



Predictive Customer Interaction Management

An architecture that enables organizations to leverage real-time events to accurately target products and services.

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“Don’t call us. We’ll call you.” That’s what the majority of households are telling the telemarketing industry.

This paper introduces a real-time, event-driven, multi-channel, application-agnostic architecture for customer interaction management that can change that dynamic.

Developed and formalized by TIBCO Software Inc. (TIBCO) in collaboration with Fortune 100 customers in the retail banking sector, the architecture described in this paper allows for unique and personalized interactions during outbound marketing, inbound marketing, customer service, and relationship management activities. It also allows for faster implementation than is possible with conventional CRM and data warehouse solutions.

1. Introduction

Every business needs to efficiently manage outbound and inbound interactions with customers. These interactions can occur through many channels including the web, call centers (manual, IVR, AVR), branch offices, ATMs, and email.

With inbound interactions, customers offer their attention. They visit a web site, make a call, or access an ATM because they want something at that moment – information about a product or help with a problem. These interactions usually present an opportunity to communicate with a customer who is engaged by choice and ready to share information regarding his or her wants and needs. Outbound interactions are typically used to target products to particular customer segments based on analysis of customer data. The success of these interactions – whether through email, direct mail, or other channels – depends to a great extent on the organization’s understanding of the customer’s wants and needs at the time of the offer. This paper describes an architecture that manages inbound and outbound interactions in a consistent manner to present a unified, real-time view of each customer.

REQUIREMENTS FOR EFFECTIVE CUSTOMER INTERACTION MANAGEMENT

The following list summarizes requirements for such an architecture:

- Provides consistent customer interaction management of outbound and inbound communications.

- Addresses the uniqueness and complexities of various inbound and outbound channels. For example, in an inbound call, the business logic might dictate that the CSR should not make an offer if the call time is greater than a given threshold
- Allows businesses that are aligned along product lines to use both customer knowledge and data mining to publish product propensities.
- Allows customer data to be distributed across multiple systems.
- Combines rules, policies, inferencing, and analytics – both statistical and probabilistic -to produce complex models of reasoning via events, customer data, time, and analytics.
- Leverages existing investment in data mining tools such as SAS, SPSS, and others.
- Handles the low latency requirements of real-time customer interactions with sophisticated caching techniques.
- Provides flexibility, scalability, and high availability.

KEY ASPECTS OF CUSTOMER INTERACTION MANAGEMENT

How a business treats customers and manages customer relationships is a key differentiator and is critical to succeeding in highly competitive and dynamic environments. The solution proposed in this paper addresses three important aspects of customer interaction management:

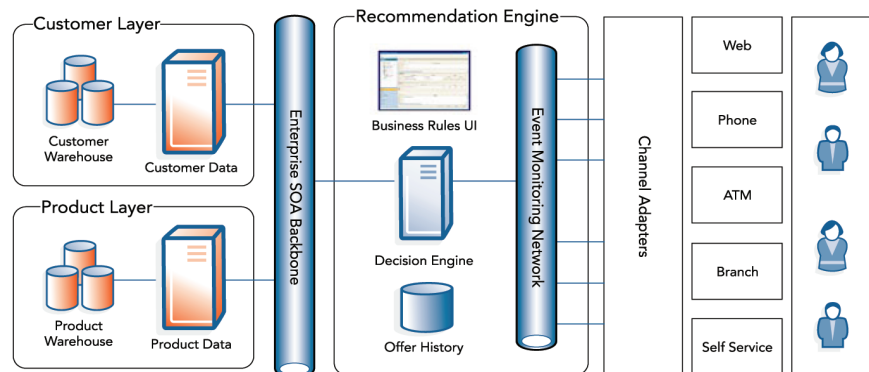
- Maintaining customer relationships using relationship events over time.
- Driving up-sell and cross-sell opportunities using both inbound and outbound events.
- Incorporating a feedback model to calculate the effectiveness of models over macro and micro dimensions.

2. Architecture

Effective customer interaction management requires an event-driven architecture (EDA) that is application and database agnostic. High-level components of such a solution include:

- Channel adapters.
- Customer interaction engine also referred to as a recommendation engine
 - Knowledge models maintained by business users.
 - Analytical models maintained by business users or reused from existing investments.
- Virtual data source.
 - SOA platform to integrate customer and other information from various data sources. A typical implementation will require integration with customer and product data from operational stores and/or data warehouses.

Figure 1.
Architecture for
effective customer
interaction management



CHANNEL ADAPTERS

In the context of this solution, channel adapters have two key roles:

- **Sense:** Channel adapters, either intrusively or non-intrusively, publish relevant events to the recommendation engine. The solution contains pre-defined adapters for various technologies used in the channels.

- **Respond:** Channel adapters provide a mechanism to initiate a dialogue with the customer.

The response is inferred and initiated by the recommendation engine to the channel adapters.

RECOMMENDATION ENGINE

The recommendation engine provides the following functions:

- A glossary of terms and vocabulary that form the basis of marketing strategies.
- Integration with channels using events.
- Pattern matching of a set of events with the policies, knowledge, and analytical models to generate a set of responses.
- Generic offers such as "Offer of the Day."
- Maintain history of offers and customer responses.
- A business user interface to create and represent marketing strategies or business "rules" based on the vocabulary of terms and events.

TIBCO provides a recommendation engine based on TIBCO BusinessEvents™ software, a market-leading complex event processing (CEP) application.

VIRTUAL DATA SOURCE

The virtual data source integrates all relevant customer and product data.

TIBCO BusinessWorks™ is an extensible SOA enablement platform that uses a no-coding approach to developing, deploying, and running integration projects and building serviceoriented architectures (SOAs). It simplifies some of the more complex implementation issues that are critical for the glue and sequence between connected systems, such as process orchestration and transformation.

3. Customer Examples

Today's leading retail banks recognize that customers are their most important and strategic asset and are rapidly adopting customer-centric IT strategies to achieve competitive advantage. This section presents a number of practical examples showing how a real-time, event-driven, multi-channel, application-agnostic architecture delivers immediate value to the retail banking business and a unique banking experience to their customers.

Retail banks have traditionally used customer resource management (CRM) systems to capture the inbound customer data stream and store the information in a central repository. Using a post-processing procedure, data mining tools are then used to analyze the data and apply rules to execute marketing campaigns.

TIBCO's approach to customer interaction management uses CEP software to enable:

- Real-time matching of customer profiles and product lines across all banking channels.
- Real-time, rules-based product recommendations based on statistical, relationship, or experience models per business line.

EXAMPLE 1: MULTI-CHANNEL CUSTOMER INTERACTION

The following example shows how banks can use real-time information to provide more effective service.

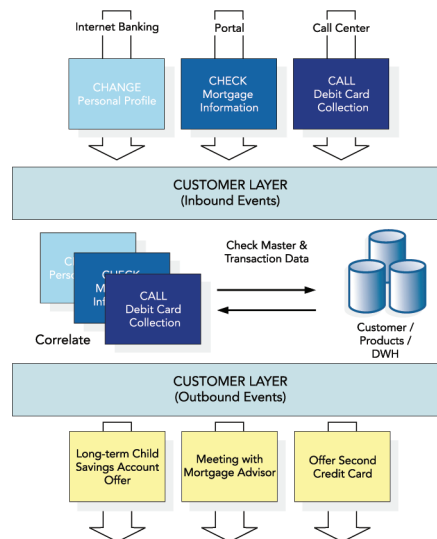
- Mick and his wife have a new baby girl named Nora.
- While using the bank's internet portal, Mick updates his Personal Profile to include the new family member.
- Still using the portal, he checks the bank's mortgage packages and requests several brochures because he is thinking about renovating or buying a new home.
- The next day he and his wife get a present from the bank congratulating them on the new family member and offering a baby savings account especially tailored for them.

- One week later, while visiting the local branch, the local branch officer congratulates Nick on Nora's birth, offers him an informational appointment with the bank's mortgage advisor, and offers to increase the credit limit on the family credit card at no charge and with no paperwork.

In the example above, complex event processing software allows the bank to:

- Capture all events through all channels in real-time.
- Seek out patterns and correlate information with the goal of identifying important events, such as the birth of a child.
- Consult historical information to determine, for instance, the customer's demographic profile and to estimate the bank's share of wallet .
- Apply different models, or rules, to assess which marketing campaign, if any, is most suited to the customer.
- Execute appropriate marketing strategies and recommend products in real-time.

Figure 2. Conceptual Model



By tracking customer interactions, capturing other vital, non-traditional customer events that help flesh out the customer profile – birth of a child, starting or ending school, landing a first job, getting married, renting a house, purchasing a new car, moving, changing a job, buying a house – and responding with relevant offers and services, banks have an opportunity to extend the customer relationship and demonstrate that the customer is the bank's most important asset.

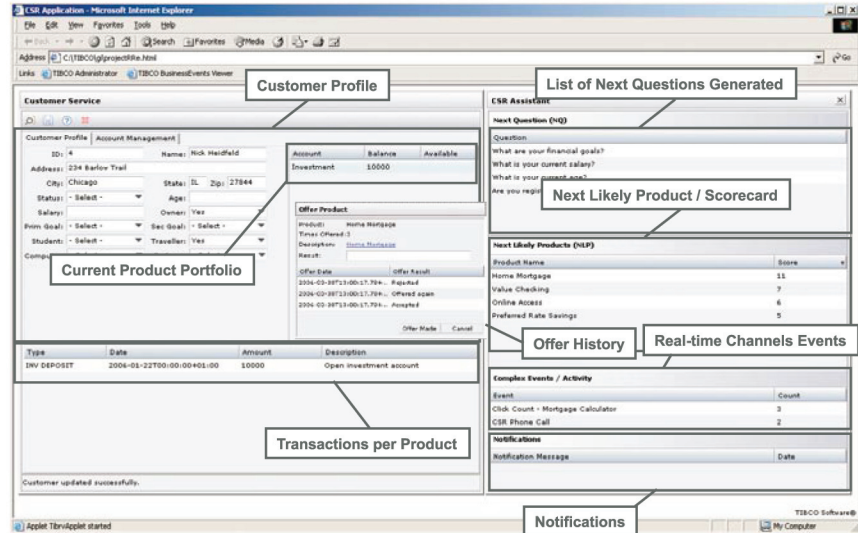
The following diagram shows the conceptual model:

EXAMPLE 2: REAL-TIME PRODUCT RECOMMENDATION ENGINE

The following example demonstrates how the real-time product recommendation engine can be used from the customer service representative's (CSR) perspective. Figure 3 shows a CSR user interface built using TIBCO General Interface™ (the award-winning AJAX-based platform for building rich internet applications) and displaying the information provided by the recommendation engine. The screenshot shows the following information aggregated from several sources and presented to the CSR:

- Customer Profile.
- Current Product Portfolio with a real-time view of Transaction History.
- List of Next Questions dynamically generated.
- Next Likely Product to be offered, with corresponding Scorecard dynamically generated according to various business models.
- Offer History to avoid repeating offers.
- Channels Events showing customer interactions in real-time.
- Notifications relating to marketing promotions.

Figure 3. CSR user interface built using TIBCO General Interface



The following cases show how a recommendation engine can support a CSR in recognizing the implications of events and responding with appropriate offers:

CASE 1: CHANGE OF ADDRESS

Description	Customer has recently informed us of a change in address.
Impact on Existing Relationships	Banking and credit cards.
New Potential Relationship	Lending.
How	Incremental revenue by meeting the customer's new borrowing needs.
Event Overview	Customer changes their address.
Event Implications	Customer changes address and the address may not propagate across all systems fast enough. This is a great but time-sensitive opportunity to offer a loan.
Potential Offer	Loan to meet new financial needs, for example to purchase carpets or furniture. Ensure next offer uses the updated contact information.

CASE 2: HIGH VALUE CREDIT IN SAVING ACCOUNTS

Description	Customer has deposited a large amount of cash into a demand deposit account.
Impact on Existing Relationships	Banking.
New Potential Expanded Relationship	Banking.
How	Incremental revenue and locking of funds.
Event Overview	The customer transferred a large amount of money to a demand deposit savings account. Chances are the customer has surplus of funds which is being parked temporarily in the savings account. See whether the customer is interested in improving the return on the funds through a time deposit.
Event Implications	Cross-sell time deposit to the customer. The time window is small as there is the risk that funds may go out of the bank; need to lock quickly.
Potential Offer	Time deposit.

CASE 3: INVESTMENT ACCOUNT OPENING

Description	A customer provided her contact information and expressed interest in opening an investment account on the bank's portal.
Impact on Existing Relationships	Banking.
New Potential Expanded Relationship	Wealth management.
How	New account acquisition.
Event Overview	The customer does not have an investment account but has expressed interest, so she is a hot lead to open an investment account. The customer does not have an investment account but has expressed interest, so she is a hot lead to open an investment account.
Event Implications	An opportunity to cross-sell a wealth management package. The time window is small. She may have an existing investment relationship elsewhere and may be interested in switching banks. The bank needs to offer a compelling reason to bring her investments to its wealth management division.
Potential Offer	Wealth management products.

CASE 4: CONTACT DETAILS UNKNOWN

Description	The customer's telephone number is invalid.
Impact on Existing Relationships	Banking and credit cards.
New Potential Expanded Relationship	All.
How	Incremental revenue through increased contact volumes.
Event Overview	Customer identified via outbound telemarketing activity as un-contactable.
Event Implications	Lost business and customer service opportunity (e.g. fraud alert).
Potential Offer	Customer service enhancement e.g. alerts.

CASE 5: TRAVEL AGENCY TRANSACTION

Description	The customer has spent several thousand dollars with a travel agency.
Impact on Existing Relationships	Banking and credit cards.
New Potential Expanded Relationship	Insurance.
How	Incremental revenue for a new line of business.
Event Overview	Customer performs a transaction with a travel agency.
Event Implications	<p>Opportunity to cross-sell travel insurance.</p> <p>The time window is small; the need may be fulfilled by a competitor or the immediate need will pass.</p>
Potential Offer	Travel insurance – either one-time trip insurance or year-round protection.

4. Conclusion

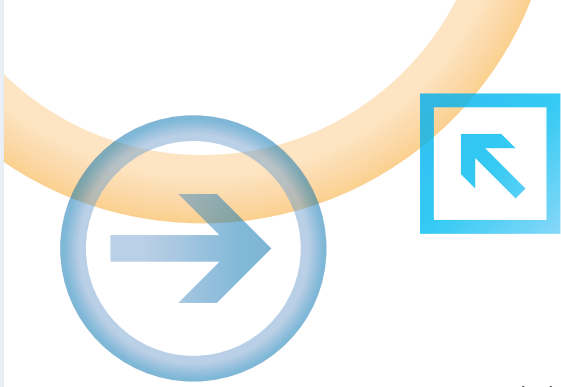
For retail banks to meet critical business objectives such as acquiring and retaining customers, providing superior customer service, and successfully cross-selling products, they must become less product-centric and more customer-centric. To do that, they must first meet operational challenges, stemming from the growth and expansion of products and channels within retail banks. That growth has led to disconnected communication channels, a fragmented view of customers, and inconsistent business processes.

Banks can address these challenges by making it a priority to implement enterprise-wide systems and processes that enable them to:

- Know and understand their customers.
- Provide efficient and effective customer service.
- Leverage cross-selling opportunities at the time of contact.

To engage in intelligent, real-time cross-selling, banks must first make improvements in customer information management, multi-channel integration, and efficient and effective customer service. The final step is to increase the value of the customer relationship by identifying relevant and appropriate cross-sell and up-sell opportunities. Deploying TIBCO's business optimization technology gives banks the event-driven infrastructure they need to take advantage of those opportunities, by providing:

- Access to real-time, accurate customer information and an integrated view of the customer that includes the customer's basic transaction history, profitability, product portfolio, and demographics.
- Instant availability of this information across all channels – whether in the branch, online, or in the call center.
- Support from sales and servicing processes that are automated, integrated, and cross-channel.



With this information at hand and a sophisticated recommendation engine, banks can evolve their marketing strategy from mass-marketing to operational and marketing customization. Marketing customization occurs when banks are able to predict the best next product of interest to their customer. Operational customization occurs when the bank is able to react instantly when a customer that has chosen to interact with a bank in one of its channels can use that opportunity to cross-sell the product. In other words, the bank is presenting only relevant offers to customers only when they have the customer's permission, time and attention. Such customized offers are much more likely to be accepted, thereby enabling banks to increase customer retention and satisfaction and, ultimately, to grow profits by attaining a larger share-of-wallet from their existing customer base.

5. About TIBCO

TIBCO Software Inc. (NASDAQ: TIBX) is a provider of infrastructure software for companies to use on-premise or as part of cloud computing environments. Whether it's optimizing claims, processing trades, cross-selling products based on real-time customer behavior, or averting a crisis before it happens, TIBCO provides companies the two-second advantage™ – the ability to capture the right information at the right time and act on it preemptively for a competitive advantage. More than 4,000 customers worldwide rely on TIBCO to manage information, decisions, processes and applications in real time. Learn more at www.tibco.com



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