KOWLOON-CANTON RAILWAY CORPORATION

Hong Kong

- ► **Tool — Borland Entera**
- ► **Industry — Transportation**
- ► **Application — Through-Train Ticketing System**
- ► **Database Server — Oracle**

COMPANY BACKGROUND

The Kowloon-Canton Railway Corporation (KCRC) is a world leader in providing quality transport and related services on a commercial basis. Operating in Hong Kong, with services into China, more than 1,300,000 passengers a day benefit from KCRC's operations. A number of divisions including KCR East Rail, KCR West Rail, KCR Light Rail, KCR Freight, KCR Bus, and KCR Property form KCRC's total operations.

APPLICATION

KCRC of Hong Kong prides itself on its reputation as a world leader in commercially based quality transport services. Providing services to the Hong Kong population of over six million people, the company provides services to more than 1,300,000 passengers per day. An additional 5,000 passengers per day benefit from the cross border train service into China proper, including recently added destinations Beijing and Shanghai. Increased business drove KCRC to evaluate its current infrastructure, and the company embarked on a large-scale project to redevelop its ticketing systems for through-train travel. KCRC adopted a three-tier client/server distributed architecture with Entera as middleware. With such a large variety of network access methods-in-house computer terminals, agents' computer terminals, telephone response, and others-the company required a distributed network with a flexible and open middleware technology. Entera provided the perfect middle-tier solution for the high-throughput, transaction-intensive environment, because it is designed so that necessary modifications can be easily and seamlessly implemented.

The distributed network allows KCRC to maintain central control of the ticketing inventory while giving any number of ticket vendors access to the system. The previous through-train ticketing system was a manual process. In Hong Kong, tickets were sold either directly by KCRC at stations or through the China Travel Services agency. In China, tickets were sold

in train station agents and by other agents located in hotels. Both systems worked on a quota basis and relied on physical allocation of ticket stocks to these outlets, which caused logistical supply and delivery problems. Larger quantities of tickets were allocated to the stations where journeys originated, causing potential problems if customers wanted to purchase return tickets from other stations. Local stations could be out of tickets even though a train might be running below capacity. In comparison, the new fully computerized ticketing system allocates tickets wherever customer are located. Customers receive better service, and KCRC is able to run trains much closer to capacity.

In the new three-tier system, the client logic is stored in the presentation layer, the business logic is in the middle tier, and the third tier is an Oracle database. Entera in the middle tier is compatible with a variety of development languages, giving the flexibility to use different client languages, simplifying the integration of additional ticketing agents in the future. System design changes do not interrupt the network and are totally transparent to the user. Alterations can be implemented in the business logic layer without affecting the presentation layer. Entera handles the communications between the database server which houses all through-train service schedules, the ticket administration server containing the central ticketing program functions, and the ticket counter unit which contains such front-end ticketing functions as the ticketing operators' interface. Travel agents, who usually have their own ticketing systems, sell KCRC tickets by connecting at the ticket administration level. Entera allows program-to-program communications between the central systems of the agents and of KCRC. Contained within Entera are directory services which enable Entera to identify, relay, and deliver requests for information.

Entera architecture separates the presentation layer from the business logic layer. KCRC can easily incorporate additional ticketing agents into the network with minimal system configuration. Only the front-end presentation layer needs to be adapted. No changes are required to the business logic, so it is much easier to integrate new clients. For example KCRC recently launched Tele-Ticketing with an interactive voice response system on the first tier. Entera in the second tier receives and responds accordingly, interacting directly with the Through Train Ticketing System and the Visa, Master Card, American Express, and Diners Club credit card systems. Train travelers can book and pay over the telephone and collect tickets any time up to one hour before their time of travel. Future KCRC plans include self-service ticketing kiosks located in train stations and Internet ticketing.

KEY ADVANTAGES

• Entera's ability to handle multiple databases is critical for KCRC, because the company intends to increase the number of databases it uses. Entera will save valuable resources that would otherwise be spent downloading data or converting between databases.
• Entera's two-phase commit function will ensure that multiple databases are updated together. If one fails, Entera can recognize and hold the updates until the problem is corrected, preventing invalid database updates that could lead to major customer service problems.
• The interconnection of KCRC's central ticketing system with that of the China Ministry of Rail will give ticketing outlets throughout China access to KCRC's train ticketing inventory.

TECHNOLOGY

Database Server   Oracle on Windows NT servers

DEVELOPMENT

Timeline   KCRC's Through-Train Ticketing System went live in May 1997 and added the connection of its two major local travel agents' systems in October 1997. The next phase will connect KCRC's central ticketing system with the China Ministry of Rail central system.

CUSTOMER COMMENTS

"The three-tier approach means that virtually any means of communication can be the first tier. Entera in the second tier can receive and respond accordingly, giving us great flexibility in designing our customer service strategies. We can easily add on additional ticketing services in the future with minimal system integration. Entera is helping KCRC to develop a future-proof ticketing solution."

—Sam Liu, Software Services Manager, Information Services Division

The Kowloon-Canton Railway Corporation

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