Early Success Stories with Teradata Analytics for SAP® Solutions
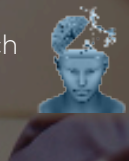
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Executive Summary

The SAP System originated in the 1980's, a time when IT organizations struggled with scarce, expensive resources and a patchwork of homegrown and purchased point applications. SAP was unique and caught fire in the US in the 1990's due to a combination of Business Process Reengineering fervor and Y2K remediation. Today, over 80% of the Forbes Global 2000 organizations use SAP Enterprise Resource Planning (ERP), renamed to SAP ECC. The SAP ERP solution delivered an integrated set of modules for running an entire organization. The functional reach of SAP's suite of software solutions[1] is vast. No other software company offers support for such a comprehensive range of business process and transactional functionality. However, all of that capability comes with a price—complexity.

In order to provide a solution that can be configured for all types of organizations, the SAP design includes layers of abstraction and business rules buried in the data model and the application code. While using relational databases to manage the data, there are thousands of tables and many of them break good relational design principles, for reason of performance and perhaps to prevent direct access to the data. As a result, it is extremely difficult to read and extract data from SAP. SAP provides tools but they are difficult to use (over 10,000 API's) and require proprietary tools and languages. All of this leads to complexity and latency (cycle time for extraction to another platform).

The SAP system leaves organizations desiring a good solution for reporting, analytics and leveraging the latent value of the data settling in the SAP databases. Data integration is particularly challenging, not only with non-SAP data, but across multiple instances of SAP. According to a survey conducted in November 2015 by Teradata in conjunction with Gatepoint Research[2], only 25% of SAP customers surveyed implemented SAP as a single instance. Multi-instance integration is another problem. Even SAP's reporting application, BW, cannot directly integrate data across instances.

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The SAP ERP system was not designed to leverage the "operational exhaust," data managed in the business processes. Structurally, its transactional processing does not lend itself to analytical processes, requiring, of necessity, extracting and remodeling data to other structures to provide reasonable performance. Unfortunately, in doing so, lowest level detail data is scrubbed and summarized because the volume and complexity of the data overwhelms the SAP resources. This clearly calls for a better solution. To summarize, sourcing data from SAP has a number of complexities:

- The underlying reference model of SAP, which is vast, and spans many different modules
- The ability to develop code in the proprietary language, ABAP
- Understanding the functions of the application interfaces (BAPI in SAP parlance, and there are over 10,000 of them)
- The functional knowledge of the business processes themselves.

Teradata Analytics for SAP® Solutions (TAS) is specifically designed for leveraging SAP ERP data by reaching deep into the SAP data, extracting and loading the data into pre-designed schema by subject and integrating the data sources both within and external to the organization. It includes the flexibility to present and integrate data from multiple SAP systems and non-SAP systems. It has been designed to be rapidly implemented and can be extended to match changing business requirements. TAS gives business users an enterprise view enabling them to make insightful decisions quickly and gain a competitive advantage. It is also extremely fast. The end-to-end process of extraction from SAP to loading into structures ready to go in Teradata can be measured in minutes.

Teradata provides an effective solution for SAP customers by removing the complexity of integrating SAP data into a data warehouse, directly from SAP. The purpose of this paper is to highlight the experience of a number of organizations and their early success with TAS.

Teradata's Better Solution for SAP Data Warehousing

SAP's current approach to data warehousing is to port their proprietary data warehouse solution, BW, to SAP's in-memory HANA platform. While it can speed up some processes, it is an expensive proposition, not nearly scalable enough for many organizations and does not deal with the many shortcomings:

- Expensive to license and to implement.
- Monitoring and management of the utility will be distributed between HANA, Business Objects and other tools.
- No guided process for developing models. Requires self-discipline to develop and adhere to development standards and best practices.
- Hierarchy functionality requires IT support and cannot be maintained by end users like in BW.
- BW has very easy and versatile functionality for currency conversion and Units of Measure conversion (especially using material alternate unit of measures of SAP ERP). Implementation in HANA is not that flexible yet.

In fact, the Teradata and Gatepoint Research survey showed that only 8% of respondents said they would be moving to HANA, while 19% were skeptical and 70% were going to wait and see. Re-platforming a solution on faster

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hardware rarely solves the problems of scale, concurrency, inflexibility and lack of transparency. Access to BW would still require all of the proprietary tools SAP provides for BW on conventional relational databases, some of which are not yet certified for HANA.

Keep in mind that the SAP system sacrificed simplicity and transparency in its design for performance. Accessing the SAP tables directly tended to degrade what was already marginal performance. As a result, SAP developed its own data warehouse product to satisfy the needs of their customers that weren't met with SAP ERP/CRM. Most SAP customers adopted BW, but many found it only satisfied a portion of their needs. A common drawback in an application vendor-supplied data warehouse solution is the need for integration of data across multiple SAP ERP modules and from other sources, such as internal applications from other vendors and external data from data and service providers, social networks, customers, suppliers and other critical participants in the operation of the organization. In fact, many large organizations have multiple instances of SAP, each with their own implementation of BW. SAP customers typically have large investments in separate data warehouses and data. This is especially true where there is a substantial amount of non-SAP data

involved. In those cases, organizations are more likely to opt for analytical solutions that can access and process from multiple sources, including SAP. BW also lacks transparency and can only be accessed with proprietary SAP tools. Its performance is widely derided for high latency and complexity.

Teradata takes another approach leveraging the Teradata Integrated Data Warehouse (IDW), proven technology designed for high-speed analytics on massive volumes of data as the core analytic infrastructure. TAS employs an architecture to simplify the process of creating a data warehouse from ANY SAP data—ERP, BW or other modules.

This is a simplified model of the TAS architecture. SAP data (principally ERP data, as BW data is derived from this source, but it is possible to extract the data from BW as well, particularly those elements that serve reporting and are not present in the ERP data). The data extractors of TAS are able to cut through the layers of abstraction and indirection in the SAP model and bring data into a staging area where data can be harmonized and merged from multiple SAP instances and other non SAP data, including your existing data warehouses and data marts.
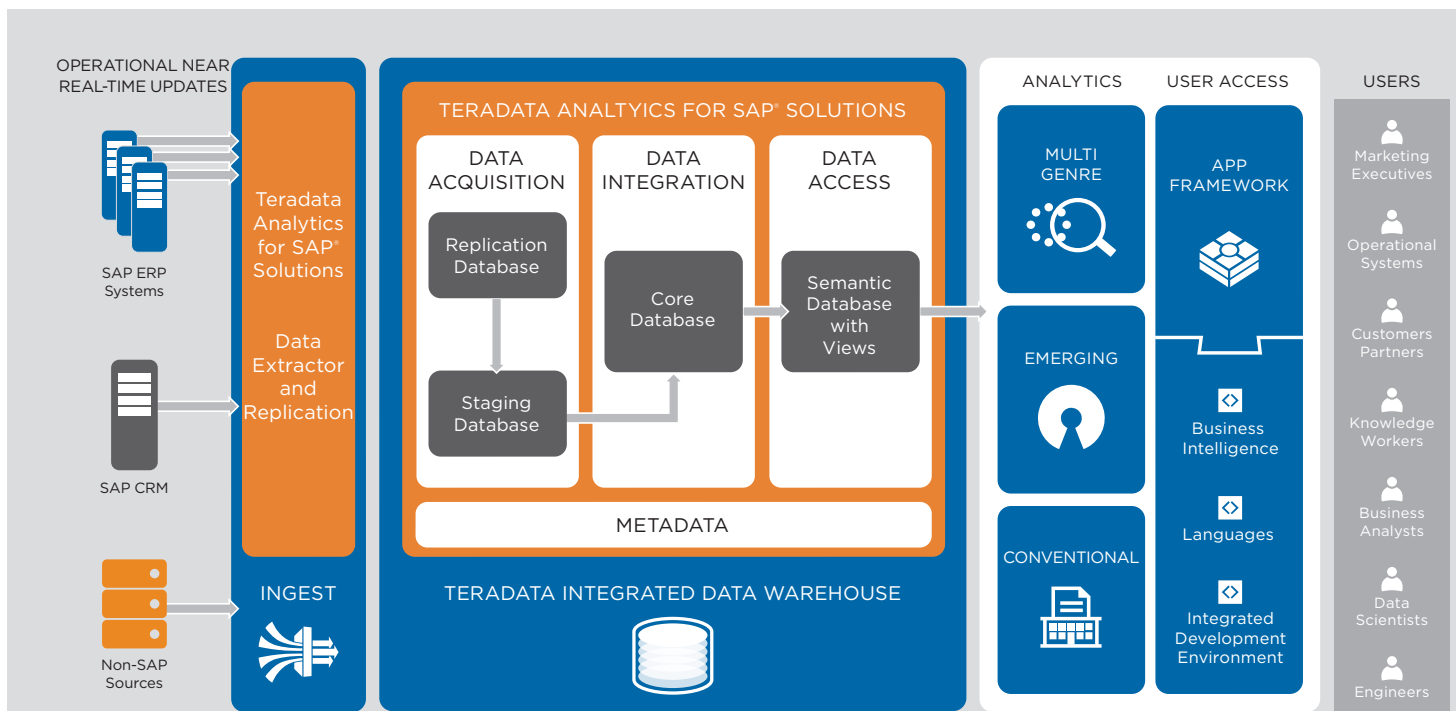

Figure 1. Teradata Analytics for SAP Solutions integrates SAP and non-SAP data and provides access to enterprise users.

Some of the benefits provided by TAS are:

- Implemented in days, not months because integration is prebuilt.
- Optimized for the Teradata data warehouse.
- Includes prebuilt Extract, Transform, and Load (ETL) data flows implemented in data integration software.
- Provides prebuilt SAP data mappings, change data capture logic, and data models to extract data from SAP financial, logistics, manufacturing, human resources and sales modules.

The real benefit to the users of TAS is to provide the means to mobilize the data resources of the SAP system without the complexity and cost of SAP. TAS has minimal effect on the performance of SAP and providing the analytics and reporting in the EDW removes a great deal of processing from the SAP system.

Case Studies of TAS Early Adopters

The case studies described here are mostly in the early stages. All of them, though, are past the POC stage and executing in production. Expansion of the breadth and scale of TAS implementations is planned in all of them, but clear benefits are already realized.

Largest Independent Energy Company

This company is a multinational energy corporation that explores, produces, transports and markets crude oil, bitumen, natural gas, liquefied natural gas (LNG) and natural gas liquids. The company operates through six operating segments, which are primarily defined by geographic region: Alaska, Lower 48, Canada, Europe, Asia Pacific and Middle East, and Other International. They explore, develop, and produce crude oil and natural gas globally with a strong commitment to safety and operating excellence.

Issues Faced

The primary motivation was to continually improve safety, reliability, and maintenance and decrease lifting costs in production operations. Lack of visibility to timely, detailed equipment data around the world was leading to increased maintenance costs and well downtime, decrease in production and higher lifting costs. The complexity of the SAP ERP with over 90,000 tables, a proprietary interface, and over 10,000 SAP BW cubes led to expensive and timely projects that were not meeting the business needs.

This called for a transformation from doing scheduled maintenance to more cost effective condition based maintenance. Detail information in various SAP modules such as work orders for scheduled maintenance, project controls, time sheets and a host of other detailed operational data was combined with non-SAP data including sensor data flowing from wells, systems such as SCADA and well information. The company initially attempted to implement this solution with SAP BW, however after 8 years of effort, they were unable to generate the analysis required and maintenance cost continued to rise.

Solution

The company leveraged Teradata IDW as a foundation to integrate data from the various sources. TAS was implemented to extract, load, reconcile and transform data from SAP ERP into the data warehouse within 15-minute increments. Previously, data was integrated during nightly batch windows. Now they were able to move to a near real-time data integration model to base decisions on current data for accuracy and identify trends in a volatile market. The company decided to expand the scope of the project to include financial data, which allows the company to be more proactive managing their portfolio of assets.

The company achieved a Maintenance Planning solution with Teradata that enabled them to effectively monitor:

- Safety Critical Equipment
- Production Impact Equipment
- HSE Regulatory Deadlines

The implementation was fast, delivering high value, easily accessible data and analysis. In just two days the team was accessing detailed data that was never provided by SAP BW. TAS identified the 400 relevant tables for business reporting and analysis that resulted in increased equipment availability and reduced maintenance costs by dynamically adapting maintenance activities based on current asset condition.

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Impact So Far/Next Steps

The company achieved the goal of providing visibility into all maintenance programs and the ability to drill down into the full history of maintenance that was performed on the equipment. This provided additional benefits of identifying all work orders, know faults and well deviations and integrating that data from sensors provided increased well integrity.

Now the company can:

- Combine maintenance activity, which decreased the number of trips that are needed to the well site
- Ensure that production impact and safety critical equipment have a higher maintenance priority
- Monitor all maintenance systems for regulatory compliance.

Using TAS for Maintenance Planning increased equipment availability and reduced maintenance costs by dynamically adapting maintenance activities based on operating parameters provided by the SCADA system. This enabled better operational and maintenance planning and optimized scheduled maintenance downtime.

Major Contractor

This major contractor specializes in construction, engineering and mining services for the government, transportation, power, water and other sectors throughout North America. The company has construction projects all over the world, including dam, mines, refineries, interstate highway reconstruction and oil platforms.

The company sees the application of technology as a differentiator from their competitors. The technology challenges are complex including telematics and what is now referred to as IoT (Internet of Things) for monitoring utilization of capital, labor, equipment and maintenance. With thousands of pieces of heavy equipment and complex timing of projects steps, only an IDW can provide the scale and workload management they need for near real-time input, update and query.

Issues Faced

Effective management of multiple billion-dollar mega-projects requires a complete understanding of each project's bid value and profitability. Essentially, the company needs access to the current state of all aspects of the project to mitigate risk and maximize profitability. To analyze the bid value, the company needs information from multiple sources including equipment rental, raw materials, labor costs and location, combined with key learning experiences from past similar projects.

Unfortunately, the company's current system was unable to deliver on an agile process and integrated view of the business. SAP ERP and CRM and were not designed for large-scale construction companies, and required a fair amount of customization and complexity to the application logic across multiple systems (SAP and non-SAP). Audit trails in reporting required manual reconciliation with pre-defined reports, which was especially difficult at month-end closing when report requests took hours (or even days) to compile and complete.

Beyond the efficient execution of massive projects, the company also needed to know what projects to bid on and how to structure the bids. Understanding the profitability of each project is key, and requires data from many sources. The SAP implementation was functioning solely in operational mode and bringing data together with other systems made analytics and reporting difficult and time consuming, if not impossible. When bidding on projects on the scale the company operates, the difference between being profitable and losing millions rests on the razor's edge.

Solution

The company chose TAS to integrate a complete set of detail data from multiple sources including SAP ERP in a near real-time Teradata Enterprise Data Warehouse (EDW). The data within the EDW was temporal, meaning the data warehouse was "time-aware" allowing the users to easily go back in time to view and analyze the state of their project or business. This provided new capability, something that they were unable to do before.

Impact So Far/Next Steps

As a result of implementing TAS, the company was able to analyze current data to proactively prevent problems instead of reacting to problems. They were able to generate cost reports on-demand based on the current state of their business and "roll-back" the data warehouse to any point in time for a comparison and auditing. Tasks that once took hours and days to run are now generated on-demand for executive reporting and business decisions.

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Multinational Manufacturing Conglomerate

This multinational manufacturing conglomerate is part of the Fortune 100 list, and sells directly to users and through numerous wholesalers, retailers, distributors, and dealers worldwide.

Issues Faced

In 2009, this company started the journey to converge its various ERP supply chain solutions into a single SAP system. The team began by converting its financial models into SAP BW but quickly found that they could not meet the sales, marketing and financial reporting SLA (Service Level Agreements) due to data integration challenges. Reconciling data silos and redundant data was extremely difficult and time consuming and they encountered problems in the operation of some business processes, such as orders stuck in the system.

In addition, the company identified that once the rollout of SAP to all locations was complete, the amount of data would overwhelm SAP's ability to provide analytics and application development of hybrid systems. The first phase rollout of Business Intelligence (BI) severely struggled and the team did not want to repeat that in later phases.

Solutions

As a longtime user of Teradata's IDW for many of its analytical and Business Intelligence needs, the company saw an opportunity to leverage TAS to mitigate their data integration challenges. TAS offered a seamless solution for reconciling and integrating detailed data from SAP into their Teradata IDW. By accessing the detailed transactional SAP data, as well as reference data more frequently, analysts are able to quickly reconcile the anomalies in the FI module and feed the corrected entries back to the operational systems.

Impact So Far/Next Steps

TAS quickly solved a major problem for the first business segment that went live with SAP. It also demonstrated how fast it was to implement and to load, leading to faster responses on business critical questions. For example, one of the company's implementations extracted 20 million records from SAP ERP and loaded into Teradata in two to three minutes.

Before implementing TAS, SAP BW and HANA would take a day's worth of work to add additional columns, and six to eight week delivery timeframe. In TAS, the amount of work was reduced to two to three hours, and would have the change in production within days. TAS enabled the company to meet its client-reporting request, and as a result, is able to make better-informed decisions for optimal business decisions yielding higher margins and lowering cost.

International Leader in the Frozen Food Industry

This company is a multi-national company established employing more than 17,000 people with global sales of about $9 billion CDN. The company operates across six continents with 41 sites, working with 3,200 farmers and uses 6.5 million tons of potatoes every year.

Products can be found in thousands of restaurants and supermarket freezers in more than 160 countries. In fact, one in every three french fries in the world is this company's fry. In addition to fries, the company also produces other foods, including pizza, appetizers, oven meals and vegetables for both the retail and foodservice industries.

Issues Faced

The month-end and quarter-end financial closing process across 18 international units was a major challenge that required reconciling and consolidating data across multiple time zones. Time was of the essence, however rolling up month-end data across the global time zones into their Business Planning and Consolidation (BPC) application took about six days to complete. This is primarily because the amount of data and complexity of the models was overwhelming the upper limits of SAP analytics (BW predominately) causing very long running nightly data loads. And as financial adjustments were made, it took the current system over six hours before the changes were reflected in the aggregated reports. The financial team was challenged to reduce the month-end close process from six days to three days.

Solution

Working with Teradata, the company implemented TAS data replication, which enabled them to extract financial data directly from the ERP system into Teradata in near real-time. The calculations were performed directly in Teradata, reducing the six-hour updates down to a

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15-minute cadence, allowing financial adjustments to be made as needed before the reconciled data is pushed into the BPC application.

Impact to So Far/Next Steps

The monthly close process is the benefactor of the first phase of the project with close times having improved tremendously throughout the month, especially at month end, reducing time from six hours per iteration to 15 minutes. With TAS, the company is able to far exceed its goal by reducing the overall month-end close process from six days down to only three to four days.

Going forward, beyond the BPC application, TAS is currently being expanded to address: procurement; supply chain; sales and more financial subject areas. The organization has purchased 16 TAS Modules to work with their single global instance of SAP ERP and their single global instance of Teradata IDW. Five to seven years of historical data will be integrated with data flowing from third-party systems, SAP, and many types of sensor devices.

Sustainable Agriculture Company

This company is a $13.5 billion Fortune 500 company that provides agricultural products for farmers worldwide. It operates in two segments: Seeds and Genomics, and Agricultural Productivity. The Seeds and Genomics segment produces row crop seeds, including corn, soybean, cotton, canola seeds and many others. This segment also develops biotechnology traits that assist farmers in controlling insects and weeds in corn, cotton, and soybean crops. The Agricultural Productivity segment manufactures and sells herbicides for agricultural, industrial, ornamental, turf, and residential lawn and garden applications for weed control. The company sells its products through distributors, independent retailers and dealers, agricultural cooperatives, plant raisers, and agents, as well as directly to farmers.

Issues Faced

The company set out to improve its use of data for analytical purposes and had three main goals: using advanced analytics to transition from intuitive to analytical decision making; shifting from report creation to operational BI (acting on information as opposed to presenting in a dashboard); and third, building a repository of key information.

The company is a scientific company, and very experimental in nature, leading to teams preferring to do their own work, creating silos and, at worse, duplication and inefficiency. In addition, the legacy system was updated with large volumes of data from its ERP system and experienced severe performance problems managing the volume of transactional data. The company was also experiencing performance problems with refreshing the downstream data marts. It needed a reliable Decision Support Repository (DSR) system that could be updated more frequently and to be able to eliminate the downstream data marts.

Solution

The company initially selected other software to pull detail from its ERP system, but experienced limitations with SAP's cluster and pooled tables, so it brought in TAS. Leveraging its capabilities for near real-time, the Teradata team made adjustments so TAS could replicate cluster and pooled tables and convert the binary fields into a relational format for direct and fast import into the Teradata EDW. The solution enables growth with higher transaction volume support and the elimination of many downstream data marts. It also removed redundant steps and hardware, simplifying the ETL processes.

Impact So Far/Next Steps

Leveraging Teradata, the company is able to integrate data for both direct and indirect sales channels across brands, into one consolidated customer analytics environment. Additionally, the company established a supply chain traceability process from crop grower to customer, which traces the lineage of batches through internal ERP processes at the plant. This process has changed the way analysts look at quality data and score the company's suppliers. The company also used these tools to build a cost management reporting capability for their row crop division, which provides views at both the global and regional levels. This solution enables continuous visibility into process and production costs through the integration of timely data, while also aligning costing processes globally.

Overall, the company is able to deliver critical data to decision makers much more quickly (less than two hours, as opposed to daily). The internal dependency tools that have now been put in place provide a central data model that allows the customer to measure and reuse cycles, saving approximately $6M in IT work.

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European Retailer

This retailer is a privately held Dutch retailer, offering house-hold, toys and living products via 2,800 stores across eight European countries. The company has 15 different brands that include products from toys to cookware. Prior to leveraging TAS, each brand was managed independently with its own IT, BI and data warehouse infrastructure, in the way it developed processed, maintained legacy systems, and made independent business decisions across finance, sales, supply chain and general operations.

Issues Faced
In an effort to create an integrated view on data for purchasing and sales, the company adopted a corporate strategy to manage data in a centralized system using a single IT department to create synergy across all commercial brands, share services, and ultimately increase business efficiency and lower costs. This meant replacing the existing various ERP solutions with SAP ERP, as the company's single ERP system for all 15 different brands. To help facilitate this, the company also implemented TAS, Informatica and MicroStrategy.

The company focused on maintaining business agility for sales and margin analysis by providing access to trans-actional level data from their new SAP ERP system. The work was estimated at more than 400 days of effort per source system, equating to roughly 25 months of effort.

Underestimating the complexity of the SAP ERP, the company spent the first six months developing its own SAP integration solution. With little to show, the company recognized the risk and stopped the project. Next, it consulted with a systems integration firm who provided a 400-day integration estimate per brand. The company needed a better, faster way to integrate ERP data into the Teradata IDW.

Solution
The company partnered with Teradata to implement TAS to provide an automated approach for integrating SAP ERP data, enabling the company to load data required for the first brand in five days, instead of 400. Once this framework was developed, integration using TAS was simple and repeatable. The company also developed a standard data governance approach to ensure data integrity that extended beyond the implementation process so that business and technical users understand how they can apply data for reports and analytics. TAS was also customized to handle SAP ERP retail specifics within the project timeline.

Impact So Far/Next Steps
The company's goal was to provide a repeatable implementation strategy across their brands to enable better business decisions, improve business efficiencies and lower operating costs through IT centralization. Although it is still in the early phases of this project, the company has already learned from the implementation of integrating the first brand into the Teradata IDW. According to the architect at the European retailer, "TAS is a fast and flexible integrated solution, offering lower project risk, faster development, an integrated semantic model and direct access to detailed data."

TAS provided the customer with a fast way of integrating SAP ERP retail data into the Teradata EDW, and provided them with the capabilities and framework to enrich the SAP data with other relevant data sources like Point of Sale (POS), Master Data Management (MDM) and Warehouse Management System (WMS) data. This integrated view of the data provides the customer the information required to make the appropriate business decisions at the right time.

Dutch Loyalty Management Company

This company provides loyalty management services for a coalition of companies from airlines to gas stations. The company provides the largest reward program in Holland with millions of members who earn and redeem posts for products they purchased.

Issues Faced
The loyalty program started to decline with loses of membership and drop of prominent sponsors, which precipitated an evolution of their loyalty program. The company shifted from using the same approach for all brands based on points and miles to a more dynamic approach of link rewards to the brand experience that provided real customer value. This requires a much more dynamic approach to understanding customer relationships and management including customer segmentation based on value and customer sentiment analysis.

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Solution

The company implemented a SAP CRM solution to track all customer account transactions and movement. The system required a strict SLA with maximum availability; hence it was not suited for marketing automation operations. The company needed a centralized data warehouse with near real-time data replication from their SAP CRM system without disrupting performance of their CRM system. Teradata provided an IDW for customer analytics and provided a bridge to the SAP CRM solution with TAS, with near real-time data replication. Now the marketing analyst can rely on a complete view of customers, up-to-the minute analysis and marketing optimization.

Impact So Far/Next Steps

The changes implemented through the Teradata IDW, TAS and SAP CRM helped customize loyalty programs for the brand, increase usage and growth of their business. In the next 18 months, the company will invest more in analytics to use the data in new and different ways to increase value to both brand owners and members.

Conclusion

Organizations today need to leverage every bit of information they can manage, in the forms that suit them, when they need it. Packaged data warehousing with SAP was a success only within the limits of how SAP defined data warehousing. Today, the term 'data warehouse' encompasses a very wide variety of architectures, methodologies and solutions. The one problem that is never completely solved is how to capture and harmonize data. That problem is now greater than ever and highlights the need for TAS in the ever-growing, complex world companies continually strive to stay on top of.

Success is common among the customer cases outlined in this paper based on the ability of TAS to quickly and flexibly provide data directly from SAP ECC into a format that is easily integrated and analysis ready. Each of these customers had massive amounts of data from one or more complex SAP data sources and had difficulty getting to the required decision data quickly, effectively and efficiently. TAS was able to overcome these existing roadblocks to provide millions of dollars of savings (per customer!) on existing IT projects and resulting business decisions.

TAS gives SAP customers a vastly more performant, simplified and useful analytical application. These customers will also be served by a very large professional services organization from Teradata that is focused on one and only one pursuit, integrated data warehousing and business-driven analytics.

Endnotes

1. For the sake of brevity, this paper refers primarily to SAP's ERP and CRM products, not it's entire Business Suite and other products and services

2. "Analytic strategies for SAP ERP & CRM" by Teradata and Gatepoint Research, 1 Nov 2015

About the Author

Neil Raden, based in Santa Fe, NM, is an active consultant and widely published author and speaker and also the founder of Hired Brains Research, **Hiredbrains.com**. Hired Brains provides thought leadership, context and advisory consulting and implementation services in Information Management, Business Intelligence/Analytics and Data Science for clients worldwide. Hired Brains also provides consulting, market research, product marketing and advisory services to the software industry.

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