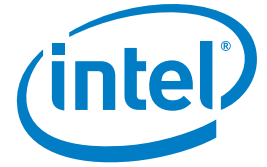


CASE STUDY

Intel® Xeon® processor
7300 and 5400 series

High-Performance Computing
Data-Intensive Computing



Soaring in a New Direction

AVIT deploys Intel® architecture to enhance performance and scalability of IT services for Egyptian civil aviation

As the organisation responsible for providing information and communication technology (ICT) services and solutions to Egyptian airports, airlines and government bodies, AVIT is dedicated to incorporating the best technologies into its offerings. Wanting to get better performance and support from its IT infrastructure at a more compelling price, it migrated away from its legacy RISC architecture to one based on Intel® technologies. Testing Intel technologies on a number of its customer environments demonstrated significant scalability and performance improvements. As a result, AVIT is now building a 100 percent Intel technology-based IT infrastructure to be fully completed by 2011.



CHALLENGES

- **Support busy Egyptian aviation industry** by delivering high-quality, responsive ICT services to numerous organisations
- **Migrate away from legacy RISC architecture** to gain better performance, cost, choice of software and support
- **Integrate with wider IT rejuvenation projects** to support the full operation of TB3, the new terminal building at Cairo international airport

SOLUTIONS

- **Evaluated various systems** on HP ProLiant* servers powered by a combination of Intel® Xeon® processors 7300 and 5400 series
- **Intel technology-based platforms** enable flexibility of operating system and hardware selection so applications can be optimised for peak performance
- **Local Intel support** enabled smooth and successful migration and proofs of concept, as well as providing ongoing assistance when needed



"We chose to work with Intel because we found that its technology and support offered us the features we needed."

Amr Ahmed,
Datacentre and Infrastructure Manager,
AVIT Operational and Technical Support

Assessing the Situation:

Beautiful beaches, vibrant cities and more than 5,000 years of fascinating history mean Egypt attracts over 10 million visitors every year. The vast majority of these arrive and depart by plane, passing through the country's main airports at Cairo, Alexandria, Sharm-el-Sheikh, Luxor and Aswan.

It is essential to make sure these tourists, who form a key part of Egypt's economy, can make their journeys smoothly and safely. Responsibility for this falls to the Egyptian Holding Company for Airports and Air Navigation (EHCAAN), part of the Egyptian Ministry of Civil Aviation. Within the EHCAAN, the department in charge of providing all ICT services for civil aviation is AVIT (the Aviation Information Technology Company).

A key part of AVIT's role is developing software for use by industry organisations such as the national airline, EgyptAir, and the primary

airports. This can range from enterprise resource planning (ERP) applications to the flight booking, reservation and tracking system used in Cairo airport's terminals one and two. Besides software development, AVIT builds and maintains the IT infrastructure for all EgyptAir's offices nationwide.

With such varied and demanding operations, AVIT must ensure the technologies on which it bases its services and solutions deliver the best performance and efficiency, 24 hours a day, seven days a week. Amr Ahmed, datacentre and infrastructure manager for AVIT Operational and Technical Support, explains: "Our customers depend on the IT infrastructure we provide to keep their services running and people on the move, so downtime cannot be an option. We are therefore committed to implementing the best technologies to support the highest quality services, products and solutions."

Intel delivers performance and scalability to power a wide range of services and solutions for the Egyptian civil aviation industry



“The performance and scalability have far exceeded our expectations and set us up well for a long time to come.”

Amr Ahmed,
Datacentre and Infrastructure Manager,
AVIT Operational and Technical Support

Like most of the aviation industry, AVIT has traditionally been a heavy user of RISC architectures such as mainframes. However, over time it experienced a number of issues with this type of platform. The performance was often unreliable, which was not acceptable in such a demanding environment with various customers and business units to serve. Mainframe servers, generally expensive anyway, are particularly costly in emerging market segments, so AVIT was also eager to find a solution to help lower its operating costs. Finally, it needed an architecture that had strong local support for any hardware or software issues.

Needing a high-performance, affordable solution with strong support, AVIT decided to migrate to a non-RISC, x86/x64 architecture. In this way it expected to benefit from more choice of vendors and flexibility.

Delivering the Solution:

AVIT chose to time the migration of its various IT environments to an x86/x64 architecture to coincide with a wider IT rejuvenation project being undertaken ahead of the opening of a new terminal building (TB3) at Cairo airport. As part of this project, AVIT was involved in discussions with various IT vendors – including Intel – about its server requirements.

“We chose to work with Intel because we found that its approach, both in terms of technology and support, offered us the features we needed for our ambitious projects,” says Ahmed. “Being partly owned by the government, though, we need to ensure that we are protecting our investments as much as

possible, so we opted to run a number of proofs of concept (PoCs) to identify the best solution for us.”

The company carried out its PoCs on servers running Intel® Xeon® processors 7300 and 5400 series. It chose these processors because it saw that they delivered enhanced performance and reliability, and that the roadmap for developing the next generation of these processors was solid.

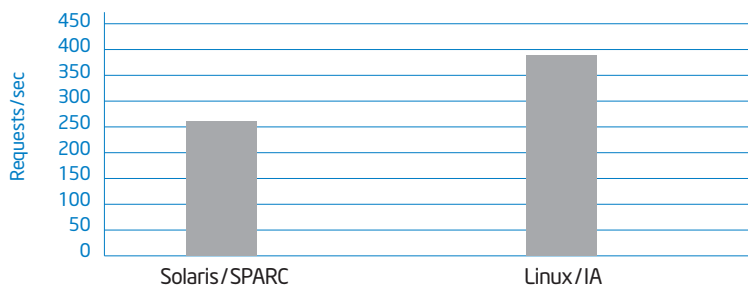
During the PoCs, engineers from Intel worked on-site with the AVIT IT team to identify the best way to optimise their wide range of software on the Intel technology-based platforms. Testing in a number of different environments ensured that performance and efficiency gains could be achieved in all areas of AVIT’s business.

One of the areas assessed was the EgyptAir Maintenance and Engineering HR ERP solution. This was migrated from the Sun Solaris* 10 operating system running on SPARC* platform onto Red Hat Linux* 4.7 running on Intel® Xeon® processors 7300 series. The PoC showed that the 1,000 concurrent users generally using the system could be scaled up to as much as 5,000 without compromising performance. “We were aiming for scalability of up to 12,000 in line with our growth plans for next year, so this has far exceeded our expectations and set us up well for a long time to come,” comments Ahmed. The testing also showed that the ERP system would run around 60 percent faster on the Intel architecture compared to the previous platform, scaling almost linearly when the number of cores is increased from one to 16.

AVIT also ran a PoC on the EgyptAir airport booking, reservation and tracking system at terminals one and two of Cairo airport. The customer-facing online booking system that forms part of EgyptAir's website is also supported by this system. It was migrated from Sun Solaris 10 on SPARC to Linux Red-Hat 4.7, this time running on Intel® Xeon® processor 5440. It was shown that the system could support up to 70,000 simulated clients with minimal impact on its performance. The IT infrastructure operated by AVIT also supports its own internal systems, so another PoC was carried out on its own environment. Here, AVIT wished to create an open source

virtualised platform in order to consolidate its server fleet. It migrated eight mail, Web, application and testing servers to a single server running on Intel® Xeon® processors 7300 series, using OpenVZ* on Linux and Windows*, with VMware ESX*. The superior performance and centralised management have been shown to save AVIT's administrators a significant amount of time - an average of 35-40 hours per week. Setting up such a virtualised environment is expected to take AVIT only 30 minutes, versus six hours of working around RISC hardware and OS issues.

EgyptAir Maintenance and Engineering ERP HR Solution Benchmarking
Solaris 10 on SPARC v.s. Redhat Linux 4.7 on Caneland/Tigerton



Sun SPARC specs:
4-way SPARC M58000 server with SPARC64 VII 2.4GHZ quad-core processors and 64 GB RAM running Solaris 10

Linux/IA specs:
4-way Intel Caneland/Tigerton SDP with 2.93GHz quad-core Xeon processors and 32GB RAM running Enterprise Linux 4.7

Benchmarking results showed increased performance for ERP system when running on Intel® Architecture

Spotlight on AVIT

- The Aviation Information Technology Company (AVIT) is a subsidiary of the Egyptian Holding Company for Airports and Air Navigation, which in turn is part of the Egyptian Ministry of Civil Aviation.
- Established in 2002, it employs over 250 engineers.
- AVIT's key role is to deliver high quality IT services and solutions to organisations within the industry, including EgyptAir, national airports and government departments.

Key Technologies

- Intel® Xeon® processors 7300 and 5400 series provide advanced performance and scalability
- Operating system independence of Intel technology-based platform means AVIT can benefit from flexibility of open source to optimise applications

Integral Answers:

- Migration from RISC to Intel architecture delivers both cost and performance benefits
- Virtualising some environments makes server fleet management simpler for IT team
- Consultancy and support from Intel during PoC made sure applications and systems were optimised for best results on Intel technology-based platform

Return on Investment

- EgyptAir maintenance ERP system runs up to 60 percent faster than on RISC architecture, with scalability up to 5,000 users
- Booking and reservation system for EgyptAir supports up to 90,000 concurrent users in testing
- Virtualisation of AVIT internal systems from eight to one server enables considerable time and cost savings
- The Egyptian Ministry of Civil Aviation's document management system can be significantly scaled up by at least four times.

Proven performance gains across multiple environments form foundation of ongoing technology partnership

A PoC was also carried out on systems that AVIT runs for the Ministry of Civil Aviation. This showed that its IBM Domino*-based document management system's scalability could be seamlessly boosted from 3,000 to 10,000 users when running on servers powered by Intel® Xeon® processors 5400 series.

Ahmed says: "The PoC results demonstrated to us the performance gains that we and our customers would enjoy by migrating to an Intel technology-based architecture. We were also keen to make the shift in order to be able to use any flavour of operating system and any type of hardware. Linux especially has a large reference and support community that gives AVIT the flexibility to optimise our solutions. We also liked the fact that Intel offers great local support in the Middle East."

Conclusion

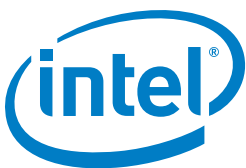
Following the successful conclusion of all PoCs, AVIT has purchased more than 25 servers based on Intel® Xeon® processors 7300 series and Intel® Xeon® processors 5400 series to support its IT infrastructure. It has also committed to following Intel's technology roadmap in the long term, integrating new technologies, such as the Intel® Xeon® processor 5500 series and 7400 series. It has already stated this intention to clients such as the Ministry of Aviation.

Moving to Linux on an Intel architecture has helped AVIT save at least 1.5 million Egyptian Pounds (EUR 190,000) per year on operating system and software licenses, upgrades, support, and maintenance. "In one situation, it cost us over EUR 17,000 just to upgrade the OS on an old RISC server to support a newer version of a Document Management System suite," recalls Ahmed.

"The combination of superior performance and solid local support means we're confident we've got the right technology partner to help us continue to deliver the best service to our customers for a long time to come," says Ahmed. "We plan to purchase only Intel processor-based technology in the future and have already increased the proportion of our nationwide infrastructure supported by Intel from 67 to 96 percent in just two years. The new Terminal Three building at Cairo airport is already running 96 percent on Intel technology-based servers and we hope to be 100 percent Intel-based, nationwide, by 2011.

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