Getting to Customer Dialog: An Architecture for Extending Data Governance to Customer Communications Management

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• Methods, Concepts, and Tools for Information Quality
• Best Practices in Data Quality Management and in Data Governance

Abstract: Data governance (DG) has emerged as the primary tool for assuring that the information assets of an enterprise are managed in compliance with a uniform set of policies and procedures. DG is still an evolving practice, but several processes and systems are generally regarded as standard components of DG. For example, a business glossary, data dictionaries, a data quality program, and master data management (MDM) just to name a few. While customer data and product data are generally recognized as master data and are typically brought under DG through MDM, customer communications have not. As a result, many businesses are failing to realize the ultimate goal of information quality, i.e. to maximize the value of their information assets, when it comes to customer experience management (CEM). This paper describes a proposed architecture and preliminary prototype for extending the governance of customer master data and product reference data to include customer communications and preferences. The design is proposed in terms of a set of data stores, APIs, and policies that help to manage both the automation and complexity of customer communication activities.

Data Governance, Master Data Management, Customer Communication Management, Customer Preference Management, Customer Experience Management, Voice of the Customer

1. INTRODUCTION

Well-executed customer relationship management (CRM) has always been critical to the success of any enterprise whether for-profit or governmental agency. CRM has continued to evolve with changes in societal attitudes and new developments in technology. The widespread adoption of email, text, and social media has dramatically increased the number of channels available for businesses to communicate with customers, while at the same time, customers are more demanding about the how, what, and when of these communications. For example, a recent study by the Aberdeen Group [Minkara 2014] found that the average business already uses nine customer touch-points, such as email, web, phone, mail, events, in-store, social media, online video, and online customer communities.

Even though customers are increasingly expecting a personalized dialog, most businesses are still broadcasting the same message content to large segments of their customer base through channels of their own choosing. At the same time, businesses that fail to honor a customer's communication preferences in channel, frequency, time, and content often find that the customer will simply opt-out of all communications, or worse, the business will lose the customer to a competitor that does honor preferences.

Data Governance (DG) has emerged as the primary tool for assuring that the information assets of an enterprise are managed in compliance with a uniform set of policies and procedures. DG is still an evolving practice, but several processes and systems are generally regarded as standard components of DG. These typically include a business glossary, data dictionaries, data requirements, information policy management, data quality management, metadata management, Master Data Management (MDM), and reference data management (RFD) [Soares 2014].

While customer data and product data are recognized as master data and have been brought under DG through MDM, customer communications have not. As a result, many businesses are failing to realize the ultimate goal of information quality, i.e. to maximize the value of their information assets, when it comes to Customer Experience

Management (CEM). The following sections propose an architecture for extending the governance of customer master data and product reference data to include customer communications and preferences.

2. PROBLEM STATEMENT

Many companies are starting to pay attention to customer feedback and have implemented voice-of-the-customer (VoC) programs. However, simply adopting a VoC program does not guarantee results. Market research [Minkara 2015] has shown that better business results can be directly correlated with companies that adopt best practices and technologies to manage their customer communication. In a survey of 207 companies [Minkara 2015], those that actively engage in Customer Communication Management (CCM) enjoy on average an 87% customer retention rate compared to all others at 56%. This retention differential can produce significant increases in bottom-line results due to the greater cost of acquiring a new customer versus the lesser cost of retaining an existing customer. This is validated in the same study where the year-to-year increase in annual revenue for companies actively engaged in CCM was 48.2% versus only 4.9% for all others.

The problem is that CCM is difficult, especially for companies with a large customer base. Attempts to address CCM through manual intervention are not practical. Large-scale CCM requires an automated system. However, CCM is not simply the recording of customer communications after the fact. In order to be effective, CCM must also assure that out-bound communications from the company to the customer conform to the customer's communication preferences before the communication is actually launched. Moreover, the conformance to customer preferences for both content of communication ("I only want offers about cameras and photography equipment, nothing else") and preferences for channel, frequency, and time of communication ("I only want email offers, and no more than 3 emails per week, please no phone calls or text messages") is required. Because CCM is primarily about compliance with policy, it fits squarely in the domain of DG [Ladley 2012].

3. PROPOSED SOLUTION

The proposed solution to this problem is a Customer Dialog and Preference Master (CDPM) system. The CDPM system is an extension of data governance (DG) to bring customer dialog and customer dialog preferences under master data management (MDM). In this respect, the proposed solution assumes that the enterprise already has a DG program. Furthermore it assumes the DG program includes a fully-developed customer MDM system.

However, the extent to which the enterprise has implemented product MDM is not as critical. The reason is that even though customers have dialog preferences about products and services, i.e. product interests, these product preferences are expressed at a category or group level. An enterprise with a limited number product or service offerings, for example a bank, can still implement CDPM given the product category codes are under Reference Data Management (RDM). Figure 1 shows the relationship of CDPM to customer MDM and product category RDM in an existing DG structure.

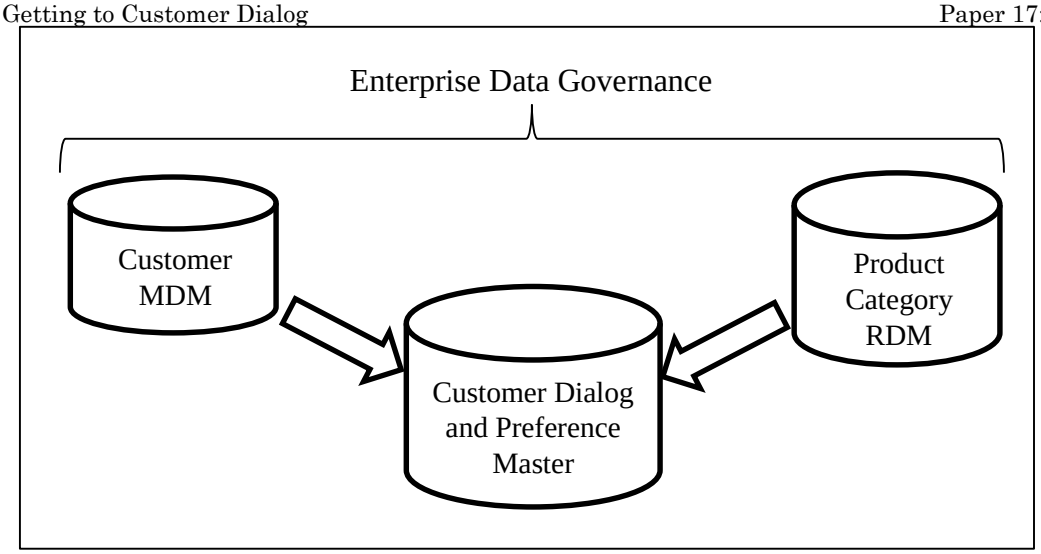

Figure 1. Extension of Data Governance to include CDPM

The goal of the CDPM system is to assure that the dialog between an enterprise and its qualified customer is always in compliance with the customer's preferences for channel, frequency, and time of the communication and the customer's preferences for specific products and services offered by the enterprise.

The purpose for having a CDPM system is to cultivate customer loyalty by consistently honoring the customer dialog preferences. Customer loyalty in-turn leads to many potential benefits for the enterprise including

(1) Higher customer retention rates
(2) Increased sales through the conversion of customers from total communication "opt-out" to an "engaged" customer participating in managed and targeted marketing
(3) Increased profitability through enhanced marketing analytics enabled by a complete and detailed view of customer dialog

4. PROPOSED CDPM ARCHITECTURE

The primary components of the CDPM system are

(1) Customer Dialog Master: A data store that records the metadata for all instances of both in-bound and out-bound communications between the customer and the enterprise. For example
    a. Customer identifier
    b. Enterprise unit identifier (Marketing, customer relations, store number, …)
    c. Direction (in-bound or out-bound)
    d. Channel (email, website, telephone, in-person, …)
    e. Channel address (email address, URL, phone number, store number, …)
    f. Date and time
    g. Message type (product offer, customer complaint, preference setting, …)
    h. Product category identifier (if related to products or services)
(2) Customer Communication Preference Master: A data store that records for each customer his or her preferences for receiving enterprise communications.

Communication preferences are recorded per channel and where applicable include the frequency and time of communication. For example

a. Customer identifier
b. Channel (email, website, telephone, in-person, …)
c. Channel address (email address, URL, phone number, store number, …)
d. Allowable communication types (none, regulatory disclosures, marketing, fraud alerts, …)
e. Priority (1, 2, 3, …)
f. Time preferences (days of the week, times of day, …)
g. Frequency preference (number per time period)

(3) Customer Product Preference Master: A data store that records each customer's preferences for products and services provided by the enterprise

a. Customer identifier
b. List of product category identifiers

(4) Policies: Data governance policies that define compliance to customer dialog preferences. For example

a. All items of information recorded in Dialog, Communication Preference, and Product Preference Masters will use the Customer Identifier from the Customer MDM system.
b. All items of information recorded in the Dialog and Product Preference Masters related to product categories will use the Product Category Identifier from the Product RDM system.
c. Every in-bound customer communication will be recorded in the Dialog Master.
d. Every in-bound customer communication requesting a change to the customer's communication preference will result in an immediate and corresponding change in the Communication Preference Master
e. Every in-bound customer communication requesting a change to the customer's product preference will result in an immediate and corresponding change in the in the Product Preference Master
f. Every in-bound customer communication reporting non-compliance with the customer's communication preference will create a problem ticket that is routed to CDPM data steward for resolution.
g. Every out-bound communication with a customer will be recorded in the Dialog Master
h. Every person, system, or application in the enterprise proposing to send an out-bound communication to a customer must first determine if the proposed communication is in compliance with the customer's communication and product preferences before initiating the communication. Any proposed outbound communication not in compliance the customer's communication or product preferences will be suppressed.
i. All non-compliant out-bound communications to customer will be reported to the CDPM data steward and the DG council for appropriate action.

The logical relationships among these components are shown in Figure 2.

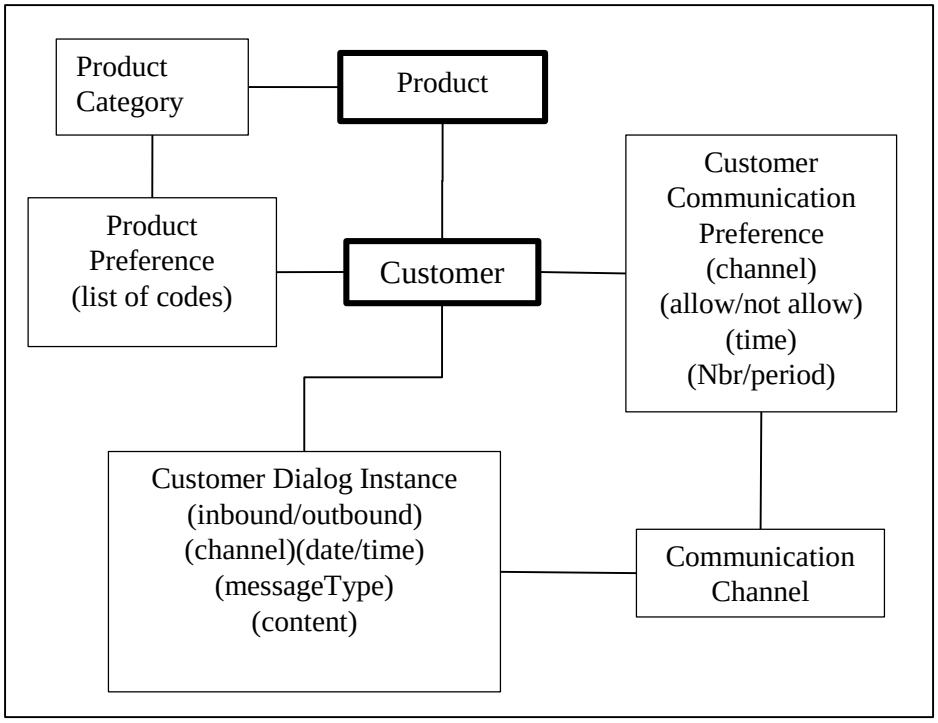

Figure 2. CDPM Logical Components

5. EXPERIMENTAL RESULTS

Some initial work has been undertaken to build a prototype CDPM system as a proof-of-concept (POC). The POC platform is the ISO-8000 compliant Master Data Quality Solutions system from PiLog International. The first demonstration of the prototype was reported at the Industry Day Conference, February 24, 2016, held in conjunction with the meeting of the ISO Technical Committee, Sub-Committee 4, Working Group 13 on Data Quality Standards. The meetings were held on the campus of Cape Peninsula University of Technology in Cape Town, South Africa, February 22-26, 2016 [Talburt et al 2016]

Figure 3 shows the initial entity-relation implementation of the logical design of Figure 2. Note that is assumes the existence of a customer data master (CDM) and a product code (category) reference data master (PCRM). In addition to the table for storing customer communication and product preference (Customer Preference Master) and the actual log of communications (Customer Communications Log), it also introduces three other code tables for contact frequency (Frequency Reference Table), channel types (Channel Reference Table), and message type (Message Type Reference Table).

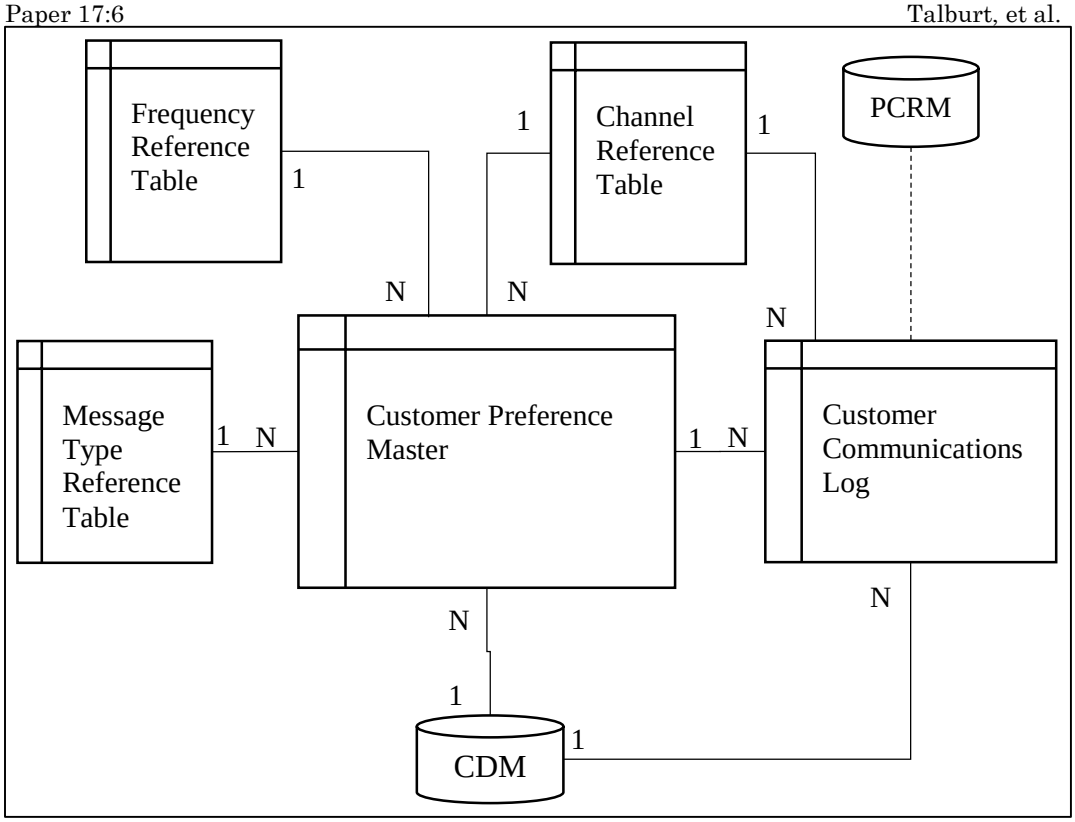

Figure 3. Initial E-R Design of the Prototype CDPM

Figure 4 shows an example of a prototype artifact. In this case it is the user interface for an entry into the communication preference master. In Figure 3, the customer has already been selected and the screen shows the preferences for telephone number 0736453627 in the communication preference master.

The prototype includes a small sample of synthetically generated (fictitious) customer master data. For simplicity, the current prototype only focuses on the storage and management of communication channel preferences using online forms. Graphic interfaces to the CDPM are important especially for in-bound communications that are typically received by a person in the company such as a point-of-sale clerk or customer service representative. These employees need to have the ability to easily enter and modify preferences in real-time during the interaction with the customer.

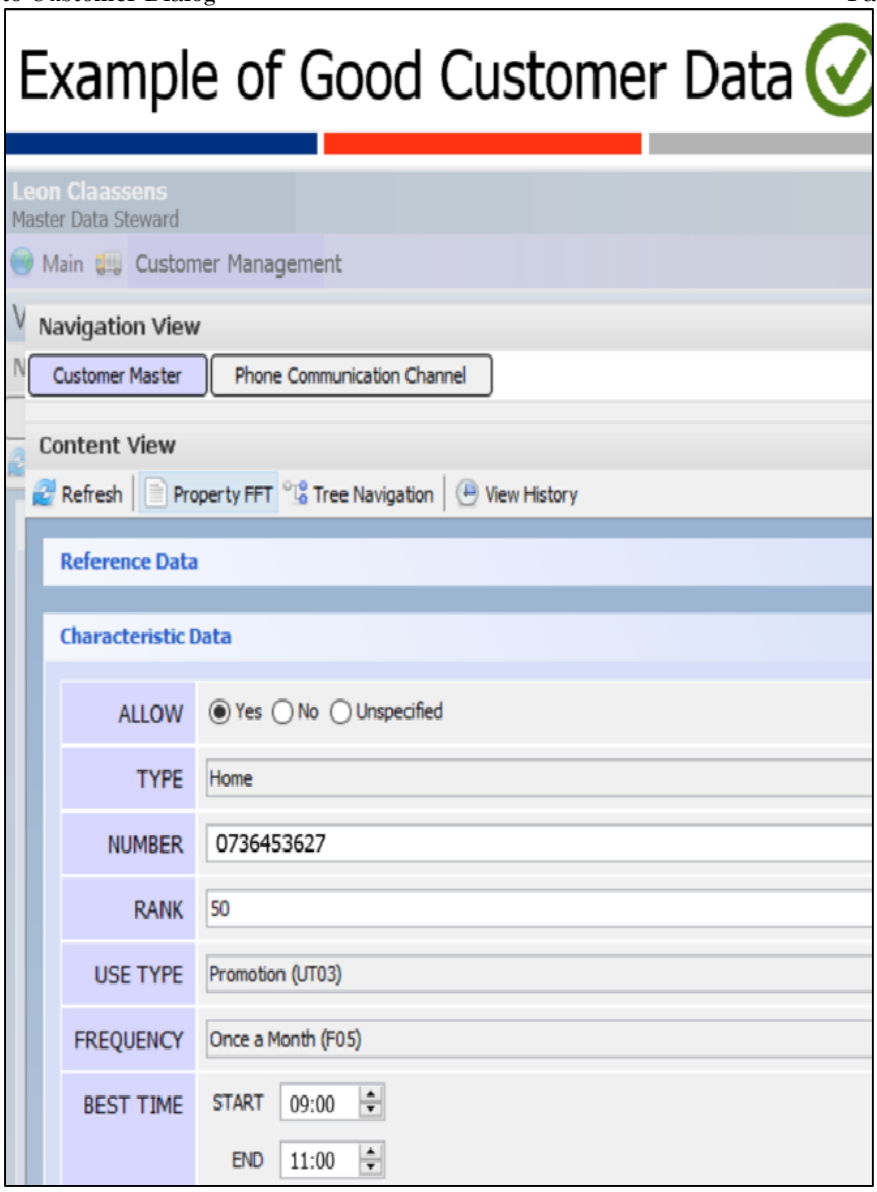

Figure 3. Example of Communication Preference Entry for Phone Contact

On the other hand, most out-bound communications to customers will be in bulk, for example an email marketing campaign, and in these cases more automation is required. Automation will be accomplished through Application Program Interfaces (APIs) that mediate interaction between programs and the CDPM components. The next areas of prototype development are

(1) Design and implement a Dialog Master for saving instances of customer communication.
(2) Write APIs for creating and reading entries in the Dialog Master.
(3) Write APIs for creating and reading entries in the Communication Preference Master.
(4) Write code to implement the business logic that will use the APIs to verify that a proposed out-bound communication to a customer is in compliance with the communication preferences of the customer. Note that compliance logic may

require reading entries from the Dialog Master. For example, to comply with an email communication preference of "at most one email per week," the compliance logic must first determine how many instances of email communications are already recorded for the customer in the Dialog Master and the times the email communications were made.

(5) Write code that will use the APIs to record the instances of out-bound communication in the Dialog Master in the case where the proposed message is compliant with communication preferences, or will generate an exception in the case where the proposed message is not compliant.
(6) Design and implement a Product Preference Master.
(7) Write APIs for creating and reading entries in the Product Preference Master.
(8) Write code with business logic that will use the APIs to verify that a proposed out-bound communication to a customer is in compliance with both the communication and product preferences of the customer.

6. CONCLUSIONS

The initial prototype shows that the major components of the CDPM architecture can be implemented as an extension of an existing customer master data management system, especially the governance of master data acquisition and entry. Important components not built for the prototype are the APIs for programmatic creation and manipulation of the structures. The APIs are critical to the automation of the governance policies. Thus it remains to be demonstrated that the CDPM can be used to automate the conformance to DG policy for customer communication and product preferences in a large-scale test. The ability to enforce automated compliance in or near real time will be critical to its success and adoption as part of DG. For companies with a large customer base where there will be hundreds of millions or perhaps billions of communications to manage, the CDPM will have to be implemented using the new distributed process platforms such as the Hadoop Distributed File System (HDFS) and other Big Data technologies such as Hbase, Spark, Solr, and Hive.

7. FUTURE WORK

In addition to completing the basic functionality of the prototype as described earlier, there are several other aspects of CDPM that can be explored. For example,

(1) The ability to implement policy as scripts rather that hard-coded program logic
(2) The use of data mining on product sales history to "infer" the product preferences for customers who have not explicitly stated product preferences
(3) The use of preference information as a way to launch multi-media marketing or sales campaigns that automatically customize and reformat the message to fit each customer's communication and product preferences.
(4) The use of preference information to set triggers to automatically initiate one-off contact with individual customers through a preferred channel when sales or new offerings correspond to the customer's product preferences.
(5) Verification of current customer and product preferences with big data sources.
(6) The ability to rank communications and the logic to suppress communications. This allows a potentially more relevant and successful communication at a later time for customers with limited allowed communications, i.e. "only send me one e-mail per month."

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