

# CASE STUDY

## THE EDUCATION EXAMINATIONS AUTHORITY OF GUANGDONG PROVINCE

»AFTER WORKING TOGETHER WITH FUJITSU, WE FOUND THAT THEY WERE VERY STRONG IN TECHNICAL SUPPORT AND THE PROVISION OF SERVICE«

Technical manager, The Education Examinations Authority of Guangdong Province



### THE CUSTOMER

As a public service agency, The Education Examinations Authority of Guangdong Province is responsible for a wide range of examinations and the work related to student recruitment. This includes the general university entrance examination, high school education, adult college entrance examinations, self-study examinations (open system education), graduate school entrance examinations, joint entrance examinations and mid-semester student recruiting, etc. In China, with its extremely large population the education environment is much more competitive than in other countries. As a result, with examination and recruitment results so fundamental to student's careers, problems occurring at crucial moments in these processes can cause adverse and serious social impact.

### THE CHALLENGE

On an ordinary night in Guangdong Province in the second half of 2006, while most people were fast asleep, a few very agitated technical staff at the Education Examinations Authority site waited anxiously. Their Sun server had broken down with serious memory problems. Even replacement of the memory could not revive the system. Overnight repetition of the debugging processes ultimately left the engineers in no doubt that the failure was the result of an operational incompatibility between the Sybase database system and the memory. It had eventually led to a situation where system operation could no longer separate the hardware and software completely when a problem occurred.

The failure created a sudden halt in operation, with service unable to be revived during normal service hours of 8:00 a.m. to 5:00 p.m. the next day. At the height of the examination season, with various important examinations ongoing, the overnight system stalls exacerbated the anxiety of the students wishing to access the portal site. This in turn placed enormous additional pressure on the technical staff.

The rapid growth in business data at the Education Examinations Authority continued, causing the system to become more and more complicated. The system became even less capable of meeting the existing mission critical requirements and the high and growing concurrent loads. Technical staff noted that data access numbers, just the on-line grading system for general university entrance examinations had increased tremendously; with year on year growth of 200,000 students. In addition data volumes, including the images generated by the scanning of examination papers, had increased 100GB per day. The construction of a more flexible, stable and safe IT infrastructure had now become a most important issue.

### THE CUSTOMER

Country: The People's Republic of China  
 Industry: Government / Education  
 Website: [www.eeagd.edu.cn](http://www.eeagd.edu.cn)

### THE CHALLENGE

The rapid growth in data for Education Examinations Authority caused the systems to become complicated, resulting in system failures which were result of incompatibility between the Sybase database system and the memory. Since the customer experienced poor support from the incumbent vendor, the customer required new alternatives for their servers running Solaris systems.

### THE SOLUTION

Fujitsu deployed its technical staff to define the problem. After careful investigation, a comprehensive implementation plan was delivered. Fujitsu used SPARC Enterprise M series servers as database servers, and replaced the database partitions in the previous servers to allow Oracle and Sybase databases to operate independently. The Fujitsu solution provided excellent compatibility between the new Fujitsu platform products and the existing system platforms.

**THE BENEFIT**

- A smooth migration that enabled full use of existing IT assets
- New platform products 100% compatible with existing applications
- Greater growth flexibility, reliability and service availability
- Excellent support and service

**PRODUCTS AND SERVICES**

- Fujitsu SPARC Enterprise servers
- Fujitsu ETERNUS4000 M500 storage system
- Disaster Recovery solution

By the end of 2007, with IT management under continual pressure from the effects of the unstable system and urgent scalability requirements, the Education Examinations Authority of Guangdong Province finally decided to expand the datacenter to meet current and future needs. Since the late 90's, the IT system had been running on Solaris platforms. Any new alternatives would be mainly from Solaris platform systems. This was created a great opportunity and fit for Fujitsu.

**THE SOLUTION**

In order to fully define the problems and issues, the technical staffs at the client's site were consulted by Fujitsu's technical consultants. This enabled correct assessment of the situation prior to determining any project. Fujitsu then proposed a preliminary framework which both sides continued to discuss and modify to ensure the real situation was thoroughly met.

Fujitsu is very careful with the design proposal. "Because the system was related to all important examinations, we had to take system stability into account and reduce any impact on IT system operation caused by the project implementation." Fujitsu project manager Mr. Kelvin Li said. "The most significant point was amount of communication and heavy workloads during the project design and implementation." Fujitsu first convened a cross-divisional meeting to coordinate maximum internal resources. This was to ensure all projects were implemented on schedule and met the client's requirements as much as possible. The project team also performed most of the design work, overall project implementation planning and ongoing communication with the IT staff from the customer's site. Finally a comprehensive implementation plan was completed and delivered.

For the data center upgrading solution, Fujitsu would use Fujitsu SPARC Enterprise M series servers as database servers and divide them into 4 partitions. This would replace the database partitions in the previous SunFire 6900 at the main center and allow Oracle and Sybase databases to operate independently. At the same time, Fujitsu would use a Fujitsu PRIMEPOWER 900 as the application servers and divide it into 4 partitions. This in turn would replace the previous SF280 in running all the applications for the examination center as well as integrate the web application.

The high volume of business at the examination center could not tolerate long periods of downtime during the migration period. So how to migrate and upgrade smoothly became the key point of the project. The Fujitsu solutions provided excellent compatibility between the new Fujitsu platform products and the existing system platforms. Fujitsu also guaranteed that the new Fujitsu platform products were 100% compatible with existing equipment. In addition all application systems would run on the new equipment without any modification. In March, 2008, integration and optimization tuning between the existing and new platform products went well, and the examination center successfully complete their data migration and product deployments before the peak examination season arrived.

Part of the Fujitsu solution provided for a remote disaster recovery function. It conducts remote data replication on duplex disk array systems. As a result, even if the database server for the main node fails, the database server at the back-up site can continue to provide the same service. In addition, the Education Examinations Authority of Guangdong Province adopted Fujitsu's Remote Disaster Recovery solution. While the production environment is based in the control room on the 11th floor of the examination center building, the Remote Disaster Recovery environment is in another control room 10 kilometers away. All production data is stored and saved on one Fujitsu ETERNUS4000 M500 storage system in the production environment and another at the DR remote site.

Taking into account the system requirements for stable public service, Fujitsu proposed a high-end server system with high stability and throughput capability. Fujitsu also optimized local system performance by implementing server partitioning functions and dynamic resource allocation to enhance system flexibility. Further the disaster recovery solution based on Fujitsu ETERNUS storage systems ensured all important data was safely and securely managed at both the main center and back-up centers,

The previous SunFire 6900 from the main center was moved to the disaster recovering environment as a back up DB server. At the same time, the previous Fujitsu PRIMEPOWER 900 was divided into 4 partitions and used as application servers in the main center.

However smooth it may appear on paper, technical staff will know that it is not so easy to upgrade from old systems to new platforms. System upgrading and migration is a systematic process, which if taken lightly or carelessly can lead to unexpected system failures. In May 2008, after construction of the new system environment, the engineers found that that system was scanning the storage systems at an unusually slow speed. The problem required repetitive debugging processes to uncover the fact that the Veritas Cluster File System ran on different physical address from the network cards used after migrating two Sun 490R servers to the single Fujitsu SPARC Enterprise server. However the excellent service provided by Fujitsu to overcome this issue won further trust from the customer.

**THE BENEFIT**

Ultimately, Fujitsu passed the various procedures and tests required by the Education Examinations Authority of Guangdong Province and became qualified to cooperate and provide solutions for data center expansion and disaster recovery in March 2008.

“Why did we choose Fujitsu?” The technical manager from the Education Examinations Authority of Guangdong Province explains. “First, Fujitsu was able to provide an excellent and broad range of products. Second, after working together with Fujitsu, we found that they were very strong in technical support and the provision of service.”

From a Fujitsu perspective Mr. Kelvin Li, the Project manager says “We knew that the Education Examinations Authority of Guangdong Province really appreciated Fujitsu’s technology. But we saw this project is not just simply as an IT project but in reality an ‘Entrance Examination’ for Fujitsu. We had to prepare well to pass it.”

Fujitsu knew that this project would involve upgrading the entire IT infrastructure, storage volume expansion, new server deployments, data migration, integrity verification and disaster recovery for the business systems. In addition, with all provincial examinations including college entrance examinations, self-study examinations, etc, reliant on this IT system, the business could not stop any time. It was important therefore to secure enough time to test and adjust the new system on a very tight schedule and achieve the result on time. Although this was a “complicated and difficult project with a very tight schedule”, Fujitsu overcame all hurdles and provided the best solution and support for this project.

**CONCLUSION**

After the initial running, the newly expanded system platform has successfully conducted several important examinations and recruitment activities in 2008. The success of the result shows how Fujitsu can provide great value to customers including more flexible solutions, stronger load capacity, and faster disaster recovery ability. The technical engineers were extremely happy about this.

However, Fujitsu’s mission continues. “We have to catch up with the need for backup systems. After that we also plan to deploy a unified identity authentication system” say the IT technical managers. The IT system upgrade is a first step on the long road with the Education Examinations Authority of Guangdong Province.

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