



HOW THE INDIAN RAILWAY RESERVATION SYSTEM CHANGED THE INDIAN IT SCENARIO

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ABSTRACT :

Indian railway is one of the world's largest railways networks comprising 115,000 km (71,000 mi) of track over a route of 65,436 km (40,660 mi) and 7,172 stations. Before computerization, it was manual register entry and long queues. People had to make their plans well in advance, go with 3-5 pre-filled forms for a journey. If one date does not work, next best date and so on. The booking clerk would check the register and see availability, if not available the customer asks for next best date. There were different queues for different destinations, people had to stand in the queue where the register was being used.

KEYWORDS : computerization , booking staff , family trips.

INTRODUCTION

At peak travel time (during school vacations, for example), people routinely joined the queue at night, to be there when the booking window opened in the morning. With air travel being extremely rare, especially for personal and family trips, these travails affected all but particularly those who travelled by lower classes in the train. The system facilitated corruption, which was rampant, and was a major reason for long queues; touts and black marketeers, working in collusion with the booking staff, would pre-empt most tickets.

One of the most visible and high-impact projects of the 1980s was computerization of the passenger reservation system of the Indian Railways. The IR, a legacy of the British Raj, had a complex passenger reservation system involving ten fare types, 130 coach types, ten classes, forty quotas, and 120 types of concessions in the 1980s. In 1984, about 4.5 million passengers travelled every day in two thousand trains crisscrossing the country. Almost 75 percent of reservations of seats and berths was handled in four metropolitan cities with nearly fifty thousand requests for reservations made daily at these stations. Seats and berths in different trains were reserved manually at train-specific reservation counters at major stations. If a berth was not available in a train, the passenger had to move and queue up in front of the window for an alternative train. This process not only led to crowded reservation counters and hardship for computers, but also left room open for corrupt practices.



Brief history of Indian Railway Reservation system:

- In 1982, Indian Railways (IR) set up a central organization (COFOIS) to computerise freight operations.
- Till 1985, All tickets were issued manually, and **Stand-alone Computerized ticketing and reservation** was introduced in multiple phases.
- In 1986 the Ministry of Railways established **CRIS**, an umbrella organisation for all information technology-related activities on Indian Railways merging **COFOIS**.

- In 1990, **CONCERT** (Country-wide Network for Computerized Enhanced Reservation & Ticketing) developed by CRIS is a total networking solution to Indian Railways Passenger Reservation System.
- The CONCERT software has been successfully implemented at all of the five PRS' sites.
- In 1999, Credit cards accepted for booking tickets and reservations.
- In February 2000, Indian Railways web site was deployed.
- In 2001, **IVRS** ('Interactive Voice Response System') for telephonic enquiries about trains introduced in some stations.
- On 03 Aug 2002, Indian Railways begins online train reservations and ticketing over the Internet.
- On 12 Aug 2005, **IRCTC** introduces E-ticketing for IR.

PASSENGER RESERVATION SYSTEM:

All the information technology related activities for Indian railways are handled by one umbrella organization CRIS (Centre for Railway Information Services) set up in 1986. It handles the task of designing, developing and implementing the Indian ticket reservation system. CRIS has developed PRS – Passenger Reservation system providing reservation services to nearly 1.5 to 2.2 million passengers a day on over 2500 trains running throughout the country. The PRS is available at over 8000 counters in more than 2380 locations throughout the country. Passengers can reserve a berth for any train 90 days in advance. In addition to the railway counters, multiple delivery channels have been provided to Rail passengers to access the PRS services.

- Reserved travel by Indian Railways is facilitated by the Passenger Reservation System (PRS) introduced in 1985-89.
- PRS provides reservation services to nearly 2.2 million passengers a day on over 2500 trains running throughout the country.
- The PRS Application CONCERT is the **world's largest online reservation application**.

CONCERT ARCHITECTURE:

The PRS Application **CONCERT** (Country-wide Network of Computerized Enhanced Reservation and Ticketing) is the world's largest online reservation application, developed and maintained by CRIS. The system currently operates from 5 Data centres. New Delhi, Mumbai, Kolkata, Chennai and Secunderabad. CONCERT architecture is based on the state of the art technology using 3-tier client-server distributed transaction processing paradigm.

Technical Specifications:

The server clusters are connected by a core network based on a mesh of 02x02 Mbps leased lines. It is an on-line client server application developed in 'C'.

Server for hosting - Blade servers having 64-Bit Itanium 9340 Processor

Operating System - Open VMS 8.4

Database - In-house CRIS proprietary

Middleware - HP Reliable Transaction Router (RTR)

Frontend - DEC Forms, C and FORTRAN as development tools

Communication Systems - CISCO routers using 2Mbps DOT lines

Network Topology - Mesh Topology

Network protocol - TCP/IP, DECNET.

Irctc website whose frontend has been developed by **CRIS** and software for running the application is provided by broad vision. Broad Vision integrates the legacy system with the existing reservation system and verifying credit card information in real-time as bookings had to be confirmed on the Passenger Reservation System (PRS) of the railways immediately.

It follows three-tier architecture:

- 1.Presentation Layer—IIS 6.0 on Windows 2003 R2 Enterprise Edition at Web Servers Layer (6 servers) with 128-bit SSL GSID Certificate for secure transmission.
- 2.Application Layer—Broad Vision Enterprise on Windows 2000 Advanced Server (40 Servers)
- 3.Database Layer—Oracle 10g Enterprise Edition on Windows 2000 Advanced Server

A cluster provided for a common database that could be accessed by different central processing units. FORTRAN-77 was selected for coding application programs to enable subsequent porting of the software from one machine to another. This was said to be the first online transaction processing application on a VAX cluster, and the first computer application with direct interface with customers in India.

Railway officials had the fear of losing authority in an important area of their operation, while some workers thought they might lose their jobs. The CMC team, however, got the support of the operational staff – including booking clerks and reservation supervisors.

CMC and the Indian Railways took care to involve workers' unions very early in the development process, in view of stiff resistance toward computerization in Indian banks. Trade union leaders were brought to the R&D centre in Hyderabad and were given demos on system objectives, functionality, and benefits. The leaders gave valuable inputs that were also incorporated. IR also agreed to give special allowances to operating staff. An air-conditioned environment and special uniforms gave the reservation staff a better status within the organization. These initiatives helped ready acceptance of computerization among employees.

By 1990, the software application was made available in twenty-two cities – accounting for 66 percent of the IR's reservation requirements. Several smaller stations were connected to bigger ones as satellite terminals and reservation offices were opened at different places within a city to decongest the main reservation complex. The software had many unique features such as the capacity to issue tickets from any station to any other station, reservation on different segments of a train's route, online changes in train profiles and route structures, the ability to define different advance reservation periods for different trains, online aggregation of data such as revenues or berth utilization, and compatibility with hardware from multiple vendors. The software could be adapted to not just fare revision but also changes in business rules. Soon different cities were interlinked into a real-time, all-time, year-round reservation system.

ADVANTAGES OF RAILWAY RESERVATION SYSTEM:

For the Indian Railways, computerization of passenger reservations yielded substantial reduction in the cost per ticket issued, a 40 percent increase in transactions handled per day, higher productivity, and fewer errors in computation, concessions calculations, and more. It was also a major image booster for IR. For passengers, it meant savings in reservation time and transportation costs, reduced corruption, and new convenience. The mean waiting time for passenger making reservations went down from seventy minutes to twenty-four minutes, resulting in an average annual saving of 100 million rupees for the economy. The greatest benefit for employees was a reduction in shift duration from eight to six hours owing to faster post-shift reconciliation of accounts. A study commissioned by the IR in 1990 reported that it would have needed 33 percent more staff to handle additional volume of work at 1985 service levels.

Computerization (and communications links) brought in transparency and speed. It made it possible to book tickets at any booking window, in any location, for travel between any points. Confirmations for onward reservations were provided instantaneously. Display boards gave online and real-time information about seat availability. For the common man, all this was truly revolutionary. It is doubtful if this largely unsung technological success has a parallel, in terms of impact, in any other field anywhere in the world.

CONCLUSION:

The Indian railway system application led the foundation stone for Indian IT sector, It has made inroads into the world IT market, the Key players in IT sector has come forward and understand the skills of

manpower in India. In a larger context, it created a positive image for computer applications in different sectors, including banking. This experience led to improvement in the airlines system and became a model for computerization in many road transport systems. In sharp contrast, another area crying out for computerization and one where, unlike the railways, models from other countries could be easily transposed, remained closed. The banking sector, where (thanks to strong unions) there was tremendous resistance to any automation as this was a step that would lead to lay-offs for employees. It is ironical, and another lesson in the practical worth of technology, that when computers were finally introduced, banking (and employment) expanded rapidly, even as customers benefited hugely.