

# Bharti Airtel

## Streams Implementation with Oracle E-Business Suite and Discoverer

*“This is an excellent solution if business is looking for Online / Real time reports without impacting production environment. It was absolutely seamless & it delivered humungous value to the customer facing teams”*

*Ravishanker N  
CIO, Bharti-Airtel*



### Corporate Profile

- Largest private telecom company in India.
- Over 80 million customers
- Annual revenue \$5 billion
- <http://www.airtel.in/wps/wcm/connect/airtel.in/airtel.in/Home>

### Oracle Technology Used

- Oracle Database 10g Release 2 (10.2.0.2)
- Oracle Streams replication
- Oracle Discoverer (10.1.2.2.0)
- Oracle E-Business Suite 11.5.10 CU2

## OVERVIEW

The Bharti Group has a diverse business portfolio and has created global brands in the telecommunication sector. Telecom giant Bharti Airtel is the flagship company of Bharti Enterprises and is the largest private Telecom Company in India. To assist in their business processes, they have implemented the CRM module of the Oracle E-Business Suite. This application is used 24x7 by the contact centers located at various geographic locations.

There are three different implementations of CRM catering to different business segments, including, most recently, for Airtel Broadband Telephone Services (ABTS). Contact centers for the landline telephone and broadband services provided by Bharti Airtel across Pan-India use this application.

Airtel comes from Bharti Airtel Limited, India's largest integrated, and the first private telecom services provider with a footprint in all 23 telecom circles. The businesses at Bharti Airtel have been structured into three individual strategic business units (SBU's) - Mobile Services, Airtel Telemedia Services and Enterprise Services. The mobile business provides mobile and fixed wireless services using GSM technology across 23 telecom circles, while the Airtel Telemedia Services business offers broadband and telephone services in 94 cities. The Enterprise services provide end-to-end telecom solutions to corporate customers and national and international long distance services to carriers. All these services are provided under the Airtel brand.

IBM, who handles IT for Bharti Airtel, engaged Oracle Advanced Consulting Services as a partner for design and Implementation of Oracle E-Business Suite for Bharti Airtel. This case study describes how Oracle ACS was able to use [Oracle Streams](#) [1] replication technology to improve the availability of the reporting system for Bharti Airtel, while reducing the overhead on the production database.

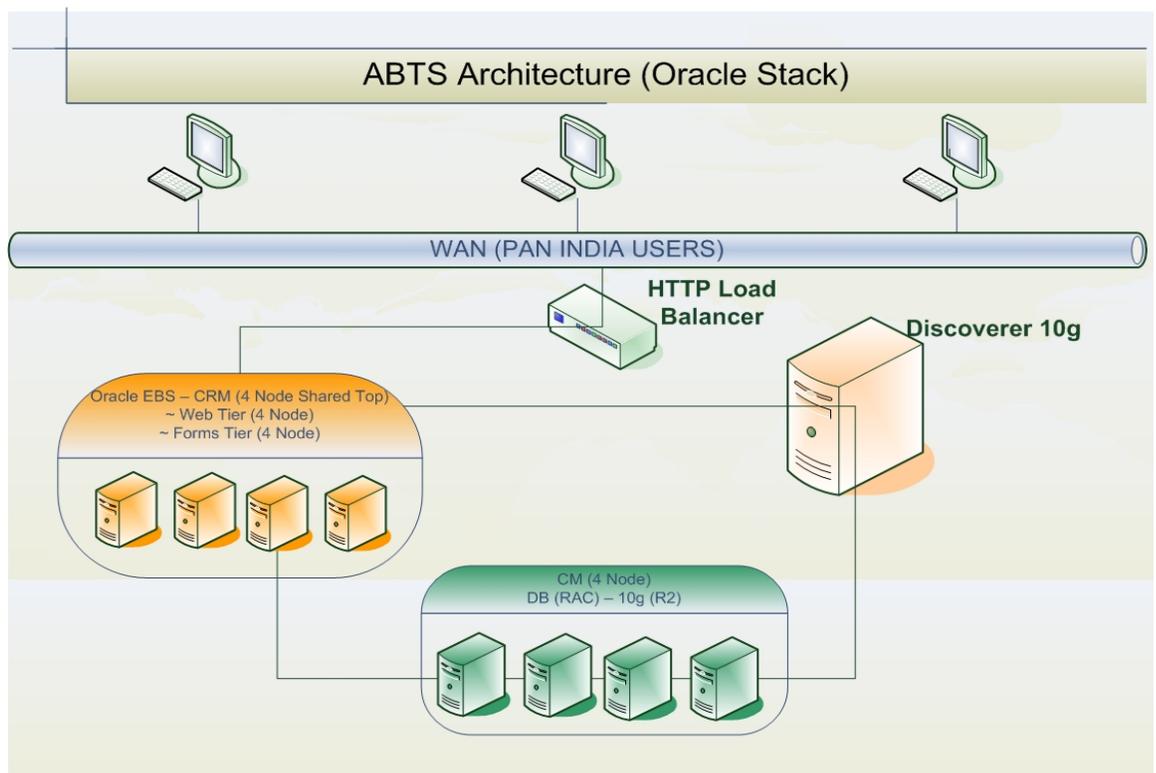
## Bharti Airtel's Requirements

At Bharti Airtel, users retrieve reports from the CRM system using Oracle Discoverer. Users of these reports prefer that they be as up-to-date as possible—ideally available in real time. However, because of the overhead that it would create on the production system, online reporting is discouraged, and materialized views

are used instead. Because these materialized views involve complex joins, they cannot be incrementally maintained.

The SQL queries of reports based on materialized views have a complete refresh daily around 01:00 AM from standard application tables (such as, HZ\_PARTY, HZ\_PARTY\_SITES, CS\_INCIDENTS\_ALL\_B, JTF\_IH\_ACTIVITIES, JTF\_TASKS\_B etc) with complex joins. The refresh of these materialized views from the production (RAC) database takes around 8-9 hours, so the latest data the business receives is always one day behind.

The business requirement of online reports (current time minus one hour) has been very difficult to achieve in this scenario. The materialized views are refreshed with data from the first day of “current month minus three”, so if the materialized views are refreshed on September 10, it will fetch data for 102 days (30+31+31+10) and the number of days will keep increasing until the end of the month. At times it becomes very difficult to complete the materialized view refresh during the end of the month within the stipulated timeline.



By creating a dedicated reporting database, Bharti Airtel can achieve multiple business goals:

- Reduce existing overhead on the production system, by offloading reporting to a secondary location.
- Provide online reporting as needed, using the dedicated reporting database.
- Improve refresh response time for the remaining materialized views.

## ORACLE STREAMS REPLICATION

Oracle Streams captures DML and DDL changes made to database objects and replicate those changes to one or more destination databases. The destination databases allow DML and DDL changes to the same database objects, and these changes can also be propagated to other databases in the environment should the user desire. Streams can be configured to propagate changes between one or more databases bi-directionally. The tables for which data is shared do not need to be identical copies at all databases; both the structure and the contents of these tables can differ at different databases.

There are three steps to the Streams replication process – Capture, Propagation, and Apply. While the basics of replication are summarized below, please note that the Streams documentation includes many ways to customize how and where these processes are executed in order to address a wide range of replication requirements. Please refer to [Oracle Streams Concepts and Administration](#) [2] for a complete discussion of capabilities.

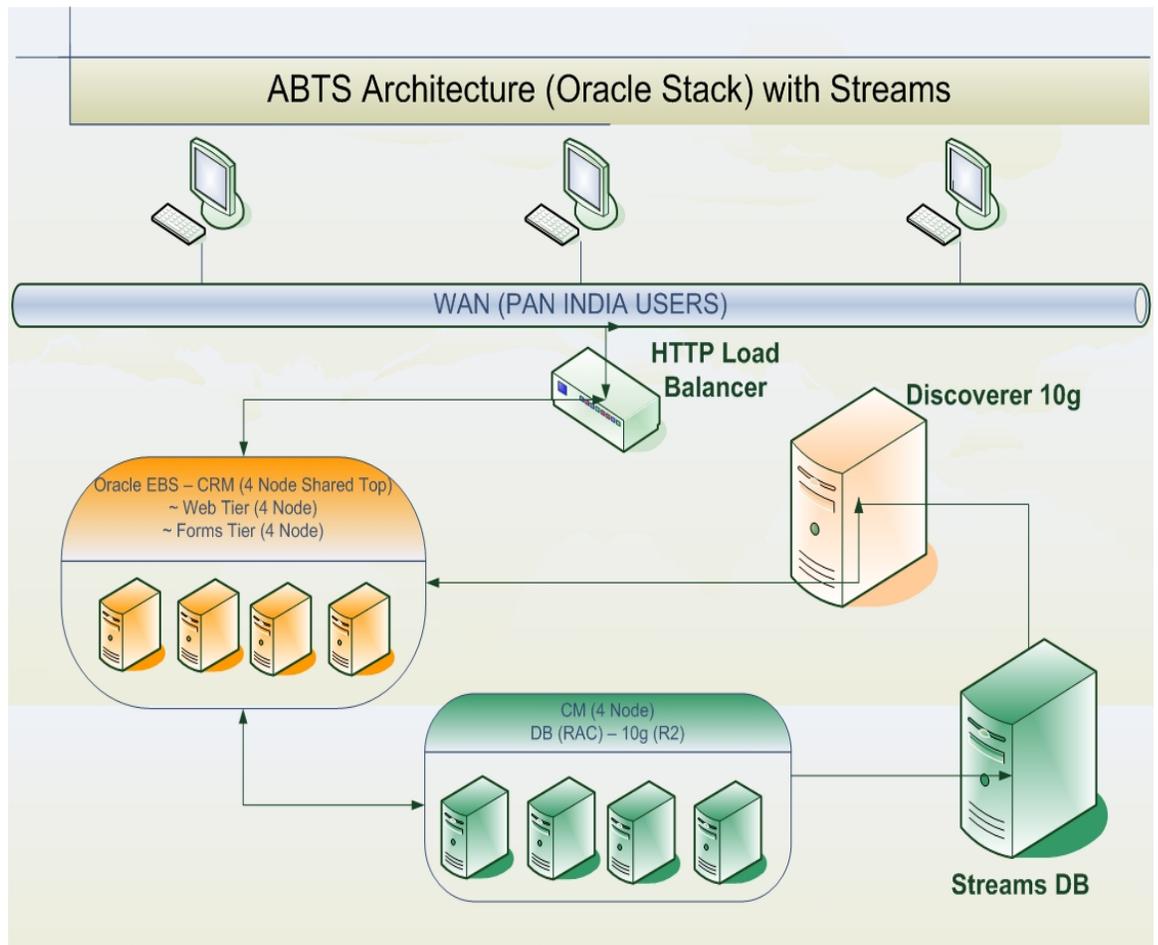
- **Capture:** A Streams capture process mines the redo log to create one or more logical change records (LCRs) and queues them to a Capture Queue. An LCR is a message with a specific format that describes a database change.
- **Propagation:** Streams propagation propagates the staged LCR to another queue residing in the destination database where apply will occur.
- **Apply:** Once the LCR has reached the destination database, a Streams apply process consumes the change by applying the LCR to the shared database object.

### Implementation Details

The solution to handle the above problem was to provide a dedicated reporting database for Discoverer that would be kept synchronized with the production database. In the existing setup, Business Continuance Volume, a storage-level backup solution, was already available and could be opened daily in read-only mode. However, Discoverer cannot run on a read-only database, as it has to write to the End User Layer (EUL) schemas. Oracle ACS determined that the best solution was to use Oracle Streams replication to create a writable copy of the production RAC database. Oracle Streams downstream capture allowed the processing to be offloaded to the secondary reporting database, with minimal overhead on the production database.

With this new configuration, Bharti Airtel achieved their goals of: minimal overhead on the production system, availability of online reporting, and greatly improved response times for materialized view refresh. In some cases, reports that had been run on day old data can now be done in near real-time.

The new architecture is illustrated in the following diagram.



### *Downstream Capture*

Downstream capture means that a capture process runs on a database other than the source database. Oracle Streams supports both real-time and archived-log downstream capture. With downstream capture, the alternative database must be on a similar platform type and operating system.

The changes that were required on the production database were:

- Enabling supplementary logging on the tables to be replicated
- Moving archive files to the downstream database

For more details on implementing an Oracle Streams replication environment using downstream capture, consult the [Oracle Streams Replication Administrators Guide](#) [3].

### **Considerations**

The primary consideration with Oracle Streams was to evaluate whether local or downstream capture is most appropriate for the environment. With local capture, the Capture and Propagation processes run on the source database and the Apply process runs on the target database. Some resources are required on both the

source and target databases. With downstream capture, the processing for both capture and apply occurs at the target database. In this case, because the source database is the production database and the target database is being used exclusively for reporting purposes, it made sense to choose a solution, downstream capture that would shift the majority of the overhead onto the reporting system.

The implementation considerations that Oracle ACS, in conjunction with Bharti Airtel, needed to resolve were as follows:

**Processes:** With downstream capture, propagation can be avoided, as the capture process will be running on the downstream database only. The number of Capture and Apply processes has to be determined depending on the number of objects being replicated. The Bharti Airtel configuration has one process each for Capture and Apply which are replicating around 75 tables. Of these, 15 tables have transaction sizes around 5-10 gigabytes.

**Supplemental Logging:** This is one of the prerequisites that need to be carried out on the source (production) database. Supplemental Logging on tables is enabled using an ALTER command, which takes a brief TM lock on the object. To ease setup for high activity tables, such as CS\_INCIDENTS\_ALL\_B, this configuration should be performed during non-peak hours.

**Monitoring:** After implementing Oracle Streams, Bharti needed to allow time to monitor performance of the new environment and tune the capture and apply processes as needed on the downstream database to achieve optimal performance.

## **Integration of Discoverer (10.1.2.2.0)**

As was mentioned above, Bharti Airtel uses Discoverer for reporting purposes. Bharti Airtel had already successfully integrated Discoverer with Oracle E-Business Suite on the production database as described in Metalink Note # 313418.1. Once the Streams environment was properly tuned, Discoverer needed to be redirected to the new reporting site, which required the EUL schema and Application authentication. Oracle ACS implemented the following steps on the reporting database to complete the Discoverer integration:

- Create APPS, APPLSYS, APPLSYSPUB, and EUL\_US users.
- Create Synonym for all objects in the source database in the respective schemas using database links.
- Set the password for all the users in the downstream database to be the same as source (encrypted value).
- Change the TNS entry on the Discoverer Node to point to the reporting database instead of the source database.

## **CONCLUSION**

By using Oracle Streams to create a dedicated reporting database, Bharti Airtel was able to achieve its business goal—overhead on the production system was greatly reduced, while reporting response time was greatly improved. In some cases, reports that had been nearly 24 hours behind are now performed online.

## REFERENCES

1. Oracle Streams  
<http://www.oracle.com/technology/products/dataint/index.html>
2. Oracle Streams Concepts and Administration  
[http://download-west.oracle.com/docs/cd/B19306\\_01/server.102/b14229/strms\\_over.htm](http://download-west.oracle.com/docs/cd/B19306_01/server.102/b14229/strms_over.htm)
3. Oracle Streams Replication Administrators Guide  
[http://download-west.oracle.com/docs/cd/B19306\\_01/server.102/b14228/toc.htm](http://download-west.oracle.com/docs/cd/B19306_01/server.102/b14228/toc.htm)

Note: 313418.1 - Using Discoverer 10.1.2 with Oracle E-Business Suite 11i

Note: 274456.1 - Downstream Capture

Note: 413353.1 - 10.2 Best Practices For Streams in RAC environment

Note: 273674.1 - Streams Configuration Report and Health Check Script

Note: 418755.1 - 10.2.0.x.x Streams Recommendations



Bharti Airtel and Oracle Streams

June 2009

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