USING A METRO-ETHERNET PROJECT TO ADDRESS IQ CHALLENGES WITH TECHNOLOGY

(Practice-Oriented Paper)

IQ Concepts

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Abstract:

The use of current information technology practices to improve and maintain Information Quality (IQ) standards from a financial and business support perspective continues to be an ongoing challenge. Many financial institutions are losing market share because they are not addressing IQ challenges with current technology practices and because they view IQ not as a product, but as a cost. "To treat information as a product, a company must follow four principles: 1. Understand consumers' information needs, 2. Manage information as the product of a well-defined production process…." [3] Many middle and senior managers do not understand technology and are quickly overwhelmed with "techno talk" or "nerd speak". "In fact, data quality seems to be a hazy concept, but the lack of data quality severely hampers the ability of organizations to effectively accumulate and manage enterprise-wide knowledge. It is the responsibility of IQ data researchers to educate decision makers that data quality is not an esoteric notion but something that can be quantified, measured, and improved, all with a strict focus on return on investment." [1] Many institutions only upgrade technology as a result of vendor suggestions, broken systems, or outdated hardware/software. This "tail wagging the dog" philosophy leads to decreased employee and management satisfaction as well as reduced customer service. Furthermore, this philosophy becomes a circle of errors that begin with degraded/ineffective systems which then leads to unbudgeted/unplanned purchases, and which eliminates strategic planning which leads….you guess it, back to ineffective systems. The ultimate result of this cycle is that one of the most critical dimensions of IQ, data believability, is often irreparably damaged. Finally, an institution's failure to embrace information quality as a product often leads directly to the perception that system data is not relevant and cannot be trusted.

Key Words: Information Quality, Metro Ethernet, Data Believability, Data Availability, Data Accuracy, Data Relevance, Data Transactability, Information Quality

Introduction

Metro Ethernet is defined as a "computer network that covers a metropolitan area and that is based on the Ethernet standard. It is commonly used as a metropolitan access network to connect subscribers and businesses to a larger service network or the Internet. Businesses can also use Metro Ethernet to connect branch offices to their Intranet". [4] This paper details the recent move from Multiprotocol Layer

Switching (MPLS) leased data circuits to Metro Ethernet by a financial institution. While the product implementation discussed below is not an entirely new approach, the application of the technology to address and measure specific information quality dimensions should be useful to other researchers and other similar institutions seeking to measure information quality as company product. The authors have documented some of the project actions and results as they relate to IQ. The institution's overall goal was to use this goal to improve IQ. Specifically, the project was implemented to address the following issues:

- Identification of IQ issues from a business and financial standpoint
- Research, define and implement solutions to the found issues
- Re-invent the network using new methods of existing technology to enhance data quality
- Use of measurements to ascertain and maintain quality improvements
- Monitor and maintain IQ in order to utilize the gained benefits

Client's Prior Information Quality Posture:

a. The bank's facilities consist of ten service locations which were connected via MPLS data circuits. Each location is a full-service banking location issuing loans, new accounts, ATM services, drive-up banking, and with full customer service facilities.

b. The bank was configured with two DSL internet connections at two different sites. Both locations were DSL business class connections with 1MB download and 256KB upload speeds. All bank branch locations were routed through the closest location for internet access.

c. Institution IQ Dimensions Affected by the Prior Configuration:

   i. Data Availability and Accuracy were adversely affected by insufficient bandwidth. The bank's most critical applications and databases are all accessed through gateway hosts at the central location. The lack of sufficient bandwidth created issues with data availability in sensitive applications such as employee time-clock, customer information database, and loan/deposit platforms. The applications often become unresponsive and timeout because the system does not receive input in a timely manner. This causes employees, under pressure to service customers, often make decisions without having accurate data.

   ii. Information reliability (IQ Dimensions of Timeliness and Availability) was affected by inconsistent data throughput. The client's data processing database is a mid-range AS400 based on the central location. Branch banks were connected via 256KB MPLS circuits. While this bandwidth was originally more than adequate, the addition of time-clock software, client-server based loan/deposit software, the increased use of internet based applications for loan and credit processing, and employee intranet caused key data systems to be slow or even unavailable.

   iii. Data coverage was inadequate as several databases were only available to the main banking location and branch banks in the city. This was caused by data routing and cost-based computing. Many of the bank locations in rural areas had to use local telephone companies which had different data handling capabilities than national companies.

iv. The perception (IQ Dimensions of Relevance and Trust) of the quality of data was one of mistrust since databases were updated at different rates. All the systems that were being used were relevant to most employees. This was especially important for the time-clock software which affected employee pay. When it was unavailable or employees had to wait (as was often the case), then trust of the data system was damaged. Bank employees often felt the need to make excuses to the customers for the speed of database system as the customer waited on a transaction be completed.

v. Data Transactability was not measured by the bank. Most fixes and remediation were accomplished in response to the user complaints that the system was slow. This often caused balancing issues between branches and the main office/data processing site further increasing data inaccuracy and faulty automated transaction tracking. Employees were often forced to stay late (resulting in increased costs) to find errors or accomplish manual transaction posting and balancing.

Client's Post Project Information Quality Posture:

a. Ten Service Locations and 13 Automated Teller Machines (ATMs) are now connected via fiber-optic cable with bandwidth of 5MB.

b. One central Internet connection with 5MB bandwidth and a contingency DSL backup internet connection is installed at the bank location on the hospital electric grid

c. IQ Dimensions Affected

i. Data Availability and Accuracy was improved by increasing bandwidth from 256K to 5MB. Besides the obvious increase in the size of the data pipe, the bank also gained a level of redundancy with a self-healing fiber-optic network ring. While it was common knowledge that more bandwidth would increase the availability of data and allow for more accurate data processing and tracking, the measurement of these improvements allowed management to see information as a commodity or product. The table below is an indicator of the specific gains in data availability and accuracy. While the original purpose was to provide more bandwidth and system resources, the bank discovered gains in productivity (measurable), accuracy (measurable), and morale (immeasurable).

DATA SYSTEM	256KB MPLS AVERAGE TRANSACTION TIMES AND ERROR RATES PER MILLION ATTEMPTS	5MB METRO ETHERNET AVERAGE TRANSACTION TIMES AND ERROR RATES PER MILLION ATTEMPTS
Data Processing System (Customer Information	182 seconds per transaction measured over the last 6 months with an average	96 seconds per transaction measured over the past 3 months with an average

File)	of 28,533 transactions per day with 114 errors per day	of 30,056 transactions per day with 76 errors per day.
Time Clock	35 seconds per transaction measured over the last 6 months with an average of 842 transactions per day with 10 errors per day	22 seconds per transaction measured over the last 3 months with an average of 842 transactions per day with 4 errors per day

ii. Information reliability and consistency was increased by adding bandwidth and redundant logical fiber optic rings allowing automatic data traffic re-routing during an outage or broken cable. Every year since 2001, at least one bank location has been without data services due to a severed cable or other data interruption. The ability to reroute traffic on the fly has provided a method to keep systems up to date and databases more reliable and consistent. This was proven by a 60 percent decrease in the bank's time clock application and an error rate decrease of over 30 percent in the reliability of the bank's most important system, the customer information database.

iii. Employee perception of data quality is greatly improved because legacy databases are now quickly accessible from all ten locations. Applications such as the loan and deposit platform system (used to document new accounts or new loans) and the time clock application are now available within a reasonable time. Before the project, employees would often work to not use the systems, over the last three months, the number of system generated loans and new accounts have also increased.

SYSTEM	256KB MPLS	5MB METRO-ETHERNET	DELTA
LOAN PLATFORM	18 LOANS PER DAY	22 LOANS PER DAY	+18%
DEPOSIT PLATFORM	24 ACCOUNTS PER DAY	29 ACCOUNTS PER DAY	+18%

iv. Data transactability has been increased because the desired business outcome of accurate, timely, reliable financial data has been delivered at a basically the same financial rates as the Bank was paying for MPLS circuits. As outlined above, data is more accurate, reliable, and timely. Another benefit was the increase in productivity, presumably caused by the increase in morale.

CONCLUSION

The authors have personally observed numerous technology improvement products **(projects).** Many are the function of overzealous managers with a yen for being on the leading (or bleeding) edge of technology with not nearly enough concern for standards or product returns. Other projects belong to the realm of enthusiastic commissioned sales personnel who use the trends of industry such as security concerns or the end of legacy software to promote the installation of the newest technology, sometimes with little or no regard to the customer's real needs. "To manage any resource, it is important to understand the concept of the life cycle, which refers to the process of change and development throughout the useful life of something". [2] The project detailed above began as purely a technology exercise. The move from leased-line data circuits to variations of fiber-optic is not a new project. What this bank gained was an understanding of how the move measurably increased IQ in the organization and added dollars to the bottom line. The lessons learned in this project can be duplicated and even multiplied in other organizations of any type. The education of senior management of measuring IQ every day and seeing IQ as a key organization product (instead of a cost center) are the first steps in meeting the challenges of IQ. Projects like this, documented with detailed research on improvements, will be invaluable in helping organizations make the first step in the value of IQ.

REFERENCES

[1] Loshin, David " Enterprise Knowledge Management: The Data Quality Approach," Chapter 1: Data Quality Management: Problems and Horror Stories. (2001): 1-21.

[2] McGilvray, Danette "Executing Data Quality Projects: Ten Steps to Quality Data and Trusted Information" Chapter 2: Key Concepts. (2008): Pg. 19

[3] "Manage Your Information as a Product", Richard Y. Wang, et. al. Sloan Management Review 1998

[4] Wikipedia. Metro Ethernet. 2010. 25 June 2010 < http://en.wikipedia.org/wiki/Metro_Ethernet>.