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Executive Overview

Data warehouses have evolved to support more than just strategic reporting, analytics, and forecasting. Today, companies are investing significant resources to integrate valuable information contained in their data warehouse into their day-to-day operations. Incorporating business intelligence into operational decision making enables these organizations to optimize business performance throughout the day. However, to achieve these efficiencies, data must be provided in real time.

Why is real-time data so crucial? To support operational users and influence what should happen next, the enterprise data warehouse needs to know what is happening right now. There are many data integration technologies that serve the data acquisition needs of a data warehouse, and the demand for low-latency data is causing IT organizations to evaluate a range of approaches: intraday batch extract, transform, and load (ETL) processes; minibatches; enterprise application integration (EAI); extract, load, and transform (ELT) technologies; as well as real-time change data capture (CDC) techniques. The challenge is to determine what solution or combination of solutions will meet the need for current data, which will propel the move to operational data warehousing.

This white paper addresses the business reasons to move to operational data warehousing and describes some of the common data integration approaches, with an emphasis on using real-time CDC capabilities to support operational users.
Why Real-Time Data for the Data Warehouse

Business time is increasingly moving toward real time. As organizations look to grow their competitive advantage, they are trying to uncover opportunities to capture and respond to business events faster and more rigorously than ever. Today, the majority of competitive advantage comes from the effective use of IT. Therefore, from that standpoint, the key to achieving faster and accurate business intelligence (BI) is a robust enterprise data warehouse combined with an enterprise analytics framework.

Across the enterprise, each facet of the business gathers data through an assortment of activities, and many organizations now deliver this data to a central data warehouse—where the data is captured, aggregated, analyzed, and leveraged to improve decision making. The quality of these decisions depends not only on the sophistication level of the analytics applications that run on the data warehouse, but also on the underlying data. Data has to be complete, accurate, and trusted. For that reason, it has to be timely: timely data ensures better-informed decisions.

The lifecycle of a data record through enterprise analytics starts with the capture of a business event in a data repository such as a database. Data acquisition technologies deliver the event record to the data warehouse. Analytical processing helps turn the data into information, and a business decision leads to a corresponding action.

To approach real time, the duration between the event and its consequent action needs to be minimized. As outlined in Figure 1, the initial data acquisition and delivery to the warehouse introduces the majority of the latency.

![Figure 1](image)

*Figure 1. The longer it takes to capture and process data, the lower the value of the information.*

Leading industry analysts have recently reported on this trend for BI and data warehousing based on the clear value achieved by companies that have deployed real-time capabilities. For example, in its *TDWI Best Practices Report Operational Data Warehousing (Q4 2010)* by Phillip Rasson, TDWI noted that
“Embracing operational data warehousing and similar technologies and practices can change how you do business by giving you many more options for dealing with time-sensitive business events. Quick reactions are increasingly required and expected of enterprises, as the pace of your business—and your competitor’s business—accelerates”. They also explain the importance of real-time data for operational data warehousing: “Why the rush to real-time data warehousing? Because real-time data transfers from operational applications to data warehouses are a fundamental part of operational data warehousing (OpDW).” Similarly, in its 2009 Update: Evaluating Integration Alternatives report, Forrester stated that “today’s complex data integration requirements demand higher-quality data and more-robust metadata and audit ability, with service level agreements (SLAs) requiring data delivery ranging from nightly batching to real-time services across heterogeneous IT ecosystems. To accommodate these changing needs, ETL software vendors have expanded their portfolios to include stronger metadata management, integrated data quality and profiling, as well as real-time data integration techniques including CDC and data federation.”

The Data Warehouse Evolution to Operational Decision Support for Front-Line Users

Traditional data warehouses have focused on support for strategic BI—a resource for the small group of analysts and decision makers engaged in strategic planning that affects time horizons of months or years. Today, more and more companies maximize the value and competitive advantage of their data warehouse by using it in an operational role, adding mission-critical decision support to their workload. This new capability is referred to as operational BI. See Figure 2.

<table>
<thead>
<tr>
<th>Strategic BI</th>
<th>Operational BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business focus</td>
<td>Manage and optimize daily business operations</td>
</tr>
<tr>
<td>Primary users</td>
<td>LOB managers, front-line employees, operational systems</td>
</tr>
<tr>
<td>Timeframe</td>
<td>Intra-day</td>
</tr>
<tr>
<td>Use model</td>
<td>Event-driven</td>
</tr>
<tr>
<td>Data</td>
<td>Real-time, low-latency &amp; historical data</td>
</tr>
<tr>
<td></td>
<td>Historical metrics</td>
</tr>
</tbody>
</table>

Based on Claudia Imhoff’s “Differences between strategic, tactical and operational BI”.

Figure 2. Data warehouses have moved beyond strategic planning into the realm of operational resources.
Long-term strategic decision making could be based on historical metrics derived from day-old or week-old data. In today’s competitive business world, companies need to see ROI from their data warehouse and BI investments, not just in strategic planning but also in operational decision making. Particularly, front-line employees can provide more-responsive service and create efficiencies in their business functions if they have the most up-to-date information possible. By combining historical data with ongoing operational data, operational data warehouses enable a much-larger population of business users to make more-informed, proactive decisions.

**ROI Drivers for Using Real-Time Data in Data Warehousing**

In operational data warehousing, the closer the warehouse is to real-time information, the more actionable it becomes for front-line users. These users need relevant information on what is happening right now and selected historical enterprise data as the organizational memory, to determine and influence what should happen next. For example, a retail store manager can respond to a sudden external event such as a snowstorm more proactively with up-to-the-minute inventory and pricing data than a competitor relying on yesterday’s news.

The enterprise data warehouse helps personnel make excellent “small decisions” that collectively enhance competitive advantage in line with business strategy. For example:

- Should I expedite this package based on the criteria I see here?
- Should I extend a special offer or up-sell to this customer at this moment?
- Should I change our current marketing campaign based on this morning’s results?

There are various business areas real-time information can be leveraged to gain competitive advantage. Here are the top 5 areas where you can expect a difference in customer experience, or in operational efficiency, or both.

**Customer Service**

By using up-to-the-minute data businesses gain a complete, up-to-date view of the customer, including customers’ most recent activity on the company’s website or the latest status of a service ticket they submitted. When the customer contacts the company, the service team has the information to handle their request fast and effectively.

In addition, nowadays companies need to provide up-to-date information to their customer via customer portals. By updating customer portals with real-time data from back-end systems, companies can offer accurate information to their customers on the Web. This, in return, decreases the number of calls customers make to access, confirm, or correct information about their account, resulting in operational cost savings for the company.
Targeted Marketing

Up-to-date information about customers also enables personalized, targeted campaigns when the customer is ready to engage with you. Several industry leaders use real-time information to offer personalized promotions to their customers considering the issue they are contacting the company for. The result they see is higher acceptance of promotional offers, since the offer is relevant to customers’ current issue and the customer is already in contact with the company.

Campaign Optimization

The sooner the marketing team sees the results of their ongoing campaign, the sooner they can adjust their promotion and increase their return on the campaign effort. This capability enables to optimize marketing budget and achieve campaign targets faster. For example, in the retail industry companies use real-time data integration to gather store data from regional locations back to headquarters. They use the data for timely comparisons of stores’ results and improve the way they execute their promotions.

Fraud Detection

Similar to above, the earlier a risky transaction is identified; the earlier it can be stopped; preventing further loss. For this reason, many leading organizations in financial services and telecommunication industries maximize ROI on their fraud detection systems by bringing the data from transactional systems in lowest latency possible.

Workforce optimization

For service-based businesses, optimizing human resources and where they are performing their job can not only improve customer experience but also minimize labor cost. For example, in field service operations employees’ schedules can easily change throughout the day due to external circumstances, such as traffic, or customer demand. Real-time data integration allows the resource planning applications to factor in the dynamically changing events to provide the most efficient schedule and workforce distribution to service the customers.

Business intelligence for operational execution drives tangible benefits many other areas including in supply chain visibility. Users numbering in the hundreds to tens of thousands can benefit from the timely information: gate agents, cashiers, dock workers, bank tellers, salespersons, customer service/call center agents, customers, and suppliers. Ultimately, incorporating BI into operations facilitates automation, which improves efficiency. Using real-time data feeds, data warehouses can trigger business actions to automate more and more of these decisions based on predefined business rules.
High Availability and the Operational Data Warehouse

Because the operational data warehouse previously described is intricately woven into business operations, the highest level of availability is required for the data warehouse to support 24/7 operational decision making. Any downtime—planned or unplanned—now directly affects the business processes it supports. The underlying database must, therefore, support features at all levels to maximize availability in case of unplanned outages, such as hardware or software failures, and planned outages, such as database and application upgrade cycles. The data warehouse should also prevent data loss that typically happens due to user or application errors. These new requirements call for a significant shift in how enterprises think about data warehouses.

Data Integration Approaches for Operational Data Warehousing

There are numerous technologies that serve data acquisition needs. One of the biggest differentiators among these solutions is the speed of data capture and delivery, as well as impact on the source systems. Only a few offer real-time data delivery with low system impact and no reliance on batch windows. Choosing the right solution requires a comprehensive understanding of organizational data requirements, including

- Data volume (size of data and number of updates)
- Date movement frequency
- Data integrity
- Transformation requirements
- Outage windows required/impact on business continuity (batch windows)

To clarify a common misconception, some data acquisition technologies often refer to “right-time” BI. Right time refers to the needs of the end users in accessing intelligence and can be different across different use cases. The need for data latency also changes over time. Which data latency users need today may change in the next year or few months, depending on the projects and new business initiatives. For operational data warehousing, the underlying technology infrastructure should deliver real-time data integration capabilities and let the business user choose the right time to access the data.

Traditional Data Integration Approaches

Traditional data acquisition approaches include scripting, ETL, EAI, and real-time CDC. Scripts and ETL are batch oriented in data delivery, whereas EAI and real-time, log-based CDC support continuous data capture.

In Figure 3 you can see the comparison of these different approaches with respect to different data architecture requirements.
COMPARISON OF DIFFERENT DATA ACQUISITION APPROACHES

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>SCRIPTS</th>
<th>ETL</th>
<th>EAI</th>
<th>LOG-BASED CDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data volume</td>
<td>Medium</td>
<td>Very high</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>Intermittent</td>
<td>Continuous</td>
<td>Intermittent or continuous</td>
</tr>
<tr>
<td>Latency</td>
<td>Medium to high</td>
<td>Medium to high</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Transactional integrity</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Varies by offering</td>
</tr>
<tr>
<td>Transformations</td>
<td>Intermediate</td>
<td>Advanced</td>
<td>Basic</td>
<td>Basic</td>
</tr>
<tr>
<td>Processing overhead</td>
<td>Intermittently high</td>
<td>Intermittently high</td>
<td>Continuous and medium</td>
<td>Continuous and low</td>
</tr>
<tr>
<td>Batch window</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Figure 3: Comparison of different data acquisition methods for major criteria

Scripts

Scripts are flexible and economical to develop, and almost every operating system can invoke scripts from their built-in scheduling facilities. However, scripts pose many challenges, such as being a drain on developer resource time and effort, as well as administrative challenges, such as manageability, documentation, and service-level agreement compliance.

Extract, Transform, and Load

ETL can be an ideal solution for the bulk movement of large volumes of data. Packaged ETL products also offer advanced transformation capabilities. As for data acquisition, ETL tasks are executed intermittently—typically during nightly maintenance windows when the data sources are quiesced, to ensure that data sources don’t change during data acquisition and lead to inconsistencies across online transaction processing (OLTP) systems and the data warehouse.

To decrease data latency, some ETL products can perform—or be customized for—CDC capabilities. To support this configuration, for the most part ETL tools must store additional data in source tables, such as time stamps, to identify changed data since the last query. Most databases were not designed...
for such accommodations, and making changes to the database schema can create issues for the source applications. Such configurations could also place a burden on production systems, because complex queries would need to be run frequently across the whole database to identify changes. Further, capturing changed data with these systems does not necessarily lead to delivering data in real time. Typically with these solutions, the changed data is still staged on the ETL server, and eventually batch loaded into the target warehouse.

It is important to note that, in general, acceptable batch windows for business-critical systems are shrinking. Significant growth in transactional data in OLTP systems, combined with the need to keep those systems and the operational data warehouse highly available at or near 24/7, leaves little to no time to allocate the batch window. At some point, a different data integration approach must be considered. Running several batch loads per day, such as minibatches or intraday batches, in an attempt to increase the frequency of refreshing the enterprise data warehouse, means overhead and business interruption trade-offs while never truly achieving a real-time infrastructure.

**Enterprise Application Integration**

Originally designed and intended for application integration, EAI solutions have evolved into a real-time data integration solution. EAI solutions continuously deliver data between source and target systems, provide fast data delivery, feature advanced workflow support, and facilitate basic data transformations. However, EAI imposes data volume constraints because these systems were designed to integrate applications, not data. EAI is designed to invoke applications and move instructions and messages and is an intrusive method for moving data from source systems. Nevertheless, with its ability to move data in real time, EAI solutions can support low-data volume environments for operational data warehousing needs.

**Change Data Capture and Delivery**

CDC technologies identify and capture changes made to enterprise data sources, and then deliver those changes to target systems. As with other technology categories, not all CDC solutions are created equal. That is, not all are low impact or transaction aware. And the available offerings differ in terms of the overall solution overhead, latency, scalability, flexibility, data integrity, and recoverability. Although log-based CDC eliminates the batch window and heavy overhead on the source and provides data in subseconds, some CDC solutions still operate end to end in batch mode where an ETL product “pulls,” or requests, periodically to receive a batch of all new changes made since the last request, and then performs transformations on batch data before loading the target system.

Real-time CDC solutions offer a continuous streaming, or “push,” approach to delivering data. With such solutions, data changes are captured as they occur, and are then immediately pushed to the target data warehouse or the ETL system for performing the transformation. Total latency can be brought down to minutes or even seconds, making that data near-instantly available to drive operational BI and
Data Integration Architectures for Operational Data Warehousing

reporting. The real-time CDC solutions that capture the changed data from the database transaction logs do not impact the performance on the source systems, unlike offerings that use database triggers or table scanning.

Data Transformations—Where Do They Belong?

As data warehouses evolve and become more operational with the benefit of real-time data feeds, the requirements for transforming the data have also changed. As previously described, in traditional data warehousing, data acquisition tends to be batch oriented. Data moves between relational and multidimensional structures, and typically most of the transformations are handled on the chosen ETL engine.

As the data warehouse approaches real time, transformations tend to take place in the data warehouse. This is often called an ELT approach: extract, load, and then transform. The data warehouse stages and transforms the data to reduce data and analysis latency. This eliminates the need to aggregate changed data on a centralized server and removes an intermediate step from the overall data flow, as well as the associated costs of acquiring and managing the dedicated ETL server.

A major requirement for operational data warehouses that receive real-time data feeds is to handle both loading and querying workloads simultaneously. Enterprise data warehouses are increasingly being designed to support these mixed workloads so that the benefits of real-time data feeds can be fully realized. Leaders in data warehousing solutions, such as Oracle Exadata, support mixed workloads, enabling continuous data loading, dashboard updating, and prebuilt reporting with timely data.

Oracle GoldenGate 11g for Operational Data Warehousing

To enable real-time data acquisition, Oracle GoldenGate uses log-based, real-time CDC capabilities to provide continuous capture and delivery of the most recently changed data between OLTP systems and the data warehouse. The application offers transactional, real-time data capture, routing, transformations, and delivery, using the push approach. As soon as a new database transaction is committed at the source system, that data is immediately captured via the database transaction logs and moved to the data warehouse where it can drive enhanced, strategic, and operational BI capabilities. Oracle GoldenGate can perform basic, row-level transformations at the point of capture or at the time of delivery.

For heavy transformation requirements, Oracle GoldenGate 11g can be integrated with Oracle Data Integrator Enterprise Edition (EE) 11g to enable end-to-end solution for data warehousing. In this configuration, Oracle GoldenGate 11g delivers transactional data to a staging area in the data warehouse for in-database transformations with Oracle Data Integrator Enterprise Edition (EE) to
support an E-LT architecture. Oracle GoldenGate can deliver the data to an existing ETL server as well.

Oracle GoldenGate eliminates the need for batch windows, is extremely low impact, supports the movement of large data volumes, improves the ability to recover data in the event of a failure or outage, and moves read-consistent data with referential integrity.

Oracle GoldenGate 11g and Oracle Data Integrator EE 11g provide an end-to-end integrated solution to support real-time data warehousing initiatives. Oracle Data Integrator EE 11g extends this robust solution with built-in integration to Oracle Enterprise Data Quality.

Both Oracle GoldenGate 11g and Oracle Data Integrator 11g are certified to support Oracle Exadata Database Machine and other major data warehouse vendors. Oracle Exadata is an ideal data warehouse for operational data warehousing solutions with its high performance, high availability and strong mixed workload support. It can provide the very fast response times that today’s front-line employees and line-of-business managers demand.

![Figure 4. With Oracle GoldenGate, Oracle Data Integrator, Oracle Exadata and Oracle Business Intelligence Enterprise Edition, Oracle provides a complete real-time, operational data warehousing solution.](image)

Oracle GoldenGate Functional Overview

Oracle GoldenGate includes process modules for capturing, routing, transforming, and delivering transactional data in real time across heterogeneous environments. The application is designed to meet the needs of real-time data warehouse implementations.
Data Capture

The Oracle GoldenGate Capture module resides non-intrusively with the source database and continuously captures any new transactions. The new data is immediately moved into a database- and platform-independent universal data format called an Oracle GoldenGate Trail File. Trail Files not only enable heterogeneity but remove the risk of data loss or corruption, in the event of an outage at the source or target.

Data Delivery

Oracle GoldenGate’s Delivery module continuously delivers all new data to the data warehouse, with end-to-end latency in sub seconds. This means the most current data is always available for more-advanced, agile BI, actions, and reporting. In addition, because smaller sets of data are being moved at any given time—unlike batch methods—there is very little overhead imposed on the source and IT infrastructure. The Delivery module applies read-consistent data while maintaining referential integrity.

Transformation Support

Oracle GoldenGate provides built-in functions for row-level transformations. For complete, high-performance transformation requirements, it can be combined with Oracle Data Integrator EE. In this joint solution, users can perform set-based transformations inside the warehouse when higher end-to-end performance is desired. Due to this ELT architecture, no additional middle-tier server is needed.

Heterogeneity

Oracle GoldenGate supports log-based CDC for a wide range of database versions for Oracle Database, MySQL, SQL Server, IBM DB2 for System z, System i, and LUW, Sybase ASE, Enscribe, SQL/MP and SQL/MX, and Teradata running on Linux, UNIX, Microsoft Windows, Oracle Solaris, and HP NonStop platforms. Oracle GoldenGate can deliver to a variety of data warehouses including SQL Server, Teradata, Oracle Database, Netezza, Greenplum, and HP Neoview. Oracle GoldenGate is certified to capture from or deliver to Oracle Exadata Database Machine. Oracle GoldenGate can also be deployed with Oracle GoldenGate Application Adapters to capture from, or deliver to messaging systems.

Like Oracle GoldenGate, Oracle Data Integrator can move data from heterogeneous source systems and deliver to Oracle and non-Oracle Databases. Oracle Data Integrator’s Knowledge Modules gives the product extensibility to support all major platforms and databases. You can read Oracle Data Integrator data sheet for more information.

Flexibility

Companies can quickly and easily involve new or different database sources and target systems to their data warehousing solutions by simply adding additional Capture and Delivery modules. This simplifies
scalability and enables Oracle GoldenGate to extend solutions for moving data back to the OLTP system for any closed-loop activities, or for simultaneously sending data to reporting instances, data stores, backups, or other target systems. To further simplify the management of Oracle GoldenGate environments, users can deploy Oracle Management Pack for Oracle GoldenGate, a graphical user interface add-on product for speeding the deployment, monitoring, and reporting on all the Oracle GoldenGate process modules supported across the enterprise.

Combining Oracle GoldenGate 11g with Oracle Data Integrator Enterprise Edition 11g

Oracle Data Integrator Enterprise Edition 11g delivers high-performance data movement and transformation among enterprise platforms with its open and integrated E-LT architecture. Including built-in connectivity to all major databases, data warehouses, service oriented architectures, business intelligence, Oracle Data Integrator Enterprise Edition helps lower total cost of ownership among data-centric architectures. An easy-to-use interface combined with a rich extensibility framework helps improve productivity and lower development costs. Oracle Data Integrator Enterprise Edition is fully integrated with Oracle Fusion Middleware, Oracle Database, and Oracle Exadata.

For heavy transformation needs, Oracle GoldenGate can be combined with Oracle Data Integrator EE’s ELT capabilities. In these configurations, Oracle GoldenGate handles the real-time, continuous data capture, or the “E” part of the ETL or ELT process, without impacting the source systems.

A Complete, Integrated, and Open Solution

Oracle Data Integrator EE 11g delivers an integrated design environment with Oracle GoldenGate. With this solution, it creates an ELT architecture with low-impact, real-time change data capture capabilities of Oracle GoldenGate. Oracle Data Integrator EE delivers unique next-generation ELT technology that improves performance, reduces data integration costs, and works across heterogeneous systems. In this integrated solution, Oracle GoldenGate can be configured through the user interface of Oracle Data Integrator 11g. Once configured, Oracle GoldenGate delivers real-time data feeds to the target database’s staging tables. Oracle Data Integrator EE extracts the data from the staging area and loads the data into user tables, after performing transformations using the processing power of the database, which enables multifold transformation performance improvements over typical ETL architectures. In addition, avoiding a middle-tier transformation server also decreases the total cost of ownership of the data warehouse infrastructure. The savings can be used to configure the data warehouse for higher overall performance on all workloads, or can go straight to the bottom line.
Combining Oracle GoldenGate 11g with Existing ETL Solutions

In addition to the “staging tables” approach mentioned above, there are several different ways Oracle GoldenGate can be used in combination with existing ETL systems.

- **Generate flat files for microbatches.** Oracle GoldenGate can provide real-time changed data in flat file format in minibatches or microbatches—such as every minute—to an existing ETL solution, which consumes the flat files to perform transformations and load the user tables. Rather than using a high-overhead ETL data extraction method, Oracle GoldenGate provides real-time, low-impact data acquisition for the transformation and loading processes. The end-to-end data latency for user tables depends on the transformation frequency and the speed of the existing ETL solution.

- **Delivery to enterprise messaging systems.** Oracle GoldenGate can also publish real-time data from source OLTP systems to a Java Message Service message queue or topic in XML or delimited text formats, from which the ETL systems can receive the changed data in real time before performing transformations and loading.

Combining Oracle GoldenGate’s real-time CDC capabilities with ETL or ELT solutions enables the immediate, low-impact capture of new transactions on the source OLTP system. When compared to the overhead imposed by ETL’s extract process, this combined solution provides a more cost-effective and efficient method for accessing timely information.

Oracle GoldenGate Customer Success with Real-Time Data Warehousing

There are numerous organizations that are seeing the benefits of real-time data warehousing today: leaders in banking and financial services, airline travel, telecommunications, manufacturing, retailers, and e-commerce businesses.

These organizations continue to push the envelope by turning their data warehouse into an integral part of the strategic and operational decision-making process. And they are achieving measurable gains in customer satisfaction levels as well as operational efficiencies—and ultimately, the bottom line.

The subsections that follow highlight two examples of this success.

**MegaFon Centralizes 200 Billion Real-Time, Mobile Communications Billing Transactions to Analyze Security and Revenue, and to Protect Against Fraud**

Founded in May 2002, MegaFon is the only Russian telecommunications provider with a network that spans all of Russia, as well as the Republics of Abkhazia, South Ossetia, and Tajikistan. The company was the first in the country to launch 3G commercial operations. It is now Russia’s top provider of...
mobile internet solutions, and is ranked second highest for the number of active communications subscribers—with 62.8 million at the end of 2011, representing a 9.6% increase from the previous year.

Challenges

Building on its growth, MegaFon recently acquired Synterra, a Russian mobile carrier. Following the acquisition, the acquired company’s billing information was in eight separate regional billing systems across Russia. To sustain growth in the multiple fixed and wireless segments, MegaFon needed a data-centric IT architecture for multiple disparate databases, to ensure accurate, trusted, and timely data for all corporate departments. For example, MegaFon wanted the ability to create smart marketing campaigns built on mobile subscriber profile data with real-time response analysis, so it could facilitate growth by maximizing conversion rates and average revenue per user. In addition, they wanted to improve mobile fraud detection and increase mobile security capabilities by distributing real-time customer data to business-critical subsystems for analysis.

Solution

MegaFon deployed Oracle Golden Gate 11g to extract billions of monthly transactions from eight regional billing systems. The data was integrated and centralized onto Oracle Database 11g, Enterprise Edition, and distributed to business-critical subsystems for revenue, fraud, and security analysis. MegaFon chose Oracle solutions because of performance, ease of implementation and use, scalability and agile management. MegaFon easily completed the implementation on budget, with minimal systems performance optimization required.

The solution enabled to create a 360-degree view of the mobile subscriber base by consolidating information from an existing Oracle’s Siebel Customer Relationship Management application and disparate billing databases, which improved insight into customers. Deploying Oracle GoldenGate 11g allowed MegaFon to implement a data-centric IT architecture and provided more accurate, trusted, and timely data for sales, marketing, customer care, and other corporate departments. Now MegaFon’s multiple offices and data centers across Russia can respond quickly to events—especially potential mobile security and fraud issues—thanks to more centralized business information and streamlined access to real-time reporting.

The solution also allowed creating sophisticated, targeted marketing campaigns based on enhanced mobile subscriber information, enabling MegaFon to maximize market penetration and facilitate continued growth. With real-time access to key performance indicators, field offices and data centers can better meet strategic goals and increase growth. In addition, the solution enables more business-specific analysis of billing data—such as revenue assurance, customer analytics, and fraud detection—to accommodate the company’s revenue growth, customer insight, and security requirements.
Additionally, Oracle’s solution delivered IT benefits. Offloading tasks—such as operational reporting and analytics—from billing and operations support systems to the new, centralized database optimized IT resource use. The solution suite also lowers total cost of ownership, as a single MegaFon engineer maintains the entire Oracle GoldenGate 11g infrastructure.

As a result of the real-time data integration implementation, MegaFon achieved more sophisticated, business-specific analysis for billing and customer data, to improve business decisions, facilitate more targeted customer marketing, and provide for ongoing growth.

Avea İletişim Hizmetleri A.Ş. Optimizes Database Compression, Reporting, and Campaign Analyses

Avea İletişim Hizmetleri A.Ş., the sole GSM 1800 mobile operator of Turkey, provides services to 97% of Turkey's population through its next generation network. With roaming agreements covering 199 countries, Avea is growing rapidly and currently serves 13 million subscribers as of mid 2012.

Challenges

Avea decided to create an open telecommunications platform that can integrate new services such as mobile number portability and 3G network services. The company’s goal was to enable fast reporting and immediate access to business data across the company by establishing an efficient and flexible data warehouse. With a new data warehousing solution, Avea wanted to improve Avea’s management of telecommunications campaigns by creating more specific target audiences and running more detailed post-campaign analyses.

“Oracle offers the best tools for data integration and data access. We rely on Oracle’s software and expertise in each step of our process. Oracle enabled us to focus on what we really do—transform data, apply business rules, and ultimately help our customers.”

Mustafa Sabri Çikrikci, Avea

Solution

Avea migrated data from disparate systems with Oracle GoldenGate and created a central repository on Oracle Database 11g, raising data access performance by a factor of five. The company used the advanced data compression capabilities of Oracle Exadata Database Machine and Oracle Database 11g to decrease 40 terabytes of data to a mere 10 terabytes.

Avea leveraged Oracle Data Integrator to optimize Avea’s Extract-Transform-Load (ETL) processes, decreasing the ETL batchwindow by more than 30 percent. Oracle’s complete solution accelerated the
company’s reporting performance by three to ten times by integrating platforms, source systems, and operational data stores with Oracle GoldenGate.

Avea also leveraged the advanced visualization and analysis features of Oracle Business Intelligence Enterprise Edition, enabling more efficient and in-depth analysis of data from across the company’s telecommunications operations. By establishing a telecommunication-specific data model with party, location, tariff, invoice, subscriber, and customer entities, enabling the company to analyze its promotional campaigns much more precisely.

As a result of its implementation, Avea automated most data warehouse maintenance processes and lowered the maintenance effort by nearly half.

**Conclusion**

Succeeding in today’s competitive business environment requires good decisions, not just at the top level of the organization. Operational data warehousing allows all users in the organization to access and respond to information in a timely manner. Establishing and maintaining this real-time data warehouse requires a continuous low-latency data capture and delivery infrastructure. Oracle GoldenGate 11g provides comprehensive functionality to continuously feed data warehouses with the most recent transactional data from OLTP systems using subsecond latency and without impacting the source systems.

Oracle GoldenGate provides the following key benefits:

- Real-time data for enabling more-advanced, agile BI
- Low-impact, high-performance data integration by reading database transaction logs
- Zero requirement for batch windows or using a middle-tier server
- Integration with Oracle Data Integrator EE 11g for high-performance ELT architecture
- Support for large data volumes and heterogeneity
- Ability to augment existing ETL solutions with real-time, low-impact data acquisition
- Exceptional flexibility, easy implementation, and maintenance
- Robust data recovery after outages
- Ability to move read-consistent data with referential integrity

Organizations that leverage the most up-to-date BI in their day-to-day operations have seen significant improvements in operational quality, productivity, and customer service.