

The Client

CRIS (Center for Railway Information Systems) is a project oriented organisation engaged in the development of major computer systems for the Indian Railways. They combine the field experience of the Railways with the knowledge of computer specialists, to design and develop major applications for the Railways using standardised software and hardware. They are responsible for implementation and maintenance of major nationally important projects such as the Passenger Reservation System (PRS), National Train Enquiry System (NTES), Parcel Management System (PMS), Un-reserved Ticketing system (UTS) and Crew Management System (CMS).

The Application

The Indian Railways sold tickets worth Rs. 15,080 crores in 2005-2006. The revenue in 2009-2010 is expected to rise to Rs. 25,000 crores. On average, a million reserved and 16 million unreserved tickets are sold every day. Even as the volumes increase, the Indian Railways is determined to provide better customer service to its passengers, in view of increasing competition from the airlines and roadways sectors.



The Challenges

The Indian Railways currently use dumb terminals for the UTS and PRS ticketing systems. Terminals require perfect circuit-switched connectivity all the way to the zonal server, in order to function. As the Railways expands computerised ticketing to Class D and E stations, connectivity becomes a big issue. Thinvent provides the customer with Linux based firmware for thin client hardware, which enables them to run their entire ticketing software, database server and synchronisation software, on the thin client itself. The customer now provides unreserved ticketing in a connected-disconnected environment. The legacy UNIX based UTS application was largely unmodified when ported to Thinix.

The ticket printing time is a major bottleneck in reducing turnaround times at the counter. Thinix delivers industry-

best ticket printing times, even while printing Hindi. While speeding things up for the operator, we ensured that the user interface is exactly as it was on the terminals, thus eliminating the learning curve for the ticketing staff. Support for printing Indian languages is provided by our ISCI API.

A terminal based system is completely centralised. With the ticketing application now running on the thin clients, the system became distributed. Controlling and managing such a system was a challenge. We enabled the customer to remotely monitor, manage, upgrade and recover the systems. They can now rapidly upgrade the application in the event of a sudden change in business rules.

A terminal based system required separate devices for UTS and PRS. Our next important task was to unify reserved and unreserved ticketing onto the same thin client, saving cost, power, maintenance, space and operator effort. This was a very complex task, because the two systems are very different in nature.

While the unreserved ticketing system runs on the thin client, reservations needs to be centralised. Thus, Thinvent developed support for the legacy and undocumented PRS terminal emulation system. Support for ISCI printing, 132 column display and chart printing, were developed in text mode itself, to make the interface exactly the same as that on a terminal. By providing 100% support for the existing emulation, we enabled PRS to run on the new devices with 0% code change.

Following were some of the other technical challenges involved

- Exact replication of the existing ticket layout and size.
- Exact replication of the existing user interface.
- Dynamic service detection and failure recovery.
- Database mirroring and recovery.



Key Components

Following are some of the key technologies developed by Thinvent, to enable the UTC project:

- An ISCII printing API and library for rapid graphical rendering of Hindi on a dot matrix printer.
- The same ISCII API is utilised in both UTS and PRS. This future-proof API supports all Indian languages, as well as Unicode.
- A PRS emulation system, which was developed by reverse engineering the undocumented PRS emulation for terminals.
- For dynamic detection and failure recovery, a monitoring system has been provided. It automatically redirects requests to backup servers when the main server is down.
- Automation of various tasks such as database synchronisation, date synchronisation and automatic start-up of database and application reduces maintenance effort.

Unique Advantages

- Flexibility offered by thin client allows the end customer to experiment with features.
- Software support for printer port sharing between two applications.
- Load balancing across servers by intelligently prioritising the standby server list.
- Disconnected operation during network failures.
- Ready to be used with any Indian language.
- Remote upgrade, remote management and factory reset support.
- Centralised cluster administration support.

User Feedback

We received many warm comments from the end users – the ticketing operators. Here are a few:

- “Your system refresh rate is much faster than dumb terminals. We can process more users now.”
- “The old terminals used to print very slow. It (ticket printing) is very fast now.”
- “Our eyes used to strain a lot while we were using dumb terminals. It is much better now.”

Current Status

Between January and March 2009, CRIS has purchased 1500 devices with our software pre-installed. Our systems are successfully delivering unreserved and reserved tickets in many zones.

Thinvent has also developed the following solutions for UTS and PRS, which are discussed in a separate document:

- ATVM kiosk with smart card based ticketing.
- Thin client based PRS terminal.
- UTS and PRS terminal repeater.
- Digital signage terminal repeater with multiple displays.
- Thin client based charting terminal.



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