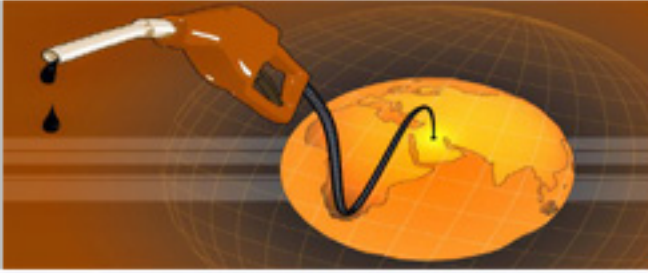


Porting from MS-SQL Server to Oracle



The Client

Bharat Petroleum Corporation Limited (BPCL) is a global Fortune 500 oil company. BPCL is in the business of refining, storing, marketing, and distributing petroleum products and has nearly 5,000 gas stations across India.

The Challenge

BPCL runs a smartcard based loyalty solution that allows consumers to buy gasoline using prepaid smart cards. This smart card solution enables BPCL's customers to promote their products by offering loyalty points and alternate means of payment through a stored value card.

The existing system of BPCL was already live with an approximately two million customer base and 150,000 transactions per day. The system however, was unable to absorb the load generated due to an increasing number of users and data volume. Report generation and transaction handling through the SQL Server database took an inordinately high amount of time, with some reports taking almost 20 days to generate.

BPCL required a complete solution inclusive of backend, Point of Sales (POS) application, and card applications. This end-to-end solution was to be integrated with multiple third party systems from areas such as banking, credit organizations, marketing and card vendors.

The solution envisaged the following functionalities:

- Provide 24x7 availability with an up time of 99.9%
- Include high security encryption for fraud prevention
- Offer scalability to cater to increasing system load
- Provide accurate transaction data as per existing business logic
- Provide an open API which integration with bank systems for periodical reconciliation of accounts.

The Solution

To overcome performance issues, Pine Labs proposed a new design based on J2EE based clustered solution using Oracle Database, Oracle Report Server and Oracle Application Server. With the size of old application data around 100 GB, and growing at a rate of about 100 MB per day, one of our biggest challenges was porting the current live application running on Windows (VC++ application) and SQL Server Database to the new solution without any downtime. A slew of additional features were also to be added to the existing application (like Web based UI, card issuance UI etc).

Pine Lab's 7-phase Porting Methodology was used to port the application:

Pine Labs Migration Method Phases



Data Porting Technologies



- Most of the initial data porting was done by writing custom stored procedures to move data to the new system.
- Since tables were refactored, initial porting required a large number of temporary tables for storing staging data.
- For more involved tables and data, specialized java programs were written to fetch, cast and insert data efficiently.

- The new application stored some CLOB data as Oracle XML type. Specific java programs were written to parse and port CLOBs to XML.
- An application framework was developed to capture errors raised during migration which stored details of each individual record (range of records) and allowed them to be handled offline.
- Both the old as well as the new applications were live in parallel for a few days. Custom shell scripts were therefore created to migrate some data instantly between the two applications for reference purposes. The remaining differential data was migrated on a nightly basis.

Comparison between the Old and the New System:

	Old System	New System
Hardware & Software	<ul style="list-style-type: none"> • SQL Server • Net infinity server • VC++, Com , ActiveX, Windows service 	<ul style="list-style-type: none"> • Sun Solaris 8.0 OS • Oracle 9i database (with partitioning & parallel server option) • Oracle 9i RAC (real application cluster) • Oracle 9i OAR (both 1-way & 2-way replication) • Oracle 9i AS (Application server) on RAC • Oracle 9i Reports server • J2EE architecture (JSP,EJB) • Extensive use of Oracle Java stored procedures and AML data type • V240,V480 sun sparc servers
System Load Capacity	<ul style="list-style-type: none"> • 2 million customer base • Over 150,000 transaction per day • Database size exceeding 100 GB 	<ul style="list-style-type: none"> • Capable of handling 5 million customers • Capable of handling up to 1 million transaction per day • 24x7 system with very low downtime tolerance • Fully web enabled • Database size exceeding 400 GB
Report Generation	Some report generation activities took more than 10 days on separate SQL Server machine.	With the new system the report generation time was drastically reduced. The report time was reduced to 30 mins using Oracle Report server and Database.

Current Status

Pine Labs built a complete smart card solution that included proprietary back end software, POS terminal software, communication software interfacing with a X.25 provider, and security layer. The solution is integrated with smart cards and POS terminals supplied by multiple vendors including Schlumberger.

The solution has been in production since September 1999. It was migrated in February, 2003 from a Windows based system to a multi-tier J2EE architecture. After successful migration, the older system was shut down.

This was the largest smart card based project in India and provided BPCL a huge competitive edge over its business rivals. The software is currently running in 40 cities and 1,000 gas stations in Asia. The current cardholder base is about 1,500,000 with about 100,000 transactions, worth about \$1,000,000 a day.

Interested?

For more details, contact **LOKVIR KAPOOR** at lokvir.kapoor@pinelabs.com or at **9312091663**.
<http://www.pinelabs.com>