

## Multi-way linkages in business and enterprise applications

### Summary

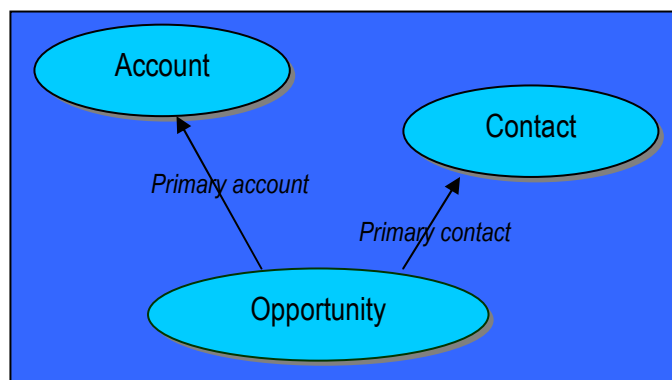
This paper provides a brief overview of the issues that arise when creating associations between record types in business applications.

### Introduction

The primary purpose of a business application is to maintain and manipulate data that mirrors the real world. In the contact management and CRM domain, for example, virtually all business applications are designed to model real-world concepts such as people (*contacts*), companies (*accounts*), *opportunities*, *products* and *activities*. Applications track and maintain the data elements that mirror these concepts. Microsoft Outlook maintains contact records containing a person's name, address, phone number, email and similar contact information. Typical CRM applications include company records containing the name, addresses and contact information for the company, as well as its status, credit rating and industry segments.

### Associations between records

A key step towards enhancing the value of this information is to create associations between records. For example, it is common to associate a contact record for a person with the company record for that person's employer. Similarly, for a particular opportunity record, one would want to associate account record for the company that offers the opportunity, as well as the contact record for the person at that company who is most relevant to that opportunity.



The diagram above depicts this idea graphically, with an arrow from the Opportunity record to each of the records with which it is associated. The labels on the arrows depict the nature of the association.

There are significant benefits that accrue from creating such associations:

**Ease of navigation.** When viewing an opportunity record, for example, the user can quickly determine whom to contact to follow up on the opportunity. In a web application, the user interface can include in the opportunity record a hyperlink which, when clicked, shows the relevant contact record. A similar hyperlink can show the association between an opportunity and its account. Such a user interface makes it much easier for an end-user to navigate the application.

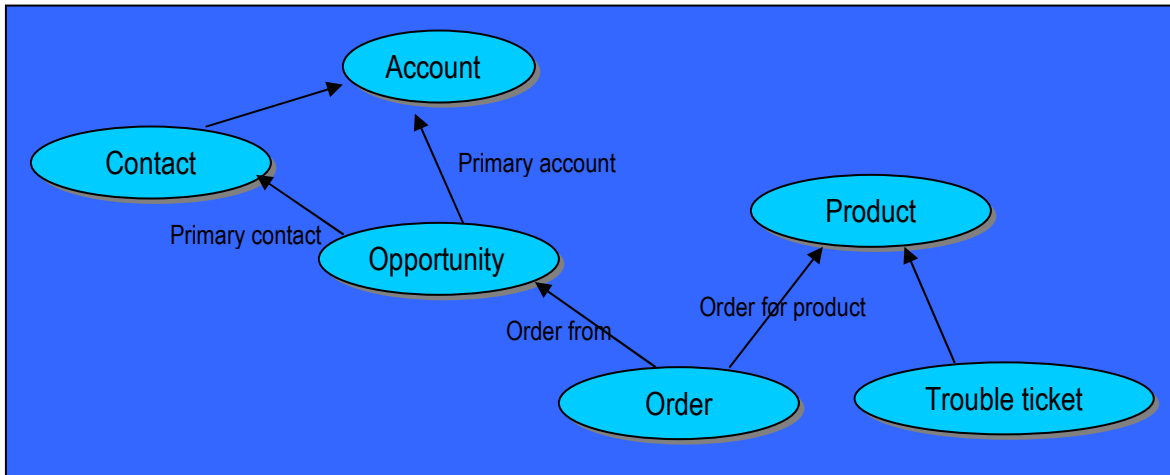
**Business rule enforcement.** Company policies can enforce business rules more strictly. For example, it is reasonable to require that an opportunity can only make sense if we know whom to contact to follow up on the opportunity. To reflect this requirement, one might want to ensure that every opportunity record must necessarily have an associated contact record. Such a business rule is easy to enforce in the application, when once the association mechanisms have been put in place.

**Inverse associations.** Once we require that every opportunity must have an associated account, we can then invert the association, and ask natural questions such as “which opportunity records are associated with the ABC account?” or “Which opportunities are most relevant to a particular contact?” Business is based on maintaining relationships, so the value of such information is obvious. The application can now provide quick answers to such questions, thus enhancing the value of the information.

**Querying and reporting.** The association capability can be used to create reports that offer insight into the health of the enterprise. For instance, we can create a report of all the account records in the database, along with the sum of the values of the opportunities associated with each account. By ordering this report according to the total opportunity value for each account, we can identify high-value accounts over time. Typical reporting capabilities can now analyze this data in multiple ways. Thus the business owner can identify trends in their business, and acquire accurate projections of future performance.

## **Chains of associations**

As the application grows to handle the diverse needs of a business, a natural consequence is that associations create chains. Below is a simplified example of some of the record types and their associations for a manufacturing business.



This diagram shows, for instance, that orders are associated with the opportunity from which they originate, as well as with the product that is ordered. Trouble tickets are associated with the products for which they are created.

The associations thus established now offer even more business value:

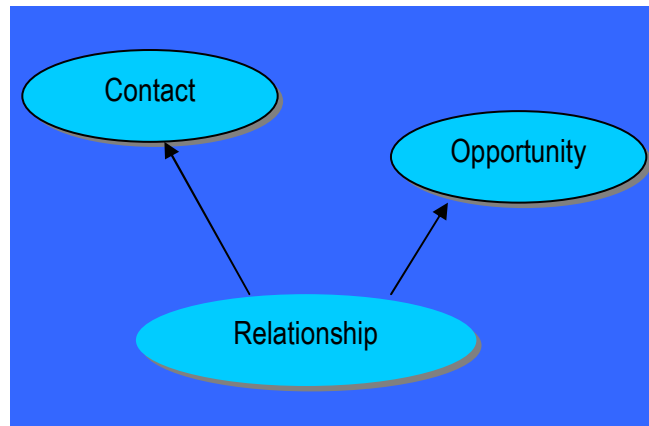
- For day-to-day operations, all customer-related information is now available in a well-structured form. For instance, when a company representative fields a call from a customer, she can instantly access information about the customer, her company, all the opportunities for that company, the orders they placed, the products they purchased and the trouble tickets they have submitted. All of this information is available via seamless linkages and hyperlinks.
- For management, executive decision-making and reporting, the application can automatically traverse all the associations between the records, and provide end-to-end reporting capabilities. Reports that answer questions such as “What accounts placed the most orders last month? The highest-value orders last quarter?” are now easily created and immediately available.

## **Multi-way linkages**

In many of the more complex business settings, it is an oversimplification to offer just a one-way association. For example, in a real-estate transaction, there are several people involved: The buyer, seller, real-estate agents on the two sides, escrow officer, the title company and the insurance company. To cater to such situations, the application must allow multi-linked associations.

A multi-way association is usually set up so that it enables a record of one kind to be associated with multiple records of another kind. In addition, it becomes important to track the nature of the relationship itself. For example, suppose we have two company records for ABC company and XYZ company, and a contact record for Person A. We might want to record the fact that Person A is an employee of ABC company, and a consultant for XYZ company. The key point is that the nature of the relationship is a property of neither the person record nor the account record, but rather that of the relationship between the two.

The technical complexities arising from such multi-way associations are quite significant, and many commercial applications simply do not support them. In those that do support such associations, the data for the relationship is set up via an intermediate “relationship” record type, as shown in the diagram at right. The “Relationship” record maintains the nature of the relationship between a particular Contact



record and a particular Opportunity record. Maintaining such data affords further advantages over traditional systems. For instance, in the example of the real-estate transaction above, it becomes easy to automate the creation of form letters for good-faith estimates and closing statements directly from the application, at the click of a button, the application maintains all the necessary information in one place.

## ***About sfCRM***

The sfCRM application is sfaFinity’s flagship product. It incorporates many of the ideas outlined in this paper, including chained and multi-way associations, querying and reporting facilities.

A key aspect of sfCRM is the melding of multi-way associations with a highly-normalized database, resulting in very high performance while maintaining stringent data integrity standards.

For more details, please visit <http://www.sfafinity.com> or email [info@sfafinity.com](mailto:info@sfafinity.com).