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BUSINESS INTELLIGENCE

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Customer 360°
Big Data Analytics Application Direction

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Background

In the past, CRM systems served as a central repository of customer master data suitable for performing analytics and reporting that enabled organizations to interact more knowledgably with customers, create relevant and profitable promotions and loyalty programs, and analyze sales and marketing performance from a customer-centric perspective. But key trends on the consumer and technology landscapes, such as the cloud, mobile, increased self-service, and growing expectations around personalization and intelligent customer service, pose fundamental challenges to the problem of customer analytics. Today, important customer interactions are spread across multiple channels, including in-store, eCommerce, mobile, and social networking. And at the same time, key business processes are moving to the cloud and offering increased self-service, such as customer service. As a result, our knowledge of the customer is now scattered across many systems, and divided between on-premise and the cloud.

The Customer360 Big Data Analytics Application is a proposed product, which will provide a packaged analytical application bringing together a complete view of the information around customers into a central data-warehouse-style repository to power a new generation of customer analytics.

Data

Potential sources of customer information in the Customer360 application include:

- **Traditional CRM data** [*sourced from Siebel or Oracle Fusion CRM*] – The traditional CRM system provides the backbone for the data model, including the basics about customers including demographics, purchase history, and marketing interactions.
- **eCommerce data** [*sourced from Oracle ATG*] – eCommerce data complements CRM with information about customers' online buying, as well as information about online marketing activities.
- **Social interactions** [*sourced from Facebook, Twitter, Pinterest, and others according to demand*] – Social data provides an important indirect view of customers. We can potentially learn their opinions about our products, services, and brand. And in certain settings such as Facebook, we can also potentially learn additional profile attributes about customers, which are invaluable for targeting offers and promotions (e.g., we can learn attributes such as relationship status, whether the customer has children, activities that the customer enjoys, etc.)
- **Customer Service interactions** [*sourced from Oracle RightNow and/or CRM and eCommerce when the contact center aspects of these products are in use*] – Customer service provides us with a view of what issues customers have had with products and services. These are both valuable in aggregate for spotting trends, but are also interesting in detail as knowledge context for interacting with a customer in an intelligent, informed, and personalized manner.
- **Product Reviews** [*sourced from connectors to popular product review applications*] – Similar to social sources, product reviews provide a window into customer reactions to our products and services. While

reviews may provide a lower volume of data, they provide a correspondingly higher quality and signal-rich source of information; when a customer takes the time and effort to provide a review, it is usually a very direct signal of their strongly held opinions.

- **Web Clickstream Data** [*sourced from connectors to popular web analytics applications*] – The online clickstream, both from traditional web applications, as well as mobile applications, both web-based and native, provides important information about what the customer is looking for, and how they are responding to the products and services on-offer on the web. Relevant data includes referring search terms, landing page hits, on-site searches performed, products viewed, conversion events, and more.

Big Data

As is likely clear from the set of data sources involved in building a complete view of the customer, the information management architecture of Customer 360 must move beyond traditional data warehousing techniques and embrace Big Data infrastructure elements. Embracing Big Data architectures is critical to unlocking the full value of unstructured data sources such as Social Media and Product Reviews, as well as potentially high-volume semi-structured feeds such as Web Clickstream data.

We envision the data management architecture of Customer 360 as a hybrid between traditional data warehousing and Big Data warehousing using Hadoop-based infrastructure. Unstructured sources will be stored and enriched for analysis within Hadoop, and structured data will be managed in a relational model using ETL, all orchestrated by Oracle Data Integrator. And to achieve the full benefit of the relationships between these sources, data will be replicated between these two physical storage infrastructures where appropriate. For example, structure customer records will be used within Hadoop to perform identity resolution and data enrichment of social interaction records. And structured aggregates from Hadoop, such as customers' influence and sentiment on Social Media, or the most recent and most frequent search terms used by the customer on eCommerce, will be used to expand the customer attribution within the structured warehouse.

Analyses

The net benefit of this architecture will be the ability to provide multiple forms of analysis on top of a complete view of the customer. Examples of analyses that the application will support include:

- **Enhanced BI, Dashboards, and Reporting** – Traditional forms of CRM BI analytics such as cohort analysis will be supported, with a core set being inherited from the Oracle CRM Analytics BI Application. But these reporting views will be expanded with enhanced customer attribution pulled from the additional Big Data sources.

- **Unstructured Analytics and Discovery** – The incorporation of unstructured data provides a direct view of the "voice of the customer," and enables us to examine *why* customers behave as they do. Why was response to a given campaign better than anticipated? Why do people frequently return a specific product? Why have we been losing web traffic against a historically strong keyword? The answers to questions such as these are often found in the voice of the customer, which can be unlocked through unstructured data analytics.
- **Predictive Analytics** – A complete picture of the customer across all interaction points allows us to better personalize and optimize the customer experience. Statistical models built in tools such as Oracle RTD or R will allow the hidden associations between customer interactions and outcomes to be mined and exploited in the presentation of more effective offers and promotions. For example, predictive analysis of customer data could be used to power better-targetted product recommendations in an eCommerce setting, or might be used to recommend more relevant offers for a call-center agent.

Two example dashboard mock-ups are depicted below:

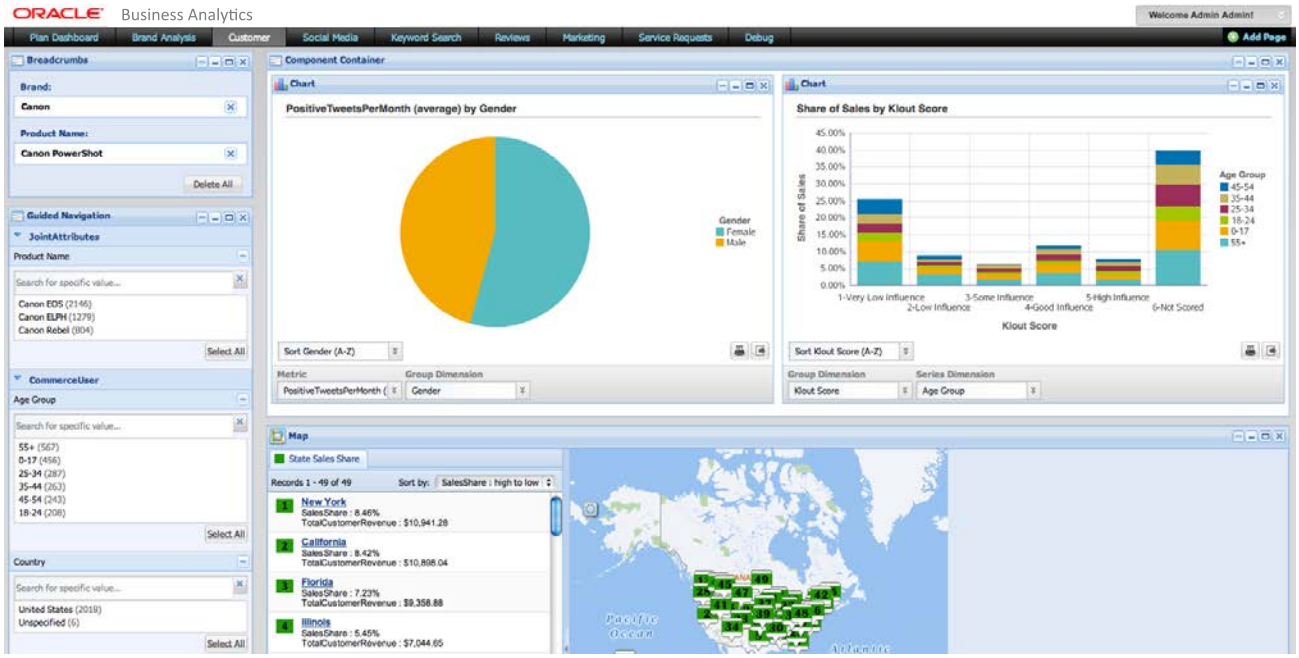

Figure 1. A sample dashboard screen illustrating the ability to segment and analyze customer groups based on both structured attributes from CRM and Big Data attributes drawn from social media, such as sentiment and influence, providing new insights into the make-up and behavior of customer segments and cohorts.

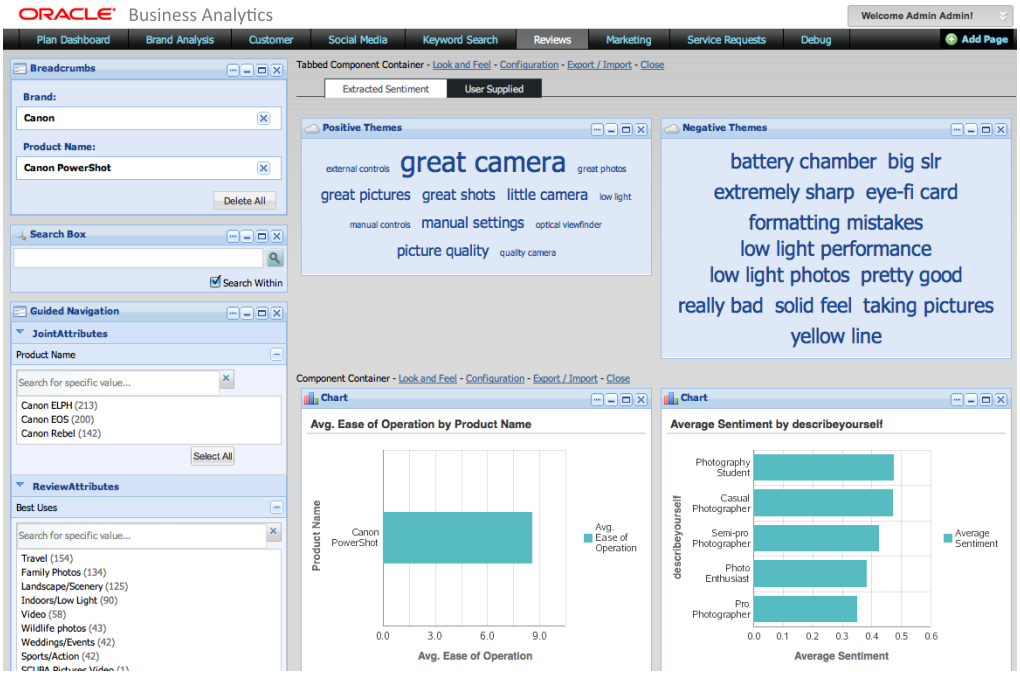

Figure 2. A sample dashboard screen illustrating the ability to perform unstructured analytics, in this example on review content, providing insight into the qualitative "voice of the customer," shedding light on customer likes and dislikes.

Architecture

A draft architecture for the Customer 360 application is depicted below. Notable characteristics of the architecture include:

- Out-of-the box connectivity to key data sources.
- Integrated management of a traditional structured Data Warehouse (lefthand side of the diagram) with an unstructured warehouse in Hadoop (righthand side of the diagram).
- Integrated ETL across both the structured and unstructured warehouses, based on Oracle Data Integrator.
- Packaged content for both structured dashboards in OBI, along with unstructured analytics based on Oracle Endeca Information Discovery, integrated into a common UI environment.

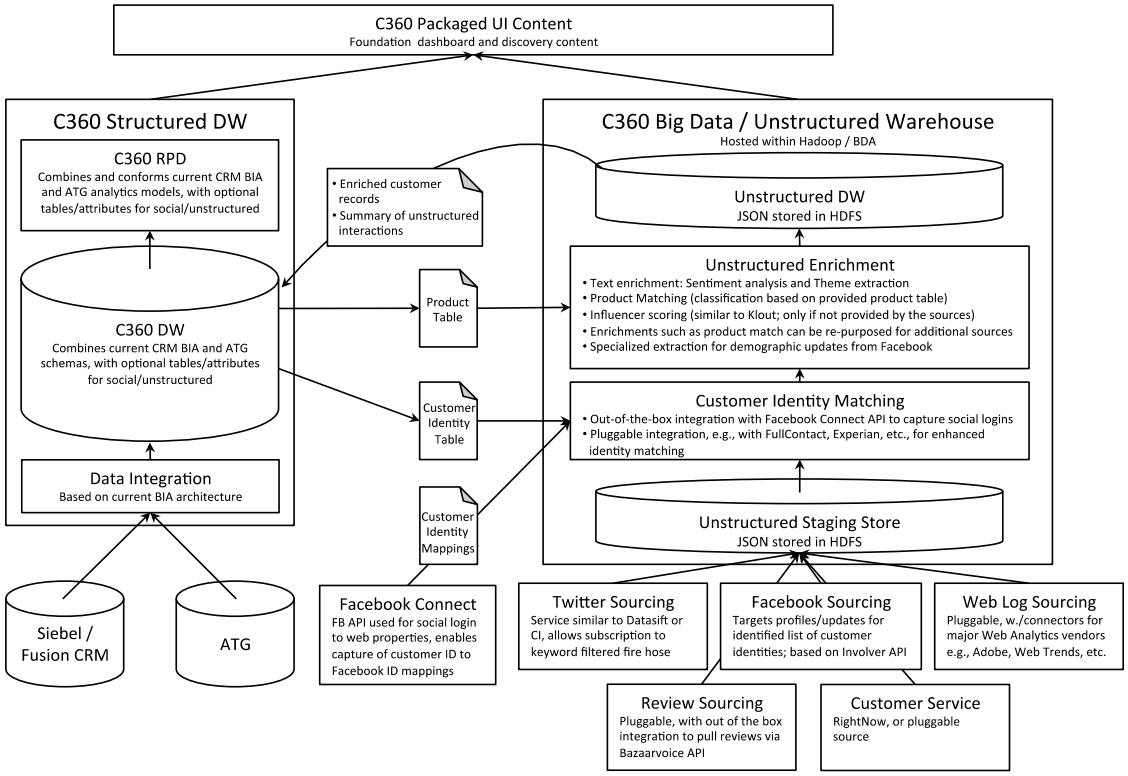

Figure 3. Draft high-level data management architecture of the Customer 360 application.

Feedback Questions

The Customer 360 application is a work in progress, and we seek engagement and feedback from customers who may be interested in the product. The following are some specific feedback questions relevant to this effort:

- **Use Cases:** Customer360 spans a number of use case domains, including Marketing-focused Customer Analytics, Customer Service Analytics, and Predictive Analytics to optimize the customer experience. Which of these problem spaces are interesting to you? Which are not? Is there a stand-out priority? Or are there other problems where you envision more complete view of the customer delivering value?
- **Data Sources:** Are there additional sources or types of customer information that you would like to see included in the data model? Are there sources described in the above discussion that you find less relevant?
- **Hadoop:** Is your organization already running either custom-developed or packaged applications that make use of Hadoop? Is Hadoop an infrastructure that your organization is willing/planning to adopt? If not, what are the dominant reasons?
- **Cloud versus on-premise:** Customer 360 spans some data sources that are on-premise as well as some that are inherently in the cloud. Is the described application one that you would prefer to consume on-cloud or on-premise, and why?
- **Social Analytics:** Are you already analyzing customer social media interactions, beyond just social "listening" (i.e., detecting and responding to specific customer issues expressed in social media settings)? Are there specific ways you believe understanding trends around customer interactions in social media could help improve your business?

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