

As you enter the cushioned comforts of a 'second class' coach of the Swiss Federal Railways' (SBB) InterCity Express that connects Geneva and Zurich, you are captivated by the timeliness of its arrival and the promptness with which it reaches its destination, not to forget the trouble-free ride. Technological expertise and timely service have been hallmarks of the Euro Rail, and the dependence on information technology cannot be missed.

Now bring your thoughts on the homegrown Indian Railways (IR) that not long ago presented a poor image of India. From miserable customer service at ticketing counters, soiled toilets, to irregular arrivals, the world's largest employer did not have much to boast barring its credentials of having an improvement army of over 42,000 coaches, about 222,379 wagons, routes that encompass about 39,435 miles, an employee strength of well over a million, and a capacity to carry about 17 mn passengers every day. However, the last few years have witnessed noticeable changes in its functioning, and IR today is huffing-puffing its way into the global arena.



IT Engine for Indian Railways

The Rajkot station sets a fine example of how IT can be leveraged to overcome track blocks in its route

Humble Beginnings

Much like any other enterprise across the world, IR began humbly by commencing on its maiden journey on April 16, 1853 from Bori Bunder in Bombay to Thane, covering a distance of 21 miles aided by three locomotives, and close to a century

later in 1951, became nationalized. Much like any organization that has its share of glories and gory days, IR today is one of the upcoming entities of modern India.

IR felt the importance of embracing modern, cutting-edge technology, much ahead of other government

institutions in our country which led to the institution of the Center for Railways Information Systems (CRIS) in 1986. But prior to this, in the 60's the government put forth a course to computerize the railways and was agreed to by labor unions and the management. To kick-start



Source: www.indiavisitinformation.com

this initiative, a diligent framework of communication network was drawn, as back then they could not visualize what IT was to do for them in the coming years.

Sources from CRIS maintain that this body aims at homogenizing the software and IT hardware in the Indian Railways. Thus began the association of CRIS with IT icons such as IBM, Wipro, and TCS on various projects. The highlight of a railway system in a nation is in its timeliness, technological competence, and disaster management systems to combat calamities.

The institution of CRIS may have

brought a lot of laurels to the IR and has upgraded its infrastructure in more ways than one, but accidents, derailments, and deaths have been a major cause of concern for IR, as well as, for its partners. Many in the government bodies attribute this to 'human slip-up', an expression that envelops a host of crimes. While some mishaps have happened with the driver failing to recognize signals, and, in some cases, poor track maintenance has been the catalyst.

Areas of Concern

The issue at hand have been to manage the enormous traffic; clear platforms for the arrival of the next scheduled trains; offer end-to-end queue management systems; and provide effective communication systems across all verticals of this behemoth.

With the growth of our nation, its dependence on railways surged manifold and IR on its part needed a stronger network at its disposal. And a stronger network obviously meant better communications systems. Three key communication areas under consideration were—communication between two stations or fixed points, between crew members of the rail, and within a station yard. Also, ever-increasing population means additional people to be carried between places resulting in the increase in the train lengths.

On its part, Indian Railways incorporated Railtel Corporation of India (RCIL) in September 2000, a 100% public sector entity. The objective of this company was to put forth a multimedia and broadband-enabled telecom network across the country which would in turn bring about not only telecom revolution, but also renovate railways operational, train control, and safety systems. In short, RCIL took care of the communication needs of IR.

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Ticketing Issues

The surge in population also meant more people using trains as a mode of transport. And soon, booking of tickets at stations became a cumbersome process for travelers because of long queues, touts that made bulk bookings, which resulted in high operational costs, and poor customer service. Travelers were left with either, waiting for long hours in queues, resulting in immense pressures on the booking clerks. Chaos prevailed as a consequence, with mismanaged ticketing, causing delays and large overheads for the clients and customers.

Also, due to understaffed railway police and management, a solution had to be conceived to prevent theft and destruction or manhandling of public property. The situation required providing a fail-safe system in case of a breakdown of the main system. The fail-safe had to be cost-effective and efficient to prevent a chaotic situation during a fail-over.

Intellvisions leveraged its extensive experience in automated self servicing solutions and used its industry recognized queue management system, called OptiQ to address the issues faced by travelers and booking clerks.

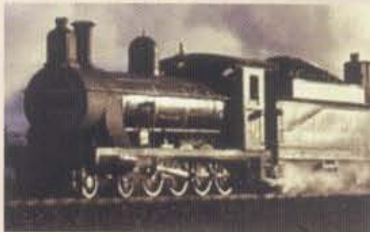
"The solution is a standalone kiosk that generates token tickets, allowing travelers to wait in the waiting lounge and carry out the purchase

IT Adoption in Railways Across the World

Keeping ourselves abreast with what is happening around the world will help us in amplifying our railway systems, and also ensure punctual services in the future. Here's a look at railway Infrastructure in different parts of the world:

Africa

If one takes a glance at the African continent, South Africa boasts of SPOORNET, the country's national railway operator that has come up with a rail computer system that connects eastern and southern African nations, where dependence on rail traffic is more due to non-viability of road transport. Under such a scenario, tracking expertise was required wherein a person who tracks shipments could trace products till it reaches its point of delivery. Companies such as TSS and Siemens have been doing work on high-end technologies that require elimination of custom hurdle, globalization of information, and economic regulations that would promote such technologies to be in place.



Japan

The East Japan Railway Company (JR East) has pioneered the utilization of cutting edge technology. JR East could be clubbed into three categories. Firstly, the business operation related systems, which help in the decision-making processes and in the development of management strategies.



The train operation related systems form the second and critical category, where the overall railway operation schedule database is constructed. Also, all information pertaining to railway routes, signals, electric power, etc get assembled into a unit that can be accessed by maintenance staff during repair and inspection.

The third category belongs to customer related systems where computer systems are engaged in places with railway businesses that involve engagements with the consumer. Such facilities provided by JR East have helped in improving the quality of travel time of consumers.

Europe

If one looks at the European Union (EU), strategies pertaining to deployment of information technology in the rail transport are handled by three entities—Europe Train Control Systems (ETCS), the European Rail Traffic Management System (ERTMS), and European Integrated Radio Enhanced Network (EIRENE).



Their main agenda over the last few years have been to utilize modern technologies to augment reliability, attractiveness, and productivity of railways. There is a continuous thrust in the exploration of radio links to support uninterrupted flow of information between the trains and the ground.

of the ticket when their respective numbers are called or flashed on the screen. OptiQ leverages proprietary algorithms to prevent fraudulent ticketing by touts or corrupt booking clerks," points out Raj Menon, executive director, Intellvisions Software.

Raj mentions that the deployment of such systems brought down the stress levels for the booking clerks as well as the travelers. He further goes on to add how in Rajkot, Gujarat, there was substantial change in the functioning of the station after adopting OptiQ. "Leveraging Intellvisions queue management system, Indian Railways was able to considerably enhance its customer service and response time at Rajkot. The booking clerks, the travelers, and the overall ticketing process benefited greatly by OptiQ's simplified token management system that automates many different aspects."

Currently, booking clerks issue tickets by hooking up to the central reservation system, but the biggest drawback of the system is that touts can easily manipulate it, and by using their connections with the booking clerks they can block a large number of tickets, thus depriving the genuine traveler of a ticket.

OptiQ connects the Q management algorithm to the central reservation system, so only those customers who have been issued tokens would be called by the system in a sequential manner to the counters.

Being in the service space, IR realized that passenger comfort and safety was the key to its success. Newer trains and increased budgets to connect every possible route across the length and breadth of the nation have brought happy smiles to millions who utilize this mode to commute, but as mentioned earlier, accidents arising out of derailment and poor judgment on the part of driver, guards, and



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—Raj Menon, executive director, Intellvisions Software

“Our solutions saved huge costs on fiber and leased lines, and today these solutions are deployed widely across all railway zones”

—Subashini Prabhakar, CTM, Dax Networks



train crew have impeded IR time and again, making it look at technology with renewed vigor.

Network Security

It was felt that traditional offerings in security such as firewalls and IDS/IPS (intrusion, detection, and prevention) technologies were not sufficient anymore. Subashini Prabhakar, CTM, Dax Networks pointed out that routing solutions were necessary in order to access security in networks. She states: “Our routing solutions have been deployed in the passenger reservation system. And also, G.SHDSL routers/LAN extenders have been deployed in FOIS (freight operations information system) and UTS (unreserved ticketing system). Further, switches and routers have been deployed in MIS (management information systems) and MMIS (material management information systems), and switches and G.SHDSL products have been deployed in ATVM (automatic ticket vending machine).” Apart from all the above projects, Dax products

are also deployed across premises of various railway offices.

Prabhakar also enthuses on Dax-products saving large costs for Railways when there was a requirement for connecting adjacent railway stations on Ethernet and IP enabling them. The company had provided a solution that used existing dead copper wires available along the railway tracks. “Our solutions saved huge costs on fiber and leased lines, and today these solutions are deployed widely across all railway zones,” says Prabhakar.

The Track Ahead

IT is no doubt a necessity, and we need to enlist areas where the focus would have to be, such as, facilities

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for better safety, train traffic management, passenger services in the station, in the platforms, and within the train coaches is imperative.

Signaling and switching are critical function in any railway network. Multiple trains share the same pair of tracks and the decisions on which trains switch onto a ‘siding’ to allow an oncoming train to pass, must be decided in real time, based on speed, position, and priority. Signaling devices in every station could be interfaced with the local LAN and each station can be connected to WAN. The challenge however is that passing the serial signaling data to Ethernet and then back could lead to the introduction of delays.

Today, solutions are available with a feature called “True Serial”, allowing conversions and transmission of data over the Ethernet to be optimized to minimize latency by allowing configuration of both the Ethernet packet size and timing of transmission.

Another headache for Indian Railways according to Menon is the presence of touts. “India presents some unique challenges considering the number of people who travel, and an entire parallel system managed by touts out to make a quick buck, something that never happens in the other countries.”

Though, despite such obstacles, IR continues to be the lifeline for millions of people who travel on the tracks and reach their destinations. Indian Railways is an example of a multi-divisional, multi-functional, and multi-location entity that requires continuous support of information technology, and an organization of such scale and size needs to utilize IT to garner business and competitive lead over its competitors — airways and roadways.

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