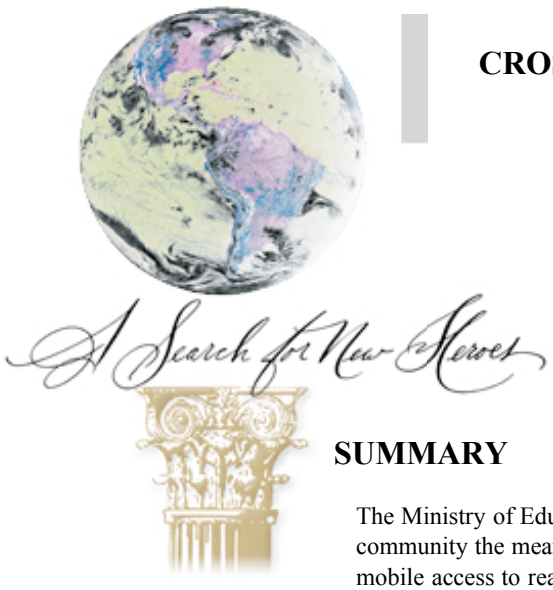

CROSS PLATFORM SOLUTION FOR CHINA'S MINISTRY OF EDUCATION

2005 COMPUTERWORLD HONORS CASE STUDY

EDUCATION & ACADEMIA

THE MINISTRY OF EDUCATION IN MIANZHU CITY, SICHUAN PROVINCE, CHINA NEEDED TO GIVE THE ENTIRE LOCAL COMMUNITY THE MEANS TO COMMUNICATE ELECTRONICALLY ON EDUCATION MATTERS, AS WELL AS ONLINE AND OFFLINE MOBILE ACCESS TO REAL-TIME DATA FROM THE EDUCATION BUREAU ON COURSE MATERIALS, STUDENT ATTENDANCE, AND ACADEMIC PERFORMANCE. **[20055376]**

SUMMARY

The Ministry of Education in Mianzhu City, Sichuan Province, China needed to give the entire local community the means to communicate electronically on education matters, as well as online and offline mobile access to real-time data from the Education Bureau on course materials, student attendance, and academic performance.

APPLICATION

Intel(R) Solution Services, Intel's worldwide professional services organization, worked together with local alliances JNS Technology Co. Ltd. (JNST), Sybase, and ZDSoft.Net in western China to develop a cross-platform solution designed to enable the local community to exchange information on education matters. We focused on western China working directly with Mianzhu City Ministry of Education. The solution included a mobilized software initiative (MSI) platform consisting of servers based on Intel(R) Xeon(tm) processors MP, Intel(R) Pentium(R) 4 processors and Intel(R) Personal Internet Client Architecture that worked in tandem with ZDSoft.Net's Xiao Xiao Tong (XXT) platform, a School-to-School Connecting System, and their new School-to-Home Connecting (SHC) application. This solution was developed using Sybase mobile wireless application developing tools and database.

BENEFITS

The Chinese government has set ambitious goals in terms of compulsory education and youth literacy for children living in its western region.

As early as 1997, China's Ministry of Education (MoE) had decided to set up experimental schools using modern educational technology to develop and reform primary and secondary education, as well as the facilities in vocational schools and adult-education schools. The use of advanced educational technology in rural schools as well as cities has made up for the shortage of teachers and textbooks. Many schools in minority regions have also adopted ancillary technologies, including audio-visual teaching aids and satellite teaching programs, which have greatly improved the quality of the teaching environment and the subjects taught. Student ability and interest has been greatly stimulated as a result.

In this context, the MoE in Mianzhu City, Sichuan Province, wanted to create an even more comprehensive and seamless system for the locality, giving the entire community access to the latest information and resources from the Education Bureau, including course materials, administrative information and student attendance and performance records. The MoE also wanted the system to offer the additional flexibility of a mobile solution that did not confine users to accessing the system from a LAN-connected desktop PC.

"Our aim is to help make nine-year compulsory education universal, wiping out illiteracy and promoting spoken and written Mandarin Chinese in minority regions," said Mr. Ji Tao, MoE, Vice Governor of Mianzhu City. "With this system in place, we can better track our students' academic progress and also better visualize and cater to our communities' educational needs."

The MoE in Mianzhu City approached Intel® Solution Services to help them develop an advanced e-Education solution. Intel Solution Services is Intel® Corporation's worldwide professional services organization, with a successful track record in helping organizations capitalize on the full value of Intel® architecture by focusing on architecture transitions. Intel Solution Services uses its unmatched expertise with Intel architecture and next-generation technologies to design cost-effective, leading-edge solutions that help deliver superior business results.

The MoE brief to Intel Solution Services was to use its alliances with local education software companies in development of an affordable and manageable "Educational Management System" for its use. Intel Solution Services led the project from out of Chengdu working with a local OEM, JNS Technology Co Ltd (JNST) and Sybase. ZDSoft.Net's Xiao Xiao Tong* (XXT) Platform and School-to-Home Connecting* (SHC) application was selected for this project, which allowed greater transparency in school reporting and providing education-related information to all sectors of the community, including supervisory bodies, schools, teachers, students and parents. Based on its extensive experience with end-user requirements, Intel's consultants recommended that the solution provide the extra convenience of online/offline access, allowing users to work with the data at their convenience, even when network connections were not available.

A thorough methodology was used by Intel Solution Services, JNST and ZDSoft.net, by which a design concept was proposed and accepted by the Mianzhu City MoE and the pilot project was deployed at Jian Nan Chun Middle School.

This work defines new challenges for society in that everyone has access to the same level of information that education officials only had a year ago. This also brings western China on par with technology available in the large eastern Chinese cities of Beijing and Shanghai.

* Other names and brands may be claimed as the property of others.

IMPORTANCE

BUILDING A COMPREHENSIVE AND EASY-TO-ACCESS E-EDUCATION SYSTEM

Working with local alliances JNST and ZDSoft.Net, Intel Solution Services developed a cross-platform solution enabling the Education Bureau, schools, teachers, students and parents to exchange information at any time and from anywhere. Intel consultants and JNST jointly designed and architected a "mobilized software initiative" (MSI) platform for the solution that worked tandem with ZDSoft.Net's School-to-School Connecting System* and their new SHC application. The solution runs on Intel® Xeon processors MP, Intel® Pentium® 4 processors, Intel® Centrino™ Mobile Technology and Intel® Personal Internet Client Architecture.

TRACKING ACADEMIC PERFORMANCE
The e-Education solution deployed was ZDSoft.Net's XXT platform that allows teachers to track and manage their student's academic activities, and is one of the most popular and reliable e-Education software solutions in China. ZDSoft.Net had also recently developed a new SHC application.

For this project, ZDSoft.Net integrated SHC application with the overall XXT platform, thereby allowing students and parents to gain access to information from the XXT platform, and effectively creating an environment for parents to communicate with teachers on their child's progress. SHC application allows online users to access student's homework status, e-card management, library and attendance status, as well as information on academic performance and examination results. However, the original design was developed specifically for a Browser-Server (BS)-based environment. This was a restriction in the sense that users could only access information from a desktop LAN terminal. Intel Solution Services recommended that the architecture be redesigned so that users could now retrieve real-time information in online or offline mode, and access data on various computing devices so that they could retrieve the information from any location at anytime.

"Intel Solution Services helped us enhance our product value as well as integrate our product with the latest technologies. This new feature will give us a more competitive advantage in the growing e-Education market, ensuring that we remain the top e-Education solution provider in China."
Mr Shentu Zubin
Chief Executive Officer
ZDSoft.Net

INTEL® SOLUTION SERVICES BUILDS MOBILITY ADVANTAGES
Intel® Solution Services' primary design goals were to architect an MSI platform with multiple platform support enabling the ZDSoft.Net SHC application to operate in both offline and online modes and to give the attendance module within the XXT/SHC system wireless capability.

"Wireless technology and mobilized applications are coming of age all over the world," said Mr. Yale Shen,

Intel Solution Services, Greater China Consultant Manager. “With our global network and broad experience in designing wireless solutions, we were able to allow the community flexible access to the data and applications in the system – irrespective of the device.”

THE ZDSOFT.NET SHC APPLICATION

The application is responsible for two key tasks in the MSI platform:

1. Retrieval of updated data upon switching from offline to online mode.
2. Complete transparency of the offline mode to users, so that users can operate the software as if they were still in online mode.

A uniform architecture was needed to eliminate the development and maintenance workload. Intel consultants selected Sybase’s mobile wireless application development tools and databases. These include Sybase PowerBuilder* v9.0, Sybase Pocket PowerBuilder* v1.01, Sybase Adaptive Server Anywhere* v8.02 for Windows and Windows CE (ASA), and Sybase MobileLink*.

Complementing the legacy architecture, several MSI components were added to both client and server side, and a new application User Interface (UI) was developed for the client module. The modified system architecture is shown below (marked as blue in Figure 2).

“We are proud to be a leading service provider to the Sichuan Government, especially in the education sector. Through this project, as we worked with Intel’s professional consultants, ourservices have not only extended beyond hardware supply but also enabled us to expand and provide end-to-end solutions using the latest technologies based on Intel® Architecture.”
Dr Xiang Shaohua (Sean)
Chief Executive Officer

MSI Enabled SHC architecture
The client modules exchange data with the local database through ASA 8.02 for Windows CE (PDA) or for Windows (Intel® Centrino™ mobile technology). These ensure the transparency of the network status at the application UI. In this case, the database schema is relatively simple and the local client-database schema is very similar to the consolidated database. The data in the local database is essentially a subset of the consolidated database’s rows set. All operations to the local and consolidated database are logged by ASA. When online, the MobileLink client triggers the data sync between the local and consolidated database according to the logs and, when offline, the MobileLink client remains inactive.

MSI COMPONENTS

- MobileLink Client: The synchronization component is installed at the client. This component connects to the MobileLink server at each synchronization process, translating the local database logs into SQL commands and uploading them onto the MobileLink server. It then downloads the updates since the last synchronization from the MobileLink server and enters these modifications into the local database.
- MobileLink Server: is the server counterpart of the MobileLink client. This component accepts requests for connection from the MobileLink client and executes the synchronization command at the consolidated database level.
- MSI Proxy and MSI Server Proxy: In general, the MSI proxies provide all the functions needed by common applications to achieve MSI capability, as well as network status information.

WIRELESS ATTENDANCE SYSTEM MODULE

An IC card reader was installed in all classrooms and each student was issued an IC card containing information such as student’s name, telephone number, courses enrolled in, etc. When the student enters the classroom, his or her information is scanned and uploaded into the consolidated database. The head teacher and the student’s parents may then retrieve the student’s attendance record for each class seamlessly, on a handheld device, without paper consolidation.

The MSI-enabled application installed on the device, automatically synchronizes data from the consolidated server with the handheld device every time the head teacher or parent passes near a hotspot, enabling them to access the student’s most recent registration data at their convenience and at any location, without them having to worry about disconnection.

ORIGINALITY

In line with the Central Government policies for Western China, the Ministry of Education (MoE) in Mianzhu City, Sichuan Province, needed to give the entire local community the means to communicate electronically on matters pertaining to education, as well as online and offline mobile access to real-time data from the Education Bureau on course materials and status, student attendance and their academic performance. The project we are describing was western China's Ministry of Education first use of mobile technology to share education data with the community.

Intel® Solution Services, Intel Corporation's worldwide professional services organization, worked together with local alliances JNS Technology Co Ltd (JNST), Sybase, and ZDSoft.Net to develop a cross-platform solution designed to enable the local community to exchange information on education matters. The solution included a mobilized software initiative (MSI) platform that worked in tandem with ZDSoft.Net's Xiao Xiao Tong* (XXT) platform, a School-to-School Connecting System*, and their new School-to-Home Connecting* (SHC) application.

As early as 1997, China's Ministry of Education (MoE) had decided to set up experimental schools using modern educational technology to develop and reform primary and secondary education, as well as the facilities in vocational schools and adult-education schools. The use of advanced educational technology in rural schools as well as cities has made up for the shortage of teachers and textbooks. Many schools in minority regions have also adopted ancillary technologies, including audio-visual teaching aids and satellite teaching programs, which have greatly improved the quality of the teaching environment and the subjects taught. Student ability and interest has been greatly stimulated as a result.

In this context, the MoE in Mianzhu City, Sichuan Province, wanted to create an even more comprehensive and seamless system for the locality, giving the entire community access to the latest information and resources from the Education Bureau, including course materials, administrative information and student attendance and performance records. The MoE also wanted the system to offer the additional flexibility of a mobile solution that did not confine users to accessing the system from a LAN-connected desktop PC.

"Our aim is to help make nine-year compulsory education universal, wiping out illiteracy and promoting spoken and written Mandarin Chinese in minority regions," said Mr. Ji Tao, MoE, Vice Governor of Mianzhu City. "With this system in place, we can better track our students' academic progress and also better visualize and cater to our communities' educational needs."

SUCCESS

During this project, we achieved success deploying a fully operational solution in three key areas:
• Keep it mobile. In today's mobile, connected world, there is tremendous value to designing a system that allows for mobile access. Particularly in the case of frequently-accessed data such as students' attendance records, which are accessed by various different parties including parents, teachers and the education department, Intel and JNST realized the value of offering anytime, anywhere access.
• The benefit of experience. The Ministry of Education recognized the importance of using consultants who had experience in both education and systems integration. Educational institutions typically have very small teams of IT staff, and it is often necessary for the consultants to assume the client's role, offering advice and inputs in terms of the data they would need and the reports they would need to generate, rather than focusing solely on the technical aspects of the solution. Working with a consultant who has a good working knowledge and understanding of the industry, such as Intel Solution Services, can thus be critical to the success of the project.
• Online and offline access. Away from major cities with broad-based high-speed Internet access, there was a need to provide for situations where Internet access was not available. With built-in auto- synchronization and other features, Intel and its alliance companies developed a system that offered the most updated possible information, whether online or offline.
• Use Intel Solution Services for its advantages in terms of methodology and experience, expertise, and a track record for delivering results. Tapping into its worldwide resources of expertise and its local network of alliances, Intel's professional services organization was able to provide a comprehensive, user-friendly solution to the MoE that took advantage of the latest available technologies to deliver results.

In western China, tens of thousands of students, parents, teachers, and education management are benefiting from this solution. This audience immediately embraced the solution and is using today. Future plans are to expand this across western China and in other remote areas in Asia.

"Once I am at work, I can check the system to see when my child arrived at school. Even after lunch, when I

synchronize the application, I know exactly what courses my child has attended that day," said a parent from Jian Nan School. "That reassures me about my child's whereabouts at any time of the day, even when I'm at work."

The system also helps the government compile statistics on how many students attended school as well as what courses were completed each day, enabling the government, as well as teachers and parents, to more closely monitor the situation as it moves towards its goal of nine years compulsory education in the western regions.

DIFFICULTY

The most important obstacles that we had to overcome in order for our work to be successful was architecting and designing a mobile software initiative to exchange information, having the solution work on PDA, notebook, and desktop platforms, and building an open-standard architecture data center in the education bureau. In addition, connecting multiple schools across large distances in western China was a key technical problem.

This project met with initial resistance in terms of funding (education budgets are always tight), changing how and who got access to student data, and what to do with the data once it was all collected.

The biggest unanticipated challenge was the new processes that had to be established once the data was available and quick decisions could be made that required immediate action vs. before when the data was available to only a few people and much later.