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**Project**
Data Integration: Data Migration of two ordering products from an acquired company’s database to client’s database.

**About Client**
It is one of the nation’s largest communications service providers focused exclusively on businesses, government, domestic and international telecommunications carriers, cable companies, content providers and mobile wireless companies. It provides advanced VoIP, Internet, managed network, and hosted IT solutions for small and medium sized businesses, enterprises and government agencies. It also delivers high-bandwidth IP and inter-city network transport services for domestic and international carriers, service providers, cable companies and mobile wireless companies. (Reference and details provided on demand)

**Client’s Problem**
1. High operating costs
2. Redundant systems with volatile interfaces handling key business data
3. Large number of inconsistent data
4. Slow speed of data transfer across systems
5. Compatibility issues between databases

**Client Requirements**
1. Reduce operating cost
2. Migrate all records
3. Consolidate duplicate records
4. Correct incorrect records
5. No downtime outside of maintenance window
6. Existing application and workflow handles migrated data
Pre-Migration Architecture

Our Challenges
1. Significant number of duplicate records
2. Significant number of incorrect records
3. Significant number of inconsistent records
4. No downtime outside of maintenance window permitted
5. Minimal data model changes permitted
6. Multiple source databases and data models
7. Huge difference between data models at source and data models at target
8. No proven approach available with the client
9. Smooth transition of in-flight orders/PSRs

Data Migration Strategies Evaluated

Strategy-1: Bring app down and migrate data
1. Bring application down
2. Move data from source to target database
   a. Option-1: Drive from target database
      i. Pull data from various sources to target database using DB-Links/Heterogeneous Link/Materialized View
b. Option-2: ETL
   i. Step-1: Extract data (data-pump, exp/imp, utl_file) from source databases at source box
   ii. Step-2: Transfer extracted data/files to target box
   iii. Step-3: Load transferred data/files into target database
3. Correct & transform the received data at target database
4. Apply within the target database
5. Validate & correct, where needed
6. Bring application up

**Strategy-2: Migrate data without bringing app down**
1. Prepare list of orders to be migrated
2. Create a .Net based application (data-import-program) that does following for an order:
   a. call existing web services to create order skeleton
   b. pulls data from various source databases using SQL/DB-Link/Web services call (existing XMLs Payloads)
   c. put pulled data into temporary schema at target database
3. Create a database program (data-migration-program) that does following for an order:
   a. corrects and transforms data in temporary schema
   b. apply transformed data on the order skeleton
4. Create a database program (data-validate-program) that does business rule validation
5. Migrate data Order-by-Order. For each order perform following steps:
   a. Step-1: Run data-import-program
   b. Step-2: Run data-migration-program
   c. Step-3: Run data-validation-program
6. Work on fall outs in parallel

**Data Migration Executed**

We went by Strategy-2 because of following reason:

1. No down time required at all
2. Gives flexibility to prioritize at order level in real time
3. Gives control on number of parallel instances in real time
4. Easy to handle bad migrations/bad data in parallel
5. Easy to migrate missed out orders, if any, when discovered
6. Utilization of existing code/web services/architecture/XML Payloads/code
We maintained Acquired Company’s System for a client approved proving period.

Technologies Utilized
- Oracle database 10g, 11g
- SQL Server 2008
- .Net Framework 3.5
- WSDL 2.0/XML 1.0/Web Services (SOA)

Final Outcome
Client’s requirement fulfilled and project delivered.

1. Reduced operating cost and increased productivity for long term
   a. Acquired company’s system decommissioned.
   b. Human resources and IT resources released and moved to other productive assignment.
   c. Existing application and workflow handles migrated products
   d. Total cost of ownership reduced by approximately 50%
2. Migrated all the records with no system/application downtime
3. Improved data quality
Lessons Learned
The key lessons learned were:

1. Rigorous as-is data analysis paid off.
2. Early integration testing was helpful in ironing out data and system related issues.
3. It is important to think outside the box and not let technology limitations dictate the solution.
4. Decision to identify and use existing APIs/programs saved considerable time and enhanced quality.
5. Reference to past experiences of similar projects is an important ingredient to ensure mistakes in those projects are not repeated.
6. Close consultation with all stakeholders is critical.
7. If everyone involved (IT and business stakeholders) works together with a clear aim in mind anything can be done.

References
References will be provided on-demand.

About Author
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