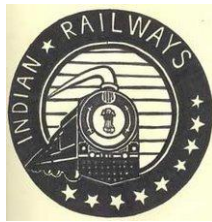


## SPECIAL I Railing on tech tracks

*Indian Railways turns tech savvy to thwart derailment*

As you enter the cushion comforts of a 'second class' coach of 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 Euro Rail and the dependence on Information Technology cannot be missed.



Flash your thoughts to the homegrown [Indian Railways](#) (IR) that not long ago presented a poor image of India. From poor customer service at the ticketing counters, soiled toilets to irregular arrivals, the world's largest employer did not have much to boast barring its credentials of having an 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 million passengers every day.

However, last few years have witnessed noticeable changes in its functioning and IR today is huff-huff-puff-puffing its way into the global arena.

Read on...

### **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. Close to a century later in 1951, Indian Railways became nationalized.

Much like any organization that has its share of glories and gory days, IR is today one of the upcoming entities of modern and technologically prowess 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 Centre for Railways Information Systems (CRIS) in 1986.

But before that, in the 60's the government put forth a course to computerize the Railways, which was agreed by labor unions and the management. To kick-start this initiative, a diligent

framework of communication network was drawn, as they probably could not visualize what IT was to do for them in the coming years.

Sources from CRIS maintain that this body aimed at homogenize the software and IT hardware in 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.

### **Nothing to do with IT**

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 who work closely with this government body.

Many in the government bodies attribute this to 'human slip-up', an expression that envelops a host of crimes. While some of the 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 in front of IR has been to manage the enormous traffic on one hand, clearing trains and pave way for the newer ones to arrive at the platforms, 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 stronger network at its disposal. Requirement of stronger network meant better communications systems on hand. Three key areas in communication were -- between two stations or fixed points, between crew members of the rail and within a station yard. Ever increasing population meant additional people to be carried between places with the train lengths increasing as a result of this.

On its part, Indian Railways incorporated Railtel Corporation of India Limited (RCIL) in September 2000, a 100 per cent public sector entity. The objective of this company was to put forth a multimedia network and broadband telecom across the country that 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.

### **Ticketing issues**

Surge in population meant more people using train as a mode of transport. Soon booking of

tickets at stations became a cumbersome process for travelers. Long queues and touts only made bulk bookings result in high operational costs and poor customer service.

Travelers were left with either waiting for long hours in queues, resulting in pressures on the booking clerks from travelers for faster ticketing or return of monetary change. Chaos prevailed as a consequence with mismanaged ticketing causing delays and large overheads for the client and their customers.

The railway stations are populated with travelers 24 X 7. Due to understaffed railway police and management, the solution was also to prevent theft, destruction or manhandling. 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 the failover.

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 the travelers and the booking clerks.

"The solution is a standalone kiosk that generates token tickets that allowed travelers to wait in the waiting lounge and carry out the purchase of the ticket when their respective numbers were 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 at Intellvisions Software Limited.

Menon says that the deployment of such systems brought down the stress levels both for the booking clerks and travelers. He further goes on to add how in Rajkot (Gujarat) there was a marked 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 tickets are issued by booking clerks by hooking up to the central reservation system. The biggest drawback of the system is that touts can manipulate the system. Using their connections with the booking clerks they can block a large number of tickets thus depriving the genuine traveler of a ticket.

Opti-Q connects the Q management algorithm to the Central Reservation System. Only customers who have been issued tokens would be called by the system in a sequential manner to the counters thus preventing misuse by touts.

## **Safety first**

Being in the service space meant that IR provided its passenger comfort and safety as it was key to its success. Newer trains, increased budgets to connect every possible route across the lengths and breadths of the nation have brought happy smiles to millions who utilize this mode to commute but as mentioned earlier, accidents arising out of derailment, poor judgment on the part of driver, guards and 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, IDS/IPS (intrusion detection and prevention) technologies were not sufficient anymore.

**Subashini Prabhakar, CTM of Dax Networks pointed out that routing solutions were necessary in order to access security in networks.**

**She says: "Our routing solutions have been deployed in Passenger reservation system. Our G.SHDSL routers / LAN extenders have been deployed in FOIS (Freight Operations Information System), UTS (Unreserved Ticketing System). Our switches and routers have been deployed in MIS (Management Information Systems), MMIS (Material Management Information Systems). Our Switches and G.SHDSL products have been deployed in ATVM (Automatic ticket vending machine)."**

**Apart from all above projects, DAX products are 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 provided a solution which 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."**

## **IT adoptions in Railways across the orb**

To keep ourselves abreast with what is happening around the world would help us in amplifying our railway systems and also ensure punctual services in the future.

## **Africa**

If one takes a glance at the African continent, South Africa boasts of SPOORNET, the country's national railway operator which 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 in that part of the world.

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 requires elimination of custom hurdle, globalization of information and economic regulations that would promote such technologies to be in place.

## **Japan**

If one looks at Japan, the East Japan Railway Company (JR East) has pioneered the utilization of cutting edge technology in that region. Take a closer look at its operations; 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 which can be accessed by maintenance staff during repair and inspection. Third category belongs to customer-related systems where computer systems are engaged in places with railway businesses that involve engagements with the consumer.

Facilities provided by JR East have helped in improving the quality of life led by its 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).

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

## **The track ahead**

IT is no doubt a necessity (putting it lightly!) and we need to enlist areas where the focus would have to be. Facilities for better safety, train traffic management, passenger services in the station, in the platforms, with in 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. 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 which never happens in the other countries."

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, but who would be 'on track' is anybody's guess.