# Redesigned Data Warehouse with Effective Data Analytics

## Organization Profile and Business Challenge

Centennial had a profound opportunity to work with a Food Services company that operates in the United States and is the world's largest provider of food and beverage services for travelers. With 30,000 associates and revenues of more than $2.7 billion, they offer travelers an unparalleled blend of local, regional and international brands. As airport dwell times have increased, so have consumers' needs to make the best use of their time in the terminal. At more than 100 airports worldwide, they bring travelers exciting food and beverage experiences they've never had before. They also offer a welcome respite along the motorways, at 99 Turnpike travel plaza stops in North America. With national and local restaurant brands in state-of-the-art facilities, they serve motorists and families driving on U.S. toll roads from Maine to West Virginia, Ohio, Pennsylvania, Indiana and Illinois, and in Canada from Windsor to Cornwall.

The Company collects huge amount of data related to stores and customers, and uses analytics to understand the behavior of the customer. They had a significantly large database, which was consolidated from various systems using an ETL (Extract, Transform, and Load) tool to mine data from a database and store it in a data warehouse. The company partnered with Centennial and outsourced the reengineering of the data warehouse and its reporting structure, and built a modular, scalable architecture, considerably reducing the processing batch time. The Data Warehouse must provide strategic and tactical decision support to all levels of management.

## Centennial Solution

To help achieve their business and IT objectives, Company approached Centennial to support this huge undertaking. To achieve expected outcome, Centennial has adopted a 4-phased approach: plan, design, implement and operate.

In the initiation phase, Centennial performed a detailed study of the existing data warehouse, ETL model, reporting structure and outlined key areas of improvement. During the design and implement phases, Centennial redesigned the data warehouse to use star schema. As a result, several data elements were added or eliminated. The new and redesigned warehouse data model may be the single most important aspect of the effort. The two primary components of the data model were the reporting data model and the metadata model. While the actual raw data was stored in the reporting data model, it was the metadata repository and its data model structure that allowed the various functional areas within the warehouse to communicate.

### Reporting Data Model

The reporting data model represented the actual data stored in the warehouse. It contained both the data and the relationships between the data. In the client warehouse, property information, lease information, financial costs, and personnel responsible for maintaining this data, are all examples of entities that existed in the reporting data model.

### Metadata Model

Simply defined, metadata is "data about data." Our premise was that Company data should be considered similar to any other Company asset with intrinsic value. Similarly then, as the Company maintained knowledge about assets, the Company also needed to maintain knowledge about the data in the data warehouse. Questions such as, where does the data come from, when does it get loaded and transformed, who is responsible for maintaining it, and most importantly, how does it relate to the other data

in the warehouse were all answered by the metadata. As reporting requirements evolved and new systems were integrated, the metadata model provided the necessary translation between older data and new data, enabling the integration of not only diverse systems but also data that existed in different chronological timeframes.

The metadata repository model was the place where information about operational source systems, the data warehouse, the ETL processes, the business views, reports, and operational statistics would be maintained. The metadata repository would reduce the delivery speed of new or modified reports through the use of standardized integration templates. These templates would aid future developers as they estimated the impact of proposed changes in the warehouse environment. This type of functionality would be critical for any company looking to manage a data warehouse over time.

### ETL and Cubes

Each ETL routine has been reviewed and updated to reflect new schema. Data is captured by store, zone, quarter and period, accounting year, and brand and concept. These changes were implemented in a short duration, resulting in an ETL that processed information at a faster pace. The data in the warehouse is processed into OLAP Cubes for reporting and analysis purposes. Using Cubes, reports could be generated for a specific store aggregation, i.e. zone, company, concept, brand, for a sequence day, week, quarter, or year. A user can merely perform a double click on the aggregation (a specific aggregation is displayed in a row or column) to drill down to the next lower level (e.g. the stores in that zone, or in this quarter) hence revealing what's going on at the next lower level of detail.

Once the speed factor had been satisfactorily handled, Centennial ensured future maintainability of the ETL. This was accomplished by making the ETL concurrent and scalable, so that the Company could confidently ramp up the storage and processing capabilities of the data warehouse at a later date, if required.

## Benefits

The new data warehouse solution delivered many benefits to the Company including:

- Easier to perform analysis, pattern search, and reporting
- Integrated budgeting and planning processes in a centralized Web-based application
- Combined specific departments and business unit plans with organizational objectives
- Reduced budgeting and planning cycle costs
- Increased batch processing speed by the tightly integrated code. The immense speed ensured a 50% time reduction in batch processes and enhanced the efficiency of the Company's processing capabilities.
- Improved flexibility and easy addition of newer data from sources that were not initially supported - thus improving the capabilities of the data warehousing solution.
- The Centennial delivery model lowered costs drastically and helped Company to focus its IT budget savings on more important tasks.

## Impact on Company's business

Centennial delivered a roadmap that enabled the Company to implement additional analytical features in a low risk and cost effective manner. Our recommendation to implement a data warehouse using standardized integration templates and a flexible data model has provided the client with a stable platform for developing and deploying future enterprise-level reports. The data warehouse has enabled the Company to leverage rapidly changing technology, embrace best-of-breed products, and integrate legacy systems into a powerful information engine delivering timely and relevant reporting capabilities for their customers.

The redesigned data warehouse served as a much needed platform to combine the data not only from legacy systems, but also new applications. The data warehouse provided a general reporting platform with analytical capability to serve as a foundation for the consolidation of enterprise data. This foundation also supported future reporting requirements and additional data sources, and it standardized technologies across the board with repeatable processes. This provided the Company with a long-term flexible, scalable and maintainable reporting/ analytical solution and decision support system.

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