

## success story



**Indian Railways runs  
state-of-the-art passenger  
reservation system  
on hp OpenVMS  
AlphaServer systems**



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**Dr. Rajesh Narang** Chief System Manager  
Centre for Railway Information Systems (CRIS)  
Indian Railways

## traveling on high technology

Indian Railways is one of the most advanced ministries in India, with an innovative and extensive IT environment — and a leading-edge reservation system powered by HP AlphaServer™ systems running the HP OpenVMS™ operating system and HP Reliable Transaction Router (RTR) middleware.

Consider the scope of the operation. Indian Railways is the world's second-largest railway, with 6,853 stations, 63,028 kilometers of track, 37,840 passenger coaches and 222,147 freight cars. Annually it carries some 4.83 billion passengers and 492 million tons of freight.

Of the 11 million passengers who climb aboard one of 8,520 trains each day, about 550,000 have reserved accommodations. Their journeys can start in any part of India and end in any other part, with travel times as long as 48 hours and distances up to several thousand kilometers. The challenge is to provide a reservation system that can support such a huge scale of operations — regardless of whether it's measured by kilometers, passenger numbers, routing complexity, or simply the sheer scale of India.



## good technology means good service

In 1986, the Ministry of Railways established the Centre for Railway Information Systems (CRIS) as an umbrella for all computer activities on Indian Railways. CRIS is responsible for designing, developing and implementing all major computer systems for the Railways. With its own R&D effort, CRIS has become a frontrunner in its field.

One of CRIS's key technical achievements is a sophisticated reservation and ticketing application called Country-Wide Network for Enhanced Reservation and Ticketing (CONCERT), which runs on the OpenVMS AlphaServer platform. According to Mr. S. K. Nanda, Director, Passenger Reservation System, Centre for Railway Information Systems at Indian Railways, "OpenVMS is an extremely rugged and reliable operating system. Its built-in auditing feature provides us with excellent security."

The primary challenge for CRIS is to provide an efficient passenger service by ensuring maximum uptime for its reservation/ticketing and inquiry application. The Railway must prepare charts that map passengers with their seats, and must post these charts outside each coach. CONCERT software enables the preparation of skeleton charts in advance for each train for the next three journey days.

Indian Railway's current CONCERT application represents a steady progression of using the latest technologies available. In the mid-1980s, Indian Railways first computerized its reserved ticketing operation on VAX™ systems running VMS™. This was done from five regional passenger reservation centres, each of which was a stand-alone site with its own local database. During the mid- to late 1990s, CRIS introduced CONCERT, which linked the five passenger reservation centres so that reserved tickets from any station of Indian Railways could be issued to any other station from a single window.

Mr. Nanda cites the importance of Reliable Transaction Router middleware in improving passenger service. "CONCERT from CRIS has been able to improve the services to the passenger by offering single-window service to the passengers. RTR gives the user location transparency for the distributed database system. Thus, the reservation from one station to any other station can be given from a single window covering the round trip, which means passengers only have to stand in one queue."

As more and more people turned to the Web to find information about various services, Indian Railways decided to provide information related to passenger reservations to the public over the Internet. In 2000, CRIS designed and implemented Indian Railways' own Web site, which receives a staggering 1.2 million hits per day. The site is hosted by CRIS and runs on the OpenVMS AlphaServer platform.

## leveraging corporate intelligence

In its quest to keep pace with ever-changing technology, CRIS works with the new HP on multiple levels. Dr. Rajesh Narang, Chief Systems Manager, Centre for Railway Information Systems, explains, "Local support for OpenVMS AlphaServer systems is excellent. Whenever we need them, they are with us. We also benefit from corporate intelligence through the OpenVMS VSP (Vertical Segment Program) organization. By working closely together, we can make good architectural choices, which helps to keep our operation at the cutting edge."

A case in point: In 2001, CRIS determined that it could increase application availability by moving CONCERT from a VAX to an AlphaServer platform. According to Dr. Narang, CRIS originally planned to do the system upgrade overnight, because it is an online application. However, based on discussions with OpenVMS experts, CRIS decided to replace its VAX systems one by one, thereby reducing risk of downtime. "Because OpenVMS allows mixed clustering, we were able to upgrade by bringing on one AlphaServer at a time," says Dr. Narang. "This made the upgrade very easy and reduced our risk of downtime. Since moving from VAX to Alpha, we have not experienced a single disk failure."

## leading-edge benefits

The new IT platform has more than lived up to Dr. Narang's expectations in terms of increased application availability and system reliability. "OpenVMS clustering technology has given us resilience against disk and processor failure. The HP StorageWorks™ RAID systems attached to the AlphaServer systems are highly reliable, so the number of failures due to malfunctioning of hard disks is almost negligible."

### industry

transportation

### challenges

- Provide a reservation system that efficiently serves more than half a million people each day
- Ensure maximum uptime so reservation/ticketing/inquiry application is available 24 x 7
- Create a Web site that can accommodate more than one million hits per day

### solutions

- hp enterprise knowledge through the OpenVMS VSP to help clarify good architectural choices
- hp OpenVMS clustering to simplify server upgrade and reduce risk of downtime
- hp AlphaServer systems for high availability, reliability and performance

### results

- Improved system reliability — increases application availability due to reduced downtime
- Cost savings — provides low cost of ownership and requires less maintenance
- Time savings — reduces time to prepare reservation charts by 50%; reduces backup time

Time savings is another significant benefit of Indian Railway's state-of-the-art IT platform. For example, the skeleton charts, which previously took three hours to prepare, now take half that time. Preparation of the reservation chart (passenger manifest), which used to take between 10 and 15 minutes, can now be prepared in less than five minutes. Backup time and the time to initialize the dynamic route database of each train for each class have also decreased considerably.

The new platform also delivers significant cost savings. "AlphaServer systems are very powerful, but the total cost of ownership is low because there is considerable savings on recurring maintenance costs," says Dr. Narang.

Indian Railways is continuously enhancing its IT system to make use of emerging technologies. Looking ahead, CRIS is turning its focus to the creation of a Web-based passenger e-reservation system and a migration to RTR 4.1. OpenVMS and AlphaServer technology from HP will continue to give Indian Railways the power and flexibility it needs to stay on the forefront of IT innovation.

### additional information

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### at-a-glance:

#### Centre for Railway Information Systems (CRIS), Indian Railways

**company profile:** an umbrella organization for all computer activities on Indian Railways, the Centre for Railway Information Systems is responsible for designing, developing and implementing all major computer systems for the Railways

**headquarters:** New Delhi, India

**founded:** established in 1986 by the Ministry of Railways

**URL:** [www.indianrail.gov.in](http://www.indianrail.gov.in)

### solution highlights

- CONCERT Passenger Reservation System: Eight AlphaServer ES40 systems and nine AlphaServer DS20E systems with five StorageWorks RA8000, RA7000 and RA3000 systems by HP running OpenVMS, Reliable Transaction Router, DEC 'C', Fortran
- Passenger-related information Web system: One AlphaServer DS10 and one AlphaServer DS1200 for Web servers, two AlphaServer DS20E application servers running OpenVMS

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