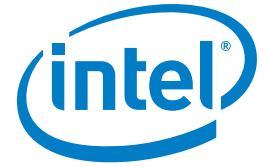


CASE STUDY

Intel® Xeon® processor 7400 and 5500 series

Enterprise Server

Performance: Data-Intensive Computing



Carestream Health's innovative SuperPACS* improves patient care for Clalit

Clalit and Carestream Health deploy ground-breaking hardware platform to support new Picture Archiving and Communication System

Israel's largest healthcare medical organisation (HMO) Clalit, worked closely together with Carestream Health - a leading medical imaging IT vendor, to deploy a new picture archiving and communication system (PACS). By providing clinicians with the new SuperPACS*, both the clinical decision-making process and overall quality of patient care is significantly improved. It is the first known implementation, worldwide, of an Oracle 11g* database running on Microsoft Windows* Server 2008 and Intel® Xeon® processor 7400-based servers.



CHALLENGES

- **Better medical imaging service.** Improve the medical imaging service by reducing to virtually zero the time between a patient scan and the results being delivered to the referring physician
- **Improve workload management.** Better manage Clalit outstanding workload across 12 hospitals and 39 imaging centres, providing healthcare services to 3.8 million insured members

SOLUTIONS

- **SuperPACS* architecture.** Allows every physician to read, process and report any patient image scan, regardless of their physical location or the site where the scan took place, establishing a unified and efficient enterprise-wide workflow management
- **Innovative IT solution.** It is the first implementation worldwide of a solution based on an Oracle 11g* database, running on IBM System x3950* multiple CPU servers, powered by Intel® Xeon® processors 7400 series, running on a Microsoft Windows* Server operating system

IMPACT

- **Patient benefits.** With the SuperPACS solution, patients benefit from an overall improvement in the quality of care as the referring physician receives the imaging scan results and is able to initiate the patient's treatment much faster
- **Organisational benefits.** With the SuperPACS solution, physicians are able to significantly improve productivity and the organisation is able to efficiently manage its imaging workflow



"Carestream SuperPACS* stores, processes and distributes very large and complex data sets quickly and efficiently. We have a vast number of performance demanding users across our organisation. For these reasons, we needed a high-performing, reliable and scalable platform to support this demand. The IBM/Intel/Microsoft platform ticked all these boxes."

Dr. Arnon Makori
Radiologist and PACS project manager, Clalit

The SuperPACS* solution

Clalit is Israel's largest healthcare medical organisation (HMO). As a forward-thinking organisation Clalit adopts the latest technology to underpin its strategic business goals. For example, to combat rising energy costs and increase IT flexibility, it was an early adopter of virtualisation in its data centre, with all servers based on the Intel Xeon processor 7400 series.

Working closely together with its PACS solution provider Carestream Health, Clalit's latest IT transformation supports the rollout of Carestream SuperPACS* - an innovative picture archiving and communication system (PACS), in order to solve the organisation's current imaging and storage challenges. Previously, physicians used CDs with a basic viewing capability and a limited, local archive to read and store imaging scans such as x-rays, ultrasounds and computerised tomograms. Enterprise-wide workflow, advanced diagnosis or central back-up were not available.

SuperPACS is an innovative IT solution allowing every user to efficiently review, read, process and report on any imaging study on a single, virtual desktop, integrated into a unified, enterprise-wide workflow, regardless of physical location within or outside an enterprise.

Dr. Menashe Benjamin, VP, Carestream Health, explains: "With SuperPACS, images are stored on a central database, enabling physicians at any location to quickly and conveniently view medical images for any patient, no matter where they were taken. The SuperPACS also enables physicians to compare patient images taken at several sites, and to improve diagnostic and reporting quality through the use of 3D processing."

To support the rollout of the SuperPACS solution, Clalit and Carestream Health required a high-performing, reliable and scalable hardware platform.



High-performing, reliable and scalable Intel® Xeon® processor technology

Best-performing hardware

Dr. Arnon Makori, radiologist and PACS project manager at Clalit, said: "SuperPACS* processes very large and complex data sets. We have a vast number of performance-demanding users across our organisation. For these reasons, we needed a high-throughput hardware platform. Obviously, given the mission-critical nature of the system, reliability was also key, as was the ability to scale to accommodate both current and future needs - ideally, for the next eight years."

For the best performance, Carestream recommended that Clalit run SuperPACS and its accompanying Oracle 11g* database on an x86 IBM/Intel/Microsoft platform. This was a unique suggestion for this sort of deployment.

Noam Rosen, Manager of System x Division at IBM Israel explains: "IBM delivered the technology and the performance Carestream required for its mission-critical SuperPACS application. The IBM solution was based on System x* servers with unique scale-up capabilities - a great advantage. It allows for seamless, on-demand growth when needed, and the capacity required today with future scaling capabilities. An evaluation organised by Carestream clearly shows the benefits of running the SuperPACS solution on Intel/IBM/Microsoft-based servers."

The test environment

Carestream's test environment consisted of two IBM System x3950* servers powered by the Intel® Xeon® processor 7400 series running on a Microsoft Windows* Server. The two IBM servers were connected to a RAID which hosted the Oracle database and the medical images. Two additional servers were used: one as a source for metadata for the store simulation and the other as a client simulating query results that typically occur within a loading session.

The tested database was populated to approximately one year's worth of data using the 'store server'. Once the test environment was ready, store and query simulation were performed concurrently in increasing rates until the maximum server throughput was reached. The test results indicated that the IBM x3950 servers are sufficiently sized to support the Clalit archive expected workload with a considerable margin for future needs. The tests results for user Query Test are shown in figure one.

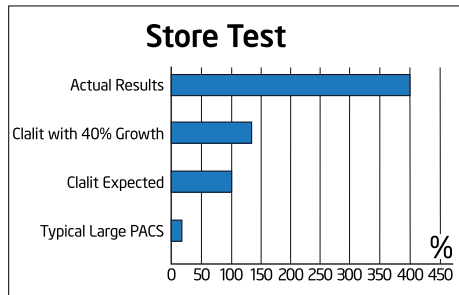


Figure one

Ground-breaking deployment

Taking Carestream's recommendation into account, Clalit also carried out its own assessment before deciding on the Intel/IBM/Microsoft platform, making this the first deployment worldwide of an Oracle 11g database running on Microsoft Windows* Server and Intel Xeon processor 7400-based servers.

Sinai Bareket, Intel Country Manager for Israel and Greece, said: "We believe that this deployment will be the first of many where we see a client server computing architecture supported by an Oracle database running on an Intel/ IBM/ Microsoft platform. We can expect to see many more in the future, and not just restricted to the healthcare sector."

SuperPACS* will be rolled out across the entire Clalit organisation with servers sited in its main Tel Aviv data centre, as well as additional local server deployments in 12 hospitals and 39 imaging centres. It also has plans to install a disaster recovery site 15km from its main data centre for full data back-up.

In addition to the server deployment, Clalit is rolling out over 100 high-end diagnostic workstations powered by the Intel Xeon processor 5500 series, as well as many standard PCs to be used by physicians to view and manipulate medical images stored in SuperPACS. Initially, the deployment was scheduled to take place over two years, but when the benefits of the SuperPACS became evident this was changed to 18 months from start to finish.

Improved patient care

With the new SuperPACS* solution - one of the most sophisticated diagnostic tools available - physicians are better equipped to make more informed and accurate diagnoses faster. Since they can access scan images of any patient from anywhere, their workflow is improved and productivity is higher.

Spotlight on Clalit

Clalit established the healthcare system in Israel in 1911 when a group of 150 immigrant workers joined together to form a mutual aid healthcare association. Since then, it has initiated, defined and set health standards for the entire country, becoming one of the most progressive public health organisations in the world. It now has around 33,000 employees, more than 1,000 clinics, 14 hospitals and 420 pharmacies throughout Israel and provides medical services to 3.7 million people.

Spotlight on Carestream Health

Carestream Health, Inc. is a successful international company providing medical and dental imaging systems and information technology solutions; molecular imaging systems; and non-destructive testing products to a broad base of customers around the world. Onex Corporation, Toronto, Canada, acquired the Health Group of Eastman Kodak Company in a multi-billion-dollar transaction in May 2007. Upon closing, the business began operating as a standalone entity (i.e., Carestream Health, Inc.) within the Onex family of companies.

Patients now benefit from an overall improvement in quality of care. Waiting times are shorter, since medical images can be recalled and viewed instantly from any location. Additionally, 3D imaging provides a much more detailed picture of the patient's anatomy, enabling physicians to provide more accurate diagnoses.

Dr. Arnon Makori concludes: "Thanks to the Carestream solution and the Intel/IBM/Microsoft platform we continue to be at the forefront of technology adoption. And, equally important, we are able to improve the quality of patient care available across our hospitals and clinics."

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