itanium 2 processors. One server is used as the production server and the other provides failover capabilities.

KSE's previous infrastructure had six to seven IBM RS6000 servers, which did not feature partitioning capabilities. Thus, workloads could not be distributed to take advantage of processor capacity, leaving most of the processors lying idle. KSE resolved that problem with the implementation of 64-bit ES7000 servers.
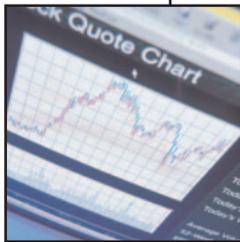
As to why KSE IT executives chose the Windows Server 2003 operating system, there were several reasons. First, they wanted to develop an open-platform based trading application. Second, the resources required to develop a new trading application were very expensive. "The ES7000 servers provided us with a platform that can run Microsoft Windows Server 2003," says Abdullah Jan Farooqui, Chief Information Technology Officer. "If we ran our applications on a UNIX platform, the cost of that system would be at least 10 times more expensive."

Another key component of this deal was the implementation of Oracle 9.20 and Oracle RAC database software. Due to the mission-critical nature of the trading application, KSE deployed Oracle's RAC clustering software to achieve transparent failover capability and uninterrupted availability.

## Benefits

Since implementing the Unisys and Microsoft solution for 64-bit computing to support its Oracle environment, KSE has seen major benefits—including better response times, more efficient utilization of computing resources and a more cost-effective solution.

For example, KSE is committed to delivering a sub-second response time to its customers, regardless of stock market conditions. Previously, depending on the order flow, users would wait between one to three minutes.

"Now with Unisys ES7000 servers at the heart of our infrastructure, we achieve the required response time without a glitch," says Farooqui. "Since implementation our staff has greatly benefited. They used to have to stay back in the office just to wait for the queues to appear in order to run a report. Now they can run reports right after the closing of the market."

Additionally, KSE's previous infrastructure could not write the number of transactions per minute (tpm) needed for its newly developed trading application. "The IBM servers were lagging behind—producing only 600 to 700 transactions per minute. With the new trading system running on Unisys ES7000 servers, we are now writing between 12,000 to 15,000 transactions per minute," says Farooqui.

According to Farooqui, KSE has also been able to support twice as many concurrent users as previously supported under UNIX, but without increased cost. And KSE can now support 2000 direct-attached trading workstations.

IT executives at KSE are also focused on improving storage support. In order to free its servers from additional workloads, the company has installed an EMC CLARiiON CX400 disk. "EMC, partnered with Unisys, offered scalability, availability and performance," says Farooqui. In the future, KSE is interested in working with Unisys to implement a Disaster Recovery (DR) site. Additionally, KSE is considering implementing a SAN because it could enable the company to replicate and synchronize data to a DR site.
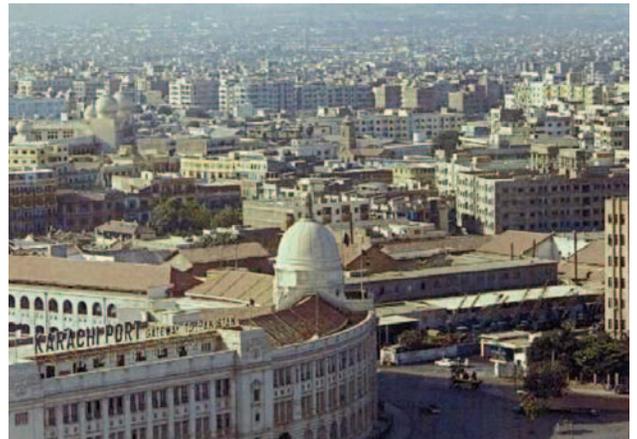
Unisys provided a complete solution for KSE's demanding IT environment—easily winning over competitors IBM and HP/Compaq in this deal. "The Unisys ES7000 server is a product that comes from people who have expertise in services and mainframes that support mission-critical environments," says Farooqui. "It is the only platform that can provide KSE with a scalable, highly available infrastructure that is needed to gain a competitive edge in this business."

Visit the Karachi Stock Exchange at:
**www.kse.com.pk**

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