

IBM Research Report

A Novel Web Sales Tracking Solution for Multi-channel Marketing Programs on Electronic Commerce

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Abstract

Internet based marketing programs have become critically important to many businesses, and at the same time more technologically advanced. If a business practices multiple types of Web marketing campaigns, sells multiple brands, and manages multiple online stores, it has to use market tracking solutions to monitor sales and leads from different marketing programs, and track and evaluate the performance of each program. A novel solution for tracking Web sales for multi-channel marketing programs is described. It consists of two technological components. A transient landing page provides a unique way to centralize, control and distribute Web traffic from different programs, and in doing so saves a Web merchant time, cost and effort in administrating its online stores. A multi-channel identifier allows the merchant to track sales and leads, and to evaluate the results and effectiveness of each program.

1. Introduction

World Wide Web is still a new frontier in many respects for business and commerce. Advertising on the Internet is an important source of revenue for many of the popular public Web sites that are willing to rent their valuable space. A marketing service provider is a trusted third party where the affiliate receives a commission from the merchant based on the number of customers directed to the merchant site from the affiliate site [1]. These affiliate programs provide performance-based marketing opportunities, and participating Web sites promote offers which link to a merchant site for sale fulfillment. Thus, merchants are interested in tracking affiliate sales from the original marketing program or channel, through the shopping cart and the sales transaction, to the back end procurement database. This sales tracking is necessary to credit commission payments to affiliate partners that refer customers to their merchant sites. Many merchants also offer their goods and services for sale on their own public sites by creating online stores. They may operate multiple online stores, and/or have different product categories

from different product divisions under the same online store. Even though sales originate from various marketing channels, in general, sales under the same merchant go through the same transaction database and the back end procurement system for simplicity, efficiency, and cost savings. Therefore, Web merchants have a requirement for tracking sales and leads and understanding their source of origination for future sales and marketing strategies.

Most merchants today use multiple unique permanent identifiers, such as browser cookies, to store and retrieve marketing data in the browser's memory on the shopper's PC. This and other conventional solutions [1], however, are often limited by browser restrictions on the number of permanent cookies [2]. Furthermore, such solutions are often difficult to administer, modify, and adapt as new marketing channels are introduced and old channels are changed on a weekly basis. A novel solution for tracking Web sales in a multi-channel environment is described. It consists of two primary technological components, a transient landing page and a multi-channel identifier.

2. The Transient Landing Page

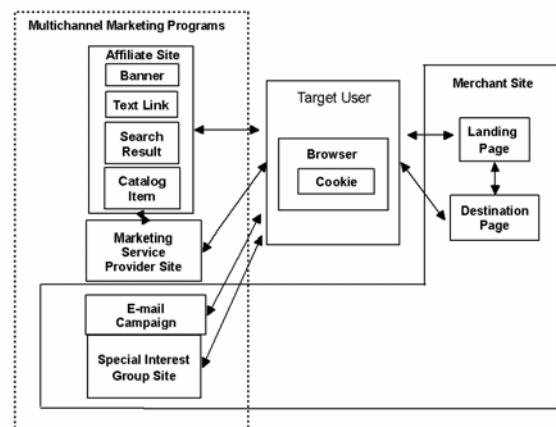


Figure 1: The market tracking framework for multichannel marketing programs.

The transient and transparent landing page acts as an anchor to centralize, track, control and distribute all the incoming Web traffic from different external and internal marketing programs to the merchant site. Figure 1 shows

the web sale tracking solution framework for multi-channel marketing programs. The shopper uses a browser to view and interact with content on Web pages. As shown in both Figures 1 and 2, a number of multi-channel marketing sources, such as affiliate sites, merchant group sites, e-mail advertisement campaigns, e-coupons and e-rebates promotion programs, generate Web traffic and direct shoppers to the merchant site. All of them have a hypertext reference to either a marketing service provider site or a landing page on a merchant site. This hypertext reference can also contain a destination page on a merchant site, a source code, a marketing channel identity, an identification of a banner, a text link, a search result, a catalog item, a campaign or an affiliate site. The source code identifies different forms of advertisements and promotions. Thus, the marketing service provider can keep count of affiliate referrals and provide tracking identifiers for the merchant to determine if the shopper ultimately makes a purchase.

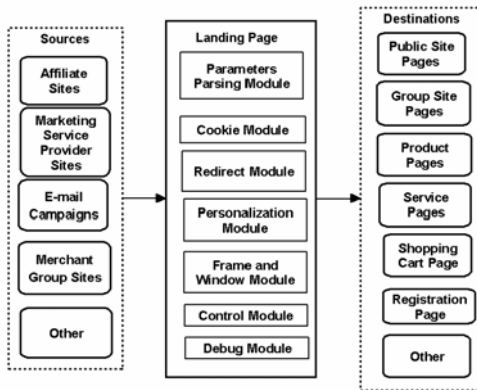
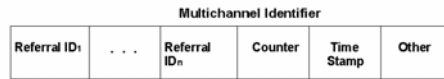


Figure 2: The architecture of a landing page for market tracking of different marketing programs.

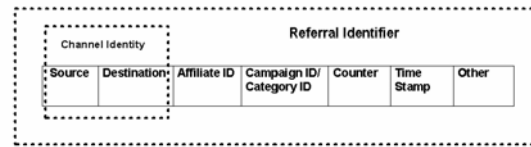
The landing page consists of a number of modules providing different features and functions as shown in Figure 2. A parameter parse module parses and validates different parameters contained in the hypertext reference. A cookie module constructs the multi-channel identifier from the channel identity, the affiliate and campaign identifications. Based on the merchant's policy on personal privacy, a personalization module collects shopper's browsing information and behaviors to customize for different browser types and versions, and other client configurations for subsequent Web pages. A control module carries out URL mappings by correcting, modifying or updating a destination page. Depending on the agreement between the merchant site and its affiliate partner, a frame and window module handles the affiliate's frame blocking window on the merchant destination page by either breaking out from a browser frame or launching a new browser window. A debug module provides debugging capabilities to help maintain, upgrade and support the merchant site by displaying

server status, environment variables and parameters. A redirect module distributes all incoming marketing traffic to their destinations on the merchant site based on navigation and control logics from the control module. It replaces the landing page with the destination page without altering the shopper browsing experience by making it transparent to the shopper. Finally, the multi-channel identifier from the check out page is captured by the merchant's server and stored on the merchant's procurement database for later retrieval and use. The landing page provides a unique way to centralize, control and distribute Web traffic, and track sales and leads from different marketing programs. It harmonizes, simplifies and customizes content delivery to shoppers originating from various marketing channels, and in doing so saves a Web merchant time, cost and effort in administrating its online stores.

3. The Multi-channel Identifier



(a)



(b)

Figure 3: Design of a multichannel identifier.

Web browsers allow servers to read and write cookies in the memory of the client's PC, but they also set strict limitations on the number of cookies. Recent versions of Netscape Navigator limit the total number of client cookies to three hundred, and allow only twenty cookies per domain name [2]. The multi-channel identifier supports multiple referral identifiers as shown in Figure 3(a). It provides the merchant the ability to record referral identifiers from a number of marketing channels. This is particularly beneficial to merchants conducting a large number of marketing campaigns or participating with a large number of affiliates. The global counter records the number of times a shopper has visited the merchant site to identify first time or frequent visitors for relevant promotions. The time stamp stores the expiration date of the permanent cookie. As shown in Figure 3(b), the referral identifier contains a channel identity field to identify the channel delivering the shopper to the merchant site. This channel identity field is further divided into a source field and a destination field. The

source field identifies where the shopper comes from. The destination field tracks various destinations, portals, or group sites where the shopper is directed. The referral identifier also includes an affiliate identifier field to record the affiliate partner directing the shopper to the merchant site. It determines the commission paid to the referring affiliate partner. A campaign or category identity field records a particular e-mail or printed advertisement campaign. It tracks and determines the responsiveness, usefulness and effectiveness of different internal and external marketing programs. For affiliate programs, this field captures the product or category identity to which a particular banner directs the shopper. As a result, the merchant is able to correlate a sale to one or more referrals. This kind of correlation provides a more accurate means for determining and distributing the sales commission among multiple affiliates that refer a customer to the merchant. A counter field records the number of times the shopper has visited the merchant site or clicked on the merchant's banner to provide useful marketing information about the shopper's interest and the popularity of the banner. A time-stamp field stores the referral date from an affiliate site or the expiration date of sales attributable to an affiliate site. In other words, the time stamp field can indicate at what point in time an affiliate site is no longer entitled to a sales commission. Since the time stamp is specific to a referral channel, the merchant can specify different expiration duration for each channel or campaign. The time stamp field allows the merchant to enforce its business policy, such as removing an expired referral identifier, incrementing the counter, or updating the category identity field of an active referral identifier.

4. Implementation and Industrial Experience

Some of the features and functions of this Web sales tracking solution are implemented in ibm.com. Any Web based technologies and programming languages can be used. The codes of any functional modules can be executed on the shopper browser, the merchant server, or partially executed at both network locations.

Based on our implementation experience, the debug module is found to be very useful during the testing stage. However, its removal on the production server after the test stage increases the performance of the transient landing page. Moreover, the use of the control module to redirect shoppers to alternative servers instead of displaying a delay message has shown to be a better service and user experience for the shopper when the main server becomes overloaded due to high volume of network traffic. Our industrial experience has also confirmed the stability and usefulness of this web sales tracking solution.

5. Results and Discussion

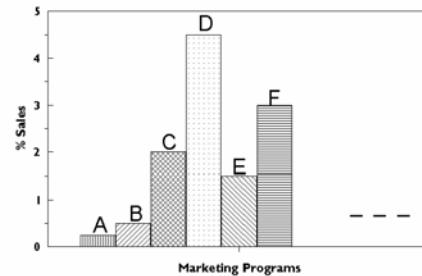


Figure 5: Normalized monthly sales originated from different multichannel marketing programs.

This web sales tracking solution enables the merchant to systemically monitor sales and leads from different marketing programs. As a result, the merchant can evaluate the effectiveness and performance of individual and concurrent programs, and thus optimize its investment on multi-channel marketing programs. As shown by normalized sales histograms originated from different hypothetical marketing programs in Figure 5, the contributions of various marketing programs to the total sales of the merchant are not evenly distributed. The merchant should terminate bottom marketing programs such as A and B, and expand top marketing programs such as D and F, in order to maximize its profits if each program's expense is about the same.

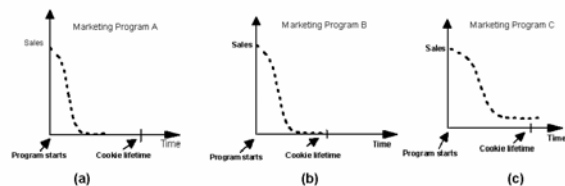


Figure 6: Distribution of sales originated from different hypothetical marketing programs over a period of time.

As the expiration date for the referral identifier can be different for different programs, the tracking of sales or leads for different programs can end at different time. The distributions of sales originating from three different hypothetical marketing programs over a period are shown in Figure 6. In the case of program A, the lifetime is set too long since the sales have dropped to almost zero long before the expiration date. However, the lifetime is set too short in program C since the sales are still coming in even

after the expiration date. As a result, some sales or leads originated from program C are not tracked. The lifetime is set just right in program B as the sales drop down to almost zero just before the expiration date.

Another difficulty faced by some merchants is payment of commissions when more than one affiliate partner refers the shopper to the merchant site. Such a situation occurs when the merchant has a large number of affiliates linking to the merchant site. A shopper could click on a merchant banner found on different affiliate sites at different times before a purchase is ever completed. This presents an issue relating to which affiliate should receive the sales commission or how to divide the commission among affiliates. Typically, the merchant pays the sales commission only to the most recent affiliate that leads the customer to the merchant because of an inability to account for multiple referring affiliates. Often times, however, such an arrangement deprives earlier referring affiliates from receiving at least a portion of the sales commission. The lack of a mechanism to determine accurately and fairly the referral compensation for the initial referring affiliate could diminish the incentive to display the merchant advertisements. The multi-channel identifier can be used to establish marketing rules giving referral credit to one marketing channel over another when multiple references to the merchant site are made by different marketing channels before the expiration date of a permanent cookie.

Let $S_i(0)$ denotes the sales originated only from the i th channel alone and $S_i(k)$ denotes the sales originated from the k th joint multi-channel program including the channel i . Assuming that there are M joint multi-channel marketing programs and each k th joint multi-channel program consists of a number of channels N_k , then the total sales S_i^T credited to the channel i , based on an evenly distribution of the sales commission to all channels from the joint multi-channel program is given by

$$S_i^T = S_i(0) + \sum_{k=1, M} 1/N_k \times S_i(k) \quad (1)$$

Another method to fairly distribute the sales commission to all channels that refer customers to the merchant site with adjustable weighting factors is suggested here. Let $W_i(k)$ denotes the weighting factor for the i th channel in the k th joint multi-channel program. Then the total sales S_i^T credited to the channel i , is given by

$$S_i^T = S_i(0) + \sum_{k=1, M} W_i(k) \times S_i(k) \quad (2)$$

where

$$0.0 \leq W_i(k) \leq 1.0 \quad (3)$$

and

$$\sum_{i=1, N_k} W_i(k) = 1.0 \quad (4)$$

This weighting factor is in the range of zero to one and is usually inversely proportional to the time lapse between the time that the customer purchases and the time that the cookie of k th multi-channel program was set. It can also be adjusted based on the importance and cost of investment on the i th channel. In the case of the affiliate marketing program example, it provides the levels of accuracy required for a merchant to calculate commissions earned by its affiliate partners.

The transient landing page provides a unique way to centralize, control and distribute Web traffic from different marketing programs. It does not negatively alter the shopper browsing experience and it is transparent to the shopper. It also harmonizes, simplifies and customizes content delivery to shoppers originating from various marketing channels, and in doing so offers a Web merchant economies related to time, cost and effort in administrating its on-line stores. The multi-channel identifier allows the merchant to track sales and leads, which can then be used to evaluate the results and effectiveness of each marketing program in an efficient way. The multi-channel identifier efficiently combines all the sales tracking information for multiple marketing channels into a single browser cookie. This ensures that it will not exceed the maximum number of cookies allocated per domain name by a browser program. As a small amount of disk space is required to store a permanent cookie, the performance of storing and retrieving such sales tracking information is improved. Moreover, it only requires the retrieval of one data field instead of many data fields on the back-end procurement database. It also does not require any code change on the back end procurement system whenever a marketing program is added, modified, or removed from the merchant site.

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7. References

- [1] F. Fiore, and S. Collins, *Successful Affiliate Marketing for Merchants*, Que, Indiana, 2001.
- [2] B. Krishnamurthy and J. Rexford, *Web Protocols and Practice*, Addison-Wesley, New York, 2001.