

Closing the Loop - Using SAS to drive CRM

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Introduction

Customer Insight underpins Customer Relationship Management (CRM). Without a detailed understanding of customer profiles and behaviour, any CRM undertaking will be running blind. Conversely, no matter how sophisticated your Data Mining capability, Customer Insight will deliver little value without the processes in place that exploit the insight to build stronger customer relationships. This paper illustrates how SAS can be used to deploy Customer Insight throughout your organisation and examines how to plan for integration at the outset of your data mining projects.

We also look at some of the techniques and tools available to organisations that transform Customer Insight into added customer value. These allow marketers to run and monitor large numbers of micro-campaigns, with individually customised messages delivered to customers through the most appropriate channels. By deploying Customer Insight the customer interaction systems ("touchpoints") and enabling ongoing analysis of communication performance and effectiveness, the CRM loop is closed.

What is closing the loop?

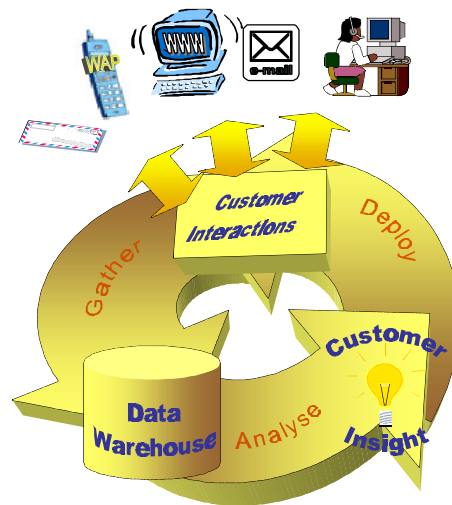


Figure 1 – "Closing the Loop"

CRM is a two-sided coin:

- Operational CRM covers "customer interactions" – providing customers with consistent access to sales, service and marketing functions through a range of different "channels" such as call centres, direct mail, Web, email, text messaging, iDTV (interactive digital television), etc. Examples of software application systems that support operational CRM are Siebel, Clarify, Vantive, Chordiant and Oracle eBusiness.

- Analytical CRM is about creating and using "customer insight" – analysing data (from customer interactions as well as other sources) to gain a better understanding of customer behaviour, needs and expectations. As well as simply generating "management information", this insight can be used to enhance customer interactions. Clearly this is the side of CRM that SAS focuses on throughout its product range, including data warehousing, data mining, on-line analytical processing and information deployment.

Many organisations focus on just one side of CRM at a time – operational or analytical. However, substantial benefits arise from exploiting the synergies between them. Closing the CRM loop is about getting them to work together effectively, and involves two key capabilities:

- **Analytical CRM to Operational CRM:** deployment of Customer Insight into customer interaction systems to enhance the effectiveness of all customer communications;
- **Operational CRM to Analytical CRM :** capture of response data arising from these communications, to enable analysts to develop understanding of the effectiveness of these changes and how further improvements can be made.

In this way, it is possible to achieve full visibility of the performance of customer interactions such as marketing campaigns, personalised treatments of web pages, etc, enabling you to make improvements that will optimise the effectiveness of every customer contact through every touchpoint.

Applications

The most common applications supported by Customer Insight in a "closed loop" CRM environment are:

- Campaign Management tools - these take the "dog-work" out of managing campaigns, so you can design and simultaneously manage large numbers of small marketing campaigns that are accurately targeted against tightly defined customer groups, and personalised for delivery through various communication channels such as email, Web and mailshots as well as both outbound and inbound contacts at call centres.
- Content customisation tools –these allow you to specify rules that personalise the treatment of different visitors to your Internet sites (Web, WAP, iDTV - interactive digital television- etc) according to their preferences and your understanding of their profiles and behaviour;
- Customer interaction management – this is a technique supported by some front-office tools (such as those used in call centres) that enables customers to be handled differently according to what you know about them – e.g. you might want to treat high value customers or those at risk of defecting to another supplier with greater priority than other customers.

And what about the future? The answer is real-time marketing - this involves capturing customer data, analysing it in real-time, generating insight and deploying it "on-the-fly". This will allow you to use what you learn about the customer during an interaction to affect the outcome of that interaction, not just in contacts that occur days or weeks afterwards. The technology required to achieve real-time marketing exists today, but it remains immature and difficult to deploy. More importantly, the methodologies and discipline required to apply these tools effectively are not well-developed yet.

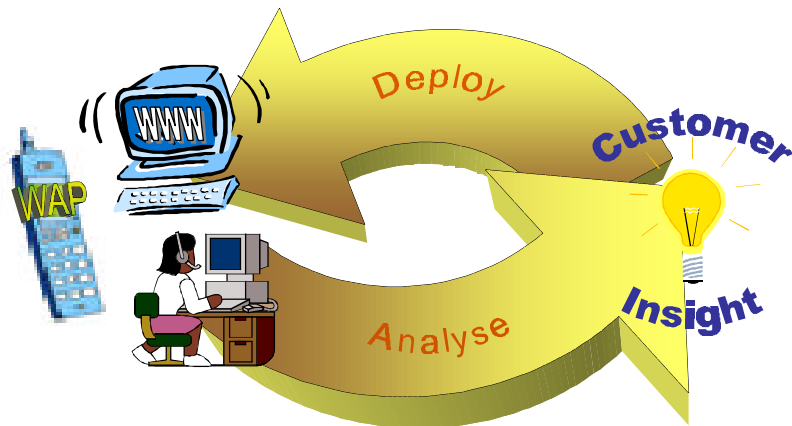


Figure 2 – Towards real-time marketing

Why do it?

When considering the reasons to adopt a "closed loop" strategy, it is useful to examine some typical situations in organisations with large numbers of customers. Many such organisations have a Customer Insight capability based on SAS, and many organisations have operational CRM systems such as campaign management and content personalisation tools. But the way that these tools are used together is usually ad-hoc, unsystematic, immeasurable and often ineffective. Here are some typical examples of problems with the way that these tools are used:

- customer segmentation strategies are defined at a high-level but not applied consistently to customer interactions – e.g. high value customers are treated the same as low value customers;
- campaign target lists are generated “ad-hoc”, manually loaded into marketing databases, and rarely refreshed – target models are redeveloped even less frequently if ever;
- conflicts occur over customer and channel ownership (*Corporate Marketing Manager to Product Marketing Manager: "They're my customers! You can't send them your mailshots!"*);
- direct responses to interactions can be tracked, but not indirect responses (e.g. changes of behaviour following a marketing campaign);
- campaign performance is measured by response uplift, not return on investment (i.e. the increase of customer lifetime value attributed to the campaign);

As a result, there is insufficient information available to improve campaign effectiveness, and the full benefit of the technology is not realised.

Our approach is to close the CRM loop by developing infrastructure and processes that can deploy customer insight generated in SAS directly into marketing tools. Furthermore, the approach supports continuous measurement of campaign effectiveness, and iterative campaign targeting improvement. The methodology covers both business processes and technical architecture.

As a result, the following benefits can be attained:

- full visibility of campaign performance and ROI (return on investment), using both direct and indirect response data, and supporting measurement against actual customer value over time;

- enhanced campaign performance, through incremental improvements to target accuracy
- reduced time-to-market and costs for each campaign, by integrating the business and technical architecture necessary to support the campaign management process;
- optimised channel utilisation through clear definitions of business ownership and effective management of conflicts.

Business architecture

To deliver a closed-loop CRM capability, a fundamental culture change must take place in the way that campaigns are run. To achieve this, a number of key preparatory steps are required, as follows:

- define clear **ownership** of key business "entities":
 - customers (e.g. corporate marketing manager, consumer marketing manager);
 - campaigns (e.g.: product manager, corporate marketing manager, sales manager, loyalty programme manager)
 - products (e.g. product manager)
 - channels (e.g. marketing communications manager, call centre manager, website manager);
- ensure the right supporting **teams** are in place:
 - analytics (SAS users)
 - campaign/content management
- formalise the campaign management **process**

The last step involves developing a suitable business process that covers the full campaign lifecycle, from the initial idea to live operation and beyond. This process will be different in every organisation, however an example that we use as a "template" is illustrated below:

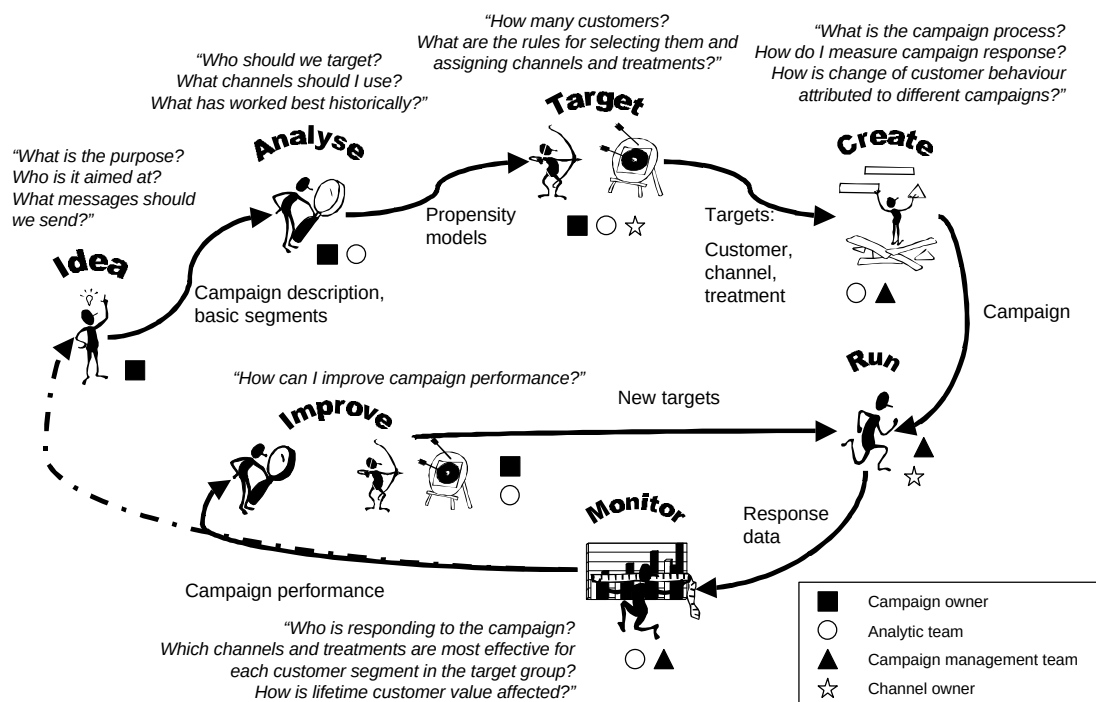


Figure 3 – template campaign management process

The diagram shows how each activity within the process is clearly defined in terms of the team members who must be involved, the input required, the questions that must be asked during the activity, and the activity's output.

Clearly, substantial work will be required to develop a detailed tailored design for this process and implement it within an organisation, but this is the only way to ensure that the potential benefits of the technologies involved will be realised.

Technical architecture

Figure 4 illustrates a technical architecture to support closed loop CRM. The analytical component is based on a data warehouse built using SAS components, including SAS/Warehouse Administrator, Scalable Performance Data Server, SAS/MDDDB, Enterprise Guide and Enterprise Miner.

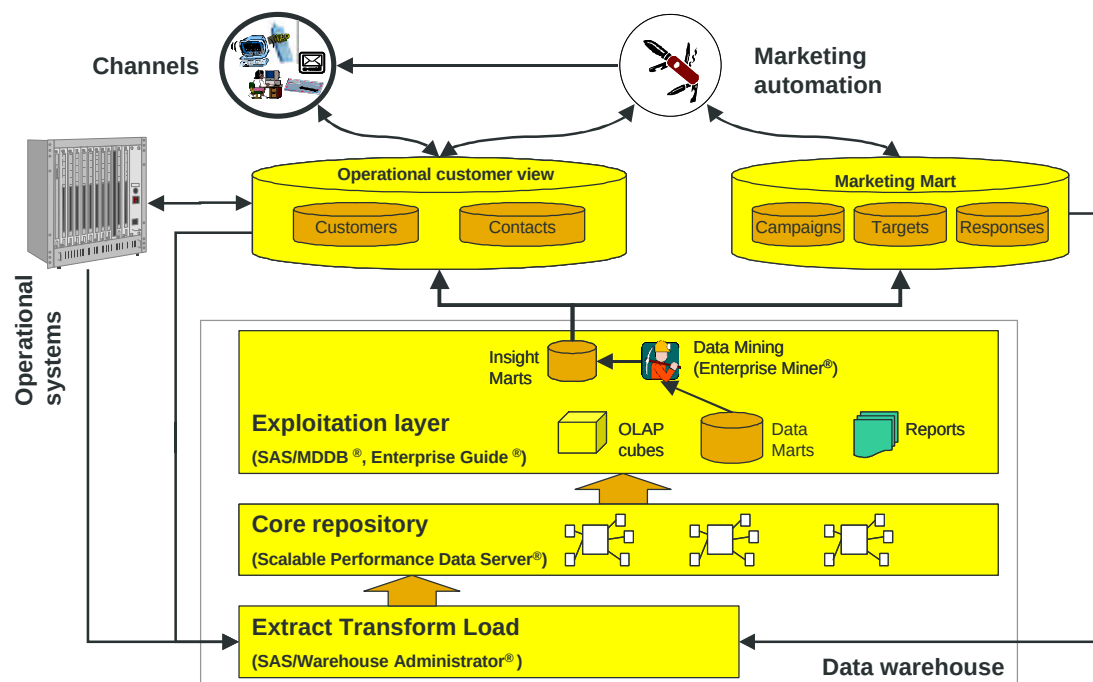


Figure 4 – Closed loop CRM technical architecture

To support effective operational CRM, we often propose the development of an "operational customer view" (OCV) to support customer interactions. This may take the form of a simple database of high-level customer data with "foreign key" references to detailed data held in other operational systems such as billing, Enterprise Resource Planning (SAP, Baan, etc), and other "legacy" applications. In more complex environments it may be implemented using EAI (Enterprise Application Integration) technology – providing a "middleware" layer to access these systems through a single technical interface. The purpose of the OCV is to provide a single consistent view of the customer that can be used by all customer contact systems to support customer interactions. As well as basic customer data, the OCV should hold data on contact history, campaigns, campaign targets (i.e. which customers have been sent campaign messages) and campaign responses.

Marketing tools also need their own database to operate from, referred to here as the "marketing mart". This holds data about customers, campaigns, targets and responses. In addition to drawing data from the marketing mart, it is often appropriate to integrate the marketing automation tools directly with the OCV where possible to ensure that:

- customer data used by marketing tools is consistent and up-to-date with other systems – e.g. ensuring that changes of address or "do not contact" opt-out flags are applied immediately for each campaign execution rather than waiting for a refresh from the data warehouse;
- campaign action and response data can be transferred seamlessly between the marketing tools and customer interaction systems.

Customer Insight generated through data analysis activities is normally held in data marts (typically SAS data sets) within the data warehouse. This data must be transferred to the OCV and/or marketing mart as appropriate – this is explained in more detail in the section on Targeting below. Some examples of the types of insight applicable are as follows:

- strategic segmentation, such as socio-demographic (e.g. "High Flyers", "Families", "Students", etc), geo-demographic (e.g. post-code based data such as ACORN) and value segmentation (e.g. "gold", "silver", "bronze", etc) – segments are often defined strategically throughout the organisation and are used to drive customer interactions and marketing activities – hence this data is applicable in both the OCV and marketing marts;
- loyalty indicators – how likely a customer is to defect to another supplier;
- channel propensity – how likely a customer is to use particular channels such as the Web, email, etc;
- campaign propensity scores – how likely a customer is to respond to a particular campaign;
- response value scores – the estimated value of a positive response to a campaign.

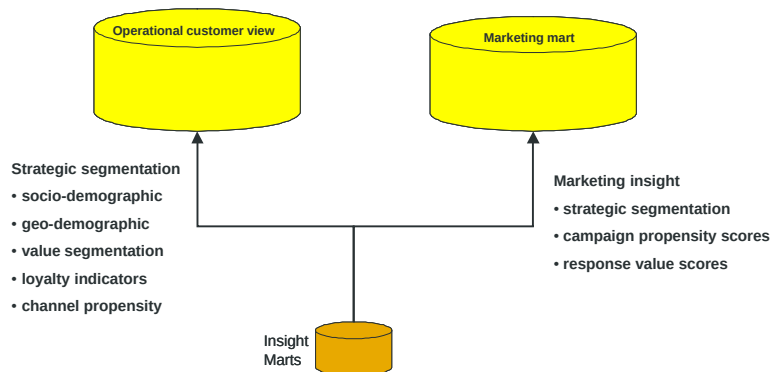


Figure 5 – Insight deployment architecture

In addition to the usual data subjects supported in the data warehouse, an additional subject is required to support analysis of campaigns, known as "Campaign target" (see Figure 6). This subject is used to support a wide range of analysis of marketing campaigns, such as response modelling and performance analysis.

A campaign target represents the fact that a campaign message has been assigned for delivery to a customer, and is defined as a combination of a customer, a campaign, a treatment (i.e. the content of the message to be delivered as part of the campaign), a channel, and possibly a response. Note that the message may not be successfully delivered (e.g. for outbound calling campaigns, the customer might not answer), and this information must also be held in the fact record. The record may also hold a "score" representing the predicted probability that the customer will respond to the campaign when delivering that particular treatment over the selected channel. If the customer is determined to have responded to the message, the response field is populated. This is illustrated in Figure 6 as a star schema, although it is equally possible to incorporate this subject into a normalised relational model.

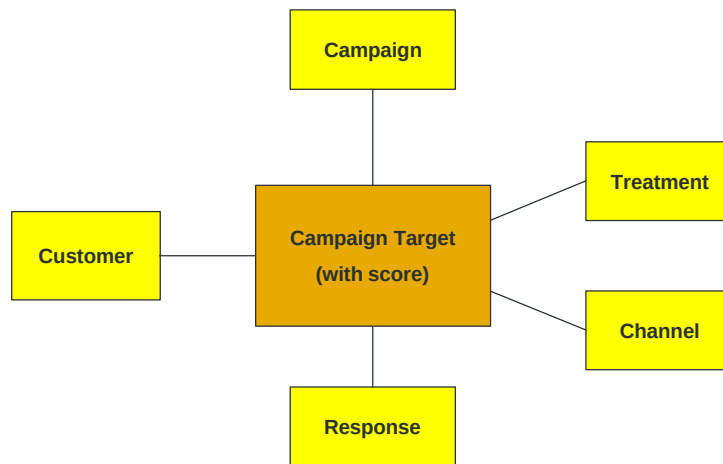


Figure 6 – Campaign Target subject (in star schema form)

A recipe for success

There are a number of issues briefly touched upon in the description of our methodology above that need to be considered in much greater detail at the outset of any closed-loop marketing project. These are:

- selecting targets for campaigns;
- tracking responses;
- measuring performance.

These are addressed in the remainder of this paper.

Targeting

What is a campaign target? As explained previously, this is a combination of:

- a campaign;
- a customer;
- a channel;
- a “treatment” - the message to be delivered.

To ensure that channels are chosen appropriately and utilised effectively, it is important to ensure that

- historical channel effectiveness is analysed by customer segment and campaign type to feed into decisions on channel selection for future campaigns;
- the campaign management team establishes an SLA with each channel owner – for example, this may require a print bureau to deliver 100,000 mailshots per week, or a call centre to deliver 10,000 outbound marketing calls per week;
- channel owners provide visibility of channel utilisation to the campaign management team;
- restrictions on how often customers can be contacted through each outbound channel are agreed with customer owners;

- the campaign management team takes on responsibility for optimising the use of every channel and customer contact "window of opportunity", based on channel availability, the demand placed on each channel by different campaigns, and constraints applicable to customer contact frequency;

Selection of treatments is likely to be based on intuition at the initial stage of a campaign. However, provided that the right data is made available and analysed effectively, selection of treatments can be optimised during ongoing campaigns.

Of course, disagreements can and do arise over what is the best campaign to deliver to a customer, or how a particular channel should be used. Some campaign management tools provide the option to choose customer targets automatically in order to optimise revenue or growth given a combination of propensity scores and constraints such as channel capacity and maximum frequency of customer contact. However, it will take a substantial culture change to trust the technology to make marketing decisions at this level. In practice, it is imperative to ensure that a rapid and effective escalation route exists to resolve these kinds of conflict.

Finally, the use of control groups is crucial to ensure that campaign performance can be measured and improved. These come in two forms:

- inclusive - additional randomly selected targets added to the target group, to evaluate the "uplift" of the targeted selection versus an untargeted selection – this allows you to measure the benefit of the propensity modeling process;
- exclusive - targets randomly removed from the target group, to ensure that the effect of the campaign on customer value can be measured by comparing the ongoing value of customers who were targeted versus those who were not.

Given a model in SAS that can be used to generate the target and control groups, the question remains of how to transfer this information to the campaign management tool. There are a number of methods, as illustrated in Figure 7 and Figure 8. The approach taken will depend on whether this is a one-off campaign or an on-going campaign, and possibly on the specific marketing automation technology being used.

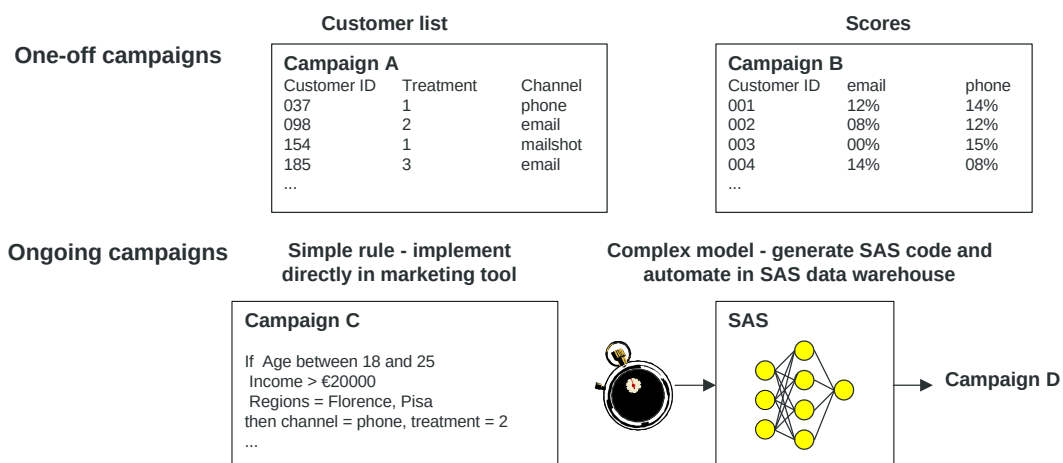


Figure 7 – Methods for specifying target groups

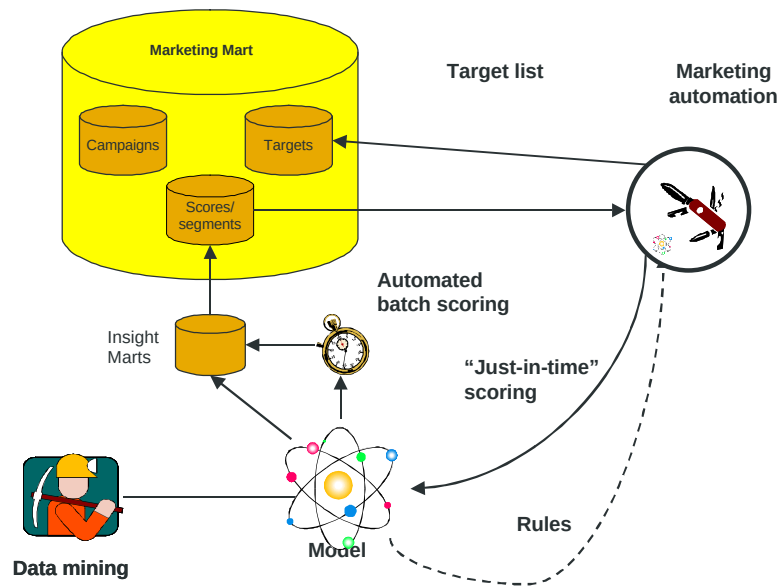


Figure 8 –Deploying customer insight into the marketing mart

For a one-off campaign, the most straightforward approach is to export a list of targets and load these directly into the tool. SAS can export data in virtually any format, or even push it directly into the marketing mart. The exported data may be either a simple list of targets, or a list of potential targets with scores. In the latter case, scores may be used by the marketing tool to decide which customers to target on the basis of estimated cost and revenue data managed within the tool.

For ongoing campaigns, you will probably want to automate this process. There are two possible approaches – which one you choose depends on the complexity of the model and the capabilities of the marketing tool:

- for simple models (e.g. a shallow decision tree generated by Enterprise Miner), it may be possible to implement the rule in the marketing tool to enable it to select the targets on a regular basis without support from SAS;
- for complex models (especially "black box" models, such as those a neural nets), you will need to automate the SAS procedures that generate the targets from the data and export these to the marketing tool.

For the last option SAS/Warehouse Administrator provides all the functions you need to make this process automatic. SAS/Warehouse Administrator provides a simple point-and-click interface to specify the SAS code to be run, the timing for the process, and the location to store the results of the model (which may be in another database). In this way it is easy to ensure that all the data needed to run the model is up-to-date and available before the model is run, and that the data is loaded directly into the marketing tool's target database as the model is executed.

A simpler approach is to automate the model directly from the marketing automation tool. This is supported by SAS Campaign Management (formerly Intrinsic), which can trigger the SAS code and extract the relevant scores from the output data mart at the time of campaign execution – i.e. "just in time" scoring.

Response tracking

What is a response to a campaign? In some cases, the answer can be less than obvious. In general responses fall into two categories:

- direct response (where the customer explicitly responds to a campaign);
- indirect response (where the response takes the form of a change of behaviour, e.g. the purchase of a product, or the use of a new service).

The problems to be addressed are:

- how do you measure indirect responses?
- how is response attributed between multiple campaigns with similar goals?

The first problem requires that you define the business rules for identifying a response to a campaign at the outset – i.e. before the campaign is implemented.

The second problem is more difficult in situations where multiple campaigns can elicit similar indirect responses. For example, one campaign may encourage people to buy a new product, whereas another campaign may encourage people to visit a particular shop. In this scenario, if someone has been targeted with both campaigns and then buys the new product at the specified shop, which campaign have they responded to? In this situation it is vital to seek agreement between campaign owners on how to attribute responses to campaigns before the campaigns are implemented.

Returning to the technical architecture, there are two ways to track responses, depending on the marketing tool:

- if the marketing tool supports response tracking (not all do!), it should be implemented this way (as shown in Figure 9), to ensure that the campaign management team have direct access via their tool to define and modify response definitions;
- otherwise, response tracking should be implemented as part of the ETL process when creating the "campaign target" subject in the data warehouse – this is very flexible but means that the campaign response definitions are managed separately from campaign definitions.

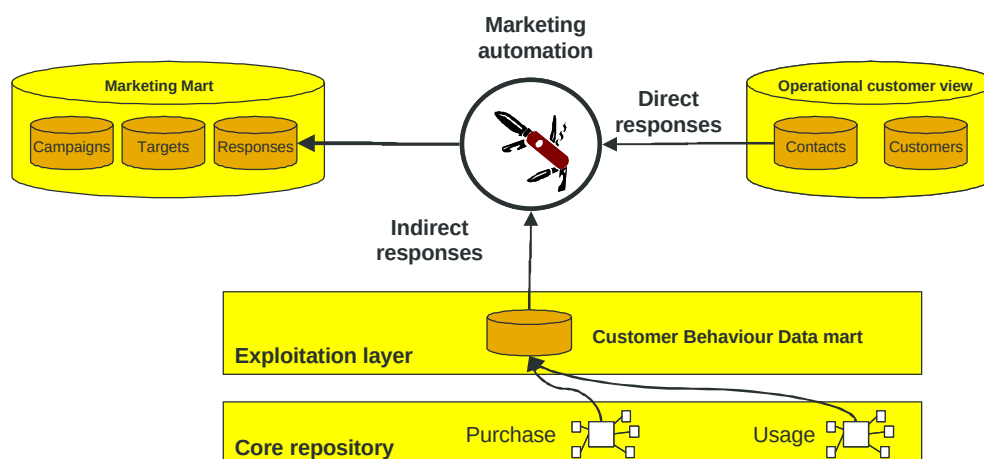


Figure 9 – Tracking responses using marketing automation tools and the SAS data warehouse

In Figure 9, a direct response is obtained from customer contact history in the OCV by the marketing tool following the customer contact in which the response occurred. For indirect responses, the marketing tool will need to have access to summarised data on customer behaviour (e.g. products bought, service usage, etc). To support this, we recommend that you build a data mart in the data warehouse that holds this type of information (or if you are lucky you will have one already!). This data mart may draw information from a variety of subject areas, such as Product Purchase and Service Usage subjects, and will be queried by the marketing tool to derive indirect response data.

Once the business rules for identifying responses have been defined and implemented, the next problem is to match up campaign responses against campaign messages, as illustrated in Figure 10. The rules for this process may vary in complexity but must be agreed between the campaign owners for all affected campaigns. The example given in the figure below shows an indirect response (i.e. a behaviour change) occurring after campaign messages 3 and 4 have been delivered, but the response is attributed to campaign 3 because of the way that responses to these campaigns are defined.

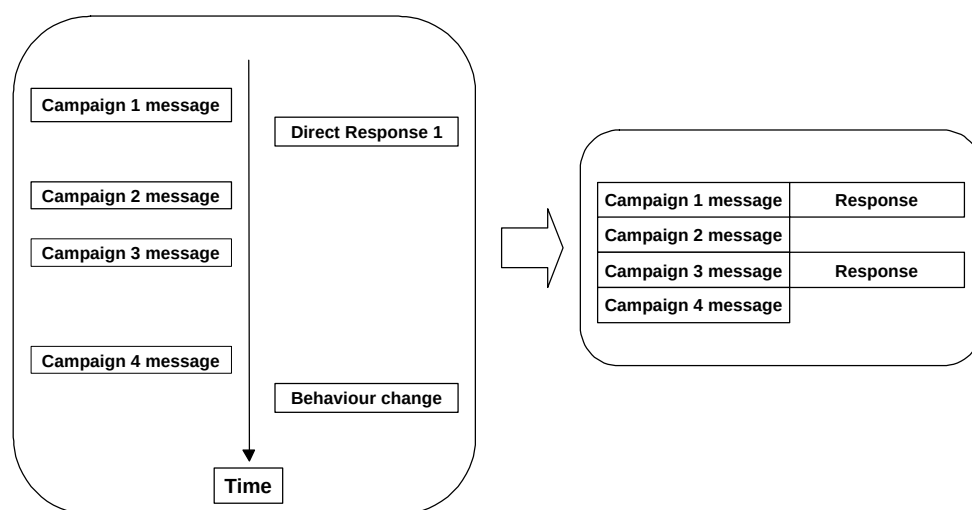


Figure 10 – Matching responses to campaign messages

Measuring performance

To measure campaign performance, it is important to draw a distinction between the short and long term goals of a campaign:

- in the short term, a campaign should elicit responses – a high performing campaign is one which generates a high response rate;
- in the longer term, a campaign should increase customer value – a high performing campaign substantially increases the overall profit generated by the targeted customers over their lifetime.

In some cases these goals are the same. For example, if a campaign's aim is just to encourage customers to buy a product as a "one-off" event, the boost to the customer's lifetime value is just the profit generated by that sale.

In other cases, e.g. encouraging customers to sign-up for an ongoing service such as a telephone or utility subscription, the estimate of the value generated by a positive response is frequently inaccurate or misleading. For example, if a campaign offers a free trial period, will the customers responding to that campaign be as profitable in the long term as the average customer?

To address this, organisations must measure campaign Return On Investment (ROI). To achieve ROI measurement it is necessary to have a customer value model that evaluates the revenue or profit generated by each customer using their historical or predicted spending and behaviour patterns. This is a separate and sometimes very complex exercise, but is usually one of the key drivers behind building a SAS data warehouse in the first place. If you don't have a customer value model, SAS or one of its Quality Partners should be able to help.

Assuming that you have implemented a customer value model in the data warehouse, its co-existence with complete campaign targeting and response data will enable you to evaluate campaign performance in terms of its effects on customer value. Here you should make use of the control groups to generate reliable evidence about the real benefit of every campaign.

Of course, to get meaningful results this can require long term monitoring – as always, please have patience!

Summary

In this paper, we have described our methodology for "closing the CRM loop", which enables organisations to obtain optimal benefit from their investments in SAS customer insight and marketing automation solutions.

The methodology covers business processes and technical architecture to support closed loop CRM, and includes advice on how to avoid a number of the pitfalls surrounding the use of customer insight to drive marketing actions.

We have described the types of problems that many organisations face in using these technologies, and we have explained how our methodology can provide solutions to these problems and deliver a range of benefits, as follows:

- full visibility of campaign performance and Return On Investment, using both direct and indirect response data, and supporting measurement against actual customer value over time;
- enhanced campaign performance, through incremental improvements to target accuracy;
- reduced time-to-market and costs for each campaign, by integrating the business and technical architecture necessary to support the campaign management process;
- optimised channel utilisation through clear definitions of business ownership and effective management of conflicts.

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