The Use and Value of Call Event Data for the Telecommunications Provider

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Introduction

Since de-regulation began in world telecommunications markets, incumbent carriers have consistently underestimated the impact competition would have on their market share. Just a few short years following de-regulation in the UK, BT lost 50% of the outbound toll calls made by businesses from London. In New Zealand, one of the first markets to de-regulate, TCNZ underestimated market share loss by a factor of ten.

Wireless carriers and IP telephony providers threaten to accelerate the erosion of the incumbents' customer base. More than ever, customers have more communications choices, are increasingly technology savvy and less loyal to established carriers. **Telco** holds a privileged position in its markets today. It still retains the vast majority of business and private customers in its local markets. Undoubtedly, **Telco** expects to lose market share as more carriers offering more services compete in its markets. However, **Telco** has a significant competitive weapon with which it can minimize market share and profit erosion. Data. Information about its customers, both business and private, and how they use its networks, products and services. **Telco** collects 300 million switched call records every day. Call records are *the* primary record of how and when customers interact with **Telco**. Of course, **Telco** collects other data about its customers interactions – service orders, network trouble reports, call center inquires and responses to marketing campaigns. All of these records are key to understanding customer needs. But none of these data types are more important than call records. Call records not only tell the telecommunications company when its service was consumed. They also indicate *how* the service was consumed. Leading telecoms are beginning to put this information to work.

It is more critical than ever for telecoms carriers to use call records as a basis for understanding customer behavior. Much has been written about the one-to-one marketing imperative. One-to-one marketing is not just another consulting theory to begin planning for. It is upon us today. Around the world, across many industries, successful companies are using one-to-one marketing to retain their best customers and acquire new ones. And they often acquire new customers from slower moving competitors. Not a single current or potential competitor in **Telco**'s home markets has the opportunity to "know the customer" as well as **Telco**. Why? Because **Telco** collects call event records[1] for virtually every user of fixed live telephony and the majority of wireless and internet customers. These data assets are a historical record that can tell **Telco** what customers want, how they want to buy services, who is unhappy, and who is profitable (and most likely to be!). Information hidden in call event records is a more valuable competitive asset than even **Telco'** s network infrastructure and quality service. Any company with the financial wherewithal and technical expertise can build a network targeted at selected **Telco** customers. But no company should ever know more about those targeted customers than **Telco.**

[1] Call Event Records may include switched, IP, wireless and other records relating to network transmission.

One of the most important challenges **Telco** faces today is developing its ability to "know the customer". Superior customer knowledge provides **Telco** with the best defense against current and future competitors. The challenge is not an easy one to overcome. If it were, knowledge of individual customers would merely represent competitive parity in today's markets. To succeed, the right technologies, processes and organizations must eventually be in place. Consistent, granular, and accessible data underpins the entire effort. **Telco** recognizes the imperative, recently deciding to undertake a very significant data warehousing project.

In parallel to its data warehouse project, and as part of **Telco**'s information architecture, a historical repository of **Telco**'s call event data should also be deployed. The business and technical benefits of collecting, storing, managing and providing access to *all* call event data are potentially enormous. Arguably, market share and profitability can not be maximized without manageable access to a phone company's call event records. Operational excellence is not assured in today's hyper-competitive telecommunications market without the hidden insights found in call event records. While the technical benefits that arise from accessible data and lower computing costs can be substantial, the impact of call records on business decision making is greater.

Business Discovery

The business case for an atomic data store that captures, stores and manages **Telco**'s call event records should include:

- Savings that accrue over current IT methods and technologies
- Ability to adopt future IT requirements with minimal disruption
- Top-line and bottom-line benefits resulting from enhanced decision making capabilities

This paper focuses on the compelling business benefits from the use of historical call event records.

Every month **Telco** waits to begin collecting call records and making them accessible to the business is lost opportunity – like network bandwidth that goes unused. It is impractical to create a historical call event repository by back loading 300 million daily call records from tape archives. Yet it is the history of network usage that makes new decision making processes possible. What follows are examples of the use of call event records to develop customer insight and improve business planning processes. The paper also discusses how accessible call record data can improve common telecommunications company operations. Call event data can impact many business functions, but the base data is the same from each use.

The applications and business benefits outlined here were "discovered" during engagements with providers such as AT&T, British Telecom, BellSouth, AT&T Wireless, SBC Corporation and MCI/Worldcom. The Discovery process is depicted in the following diagram. Discovery links the use of data to applications that support current and future corporate initiatives. In turn these initiatives have top and bottom line business impact.

Discovery is most effective when multiple organizations participate in the process. Network planning/operations, marketing, finance, sales and regulatory compliance business units *all* have needs that access to call records can fulfill. The business case for a historical call event data repository should consider all of these organizations.

The same, base call event records are useful to any and all of **Telco's** business functions. Telecoms' informational (as opposed to operational) systems historically focus on benefits to the Marketing organization. The informational needs of finance, network operations and compliance are frequently viewed as secondary. Yet, these organizations stand to significantly benefit from enhanced decision making enabled by a historical call event repository.

Following are potential areas of business value for **Telco**'s business functions.

Network Planning/Operations

- Optimize capital budgets
- Match build-outs to customer needs
- Avoid/ Reduce network outages
- Meet QOS standards
- Reduce network fraud

Marketing & Sales

- Retain customers
- Acquire Customers
- Increase network usage
- Increase product/service usage
- Optimize marketing budgets
- Maximize customer service
- Reduce/optimize channel costs
- Increase customer profitability

Regulatory Compliance

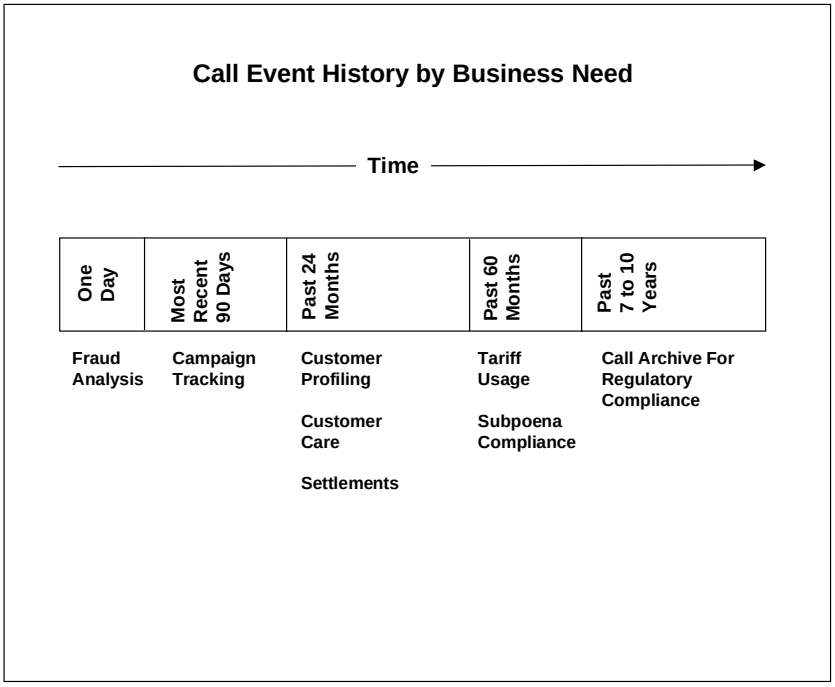
- Justify tariff structure
- Improve timeliness of compliance
- Reduce Compliance infrastructure costs

Finance

- Measure & track product and customer profitability
- Accurately forecast demand
- Reduce costs and improve responsiveness to audits
- Ensure timely and accurate collection of interconnect revenue
- Reduce network fraud
- Implement new flexible billing system

Leading telecommunications carriers have successfully developed and deployed informational applications that transform they way business is done. The rest of this paper will describe by example some of these applications, by business area. It will enumerate the business impact of these applications and provide **Telco** a business benefits "framework" for understanding the potential value of managed and accessible call records. While all of these applications require call records as a

foundation data element, the amount of call event history and the "state" of the call record varies. For instance, some applications may require access to the raw, binary state of the call record while others use the pre-rated ASCII version. Months, or even years worth of call event history are necessary to enable certain applications, yet others only require the most recent day's activity. Following are "rule of thumb" guidelines that match business areas to the call event history they generally require.



Impact of Accessible Call Event Data by Business Area

Network Planning and Operations

Fraud Analysis and Signature Processing: Fraud Management is comprised of two primary activities – fraud detection and fraud analysis. Fraud detection is a real-time activity occurring in the network itself. Once triggered, these systems block potentially fraudulent calls based upon pre-determined call characteristics such as call termination point. Network fraud is a major source of lost revenue. In the U.S. alone, fraudulent network activity costs carriers nearly $4 billion per year.

But how does the telecoms provider decide which calls should be detected as fraudulent? If too many fraudulent calls pass undetected, the revenue impact is serious indeed. However, if the carrier blocks calls that are not fraudulent, it risks alienating customers. Fraud analysis is the activity that continually fine tunes fraud detection capabilities. An imperative for fraud analysis is to develop network usage patterns for each individual customer. For instance, AT&T establishes a customer profile, called a signature, for every customer, business and private. The signature is updated every day with the network activity from the previous 24 hours.

Customer signature processing uses call records to establish usage patterns based upon several dimensions. Call dimensions include:

- Day of week
- Time of day
- Call duration
- Region of world
- Frequently called numbers

Customer signatures are used to support fraud investigations. Signature processing only requires the most recent 24 hours worth of call activity, but *all* calls for the day are used. The signatures themselves are stored and can be from 150 to 600 bytes each. (N.B. The management of signatures can require more storage than the call records from which they are derived.)

Accurate and thorough fraud investigation practices can yield significant financial benefits to the organization. Fraudulent calls can cost major carriers, such as AT&T or **Telco**, $100s of millions in lost revenue each year. Small improvements in fraud detection yield major gains to the company's bottom line.

Optimizing Capital Budgets: Major telecoms providers spend billions of dollars (Deutsche Marks, Pounds, Sterting, etc.) deploying their networks. Marginal improvements that optimize network–related capital budgets translate to significant improvements in a carrier's bottom-line results. Leading telecommunications providers are beginning to utilize network usage information to maximize network capital expenditures and increase their return on these investments.

Customer usage data combined with other customer information should be used to augment the network planning process. Usage data assists network planners overcome these common issues.

- Network Infrastructure projects are often delayed because they require additional justification. Customer-specific detail that supports overbuild activity provides justification to the company's current forecasting model recommendations.
- Multiple projects frequently compete for capital budgets. Facility analysis based on customer usage patterns enable the company to select projects with the highest return.
- Inter-network usage measurement and cost recovery are critical to capturing the true operating costs of the 'unbundled' communications network.
- Existing growth forecasting tools tend to be highly analytical and ignore customer-specific growth and network requirements

Access to customer network usage data facilitates improvement in network planning by process. In turn, **Telco** can reduce costs associated with network growth or spend capital budgets where they are likely to have the highest return on investment. Market leaders will merge customer usage profiles into the network planning process in order to meet the requirements of top-priority customer segments. The chart below identifies the characteristics of "Market Laggards" and "Market Predators" with regard to the network planning process.

Market Laggards	Market Predators
• Statistical spreading of growth estimates • Reaction-mode to surprise exhaustion of capacity • Little or no communication between planning and operations • Capital-budget driven initiative	• Customer and revenue sensitive growth planning • Anticipation of shifts in customer demand drives network expansion • Synchronized organization from Planning to Engineering to Installation to Operations • Profitability and ROI drive investment decisions

Of all of **Telco**'s organizations, network planning and operations can potentially deliver the biggest business value when their decision-making processes are enhanced by the use of call detail records. Key functions supported by access to call records and the applications that usage data enables are summarized below:

- Customer demand-based planning
- Facility utilization analysis
- Customer usage analysis
- New technology placement
- Wholesale capacity analysis
- Historic pattern detection
- Special customer requirements/bid analysis

Finance

Finance organizations also benefit from timely access to historical call detail information. Two finance business functions will be discussed – Audits and Interconnect Settlements. These applications of call detail records are not related to "knowing the customer". However they can have significant impact on top-line revenue, as in the case of settlements, or bottom-line cost reduction, such as audits.

Response to Tax Audits: Telecoms are frequently audited by various local, state and federal government agencies. Any of these government entities may tax a phone call that originates or terminates in their jurisdiction. Telcoms can incur substantial data processing and labor costs in responding to audit requests. The pressure on telecoms providers to provide actual data rather than extrapolating from the most recent years is intensifying. Leading carriers such as AT&T have built archives that store, manage and provide access to up to seven years worth of tax compliance information. At any one time, a major carrier (at least in the U.S.) is managing as many as 100 audits. Carriers incur substantial labor costs preparing each set of reports for the auditing agency. Depending upon the outcome of the auditor's ruling, the carrier pays the taxes (plus applicable penalties), settles on a compromise amount, or argues the case through the legal process.

A major telecoms carrier in the U.S. may incur as much as $200 million in additional taxes and penalties above and beyond those that have already been paid. The provider's ability to accurately and quickly respond to audits reduces labor costs. But more significantly, when it can justify with historic data that no additional taxes are owed, tens of millions of dollars may be saved. In other words, a typical telecoms company has to generate an additional $75 million to compensate for every $10 million of unnecessary taxes it pays, based upon a net profit rate of 15%. Call record history is the basis for accurately responding to tax agency audits.

Interconnect Settlements: Another use of call event records by telecoms' financial organizations is in support of disputes relating to the Interconnect Settlements. The process of handing off a call from one network to another is referred to as interconnect. In most cases, the originating carrier collects payment for the entire call. The carrier then "settles" with the second carrier for that portion of the call it carried. Interconnect Settlement agreements between carriers enable 'seamless' transmission of calls between domestic and international telecoms providers.

As one would imagine, vast sums of money are exchanged among carriers on a regular basis when settlements are made. For a major Local Exchange Carriers (LEC) in the U.S., settlements can represent 40% of its network services total revenue. However, settlements owed by one carrier to another are commonly disputed. Furthermore, the process of validating settlement charges can be labor intensive. Clerks manually spot check random bills to extrapolate settlement expenses and revenues. Obviously, small percentage adjustments in a settlement charge can result in a swing of millions of dollars either way. Accuracy is auditing settlement requests can yield top-line revenue benefits that are indeed substantial.

One U.S.-based long distance carrier uses a call event detail repository to assess the accuracy of its settlement charges for international traffic. A single analysis of a disputed settlement charge with a foreign carrier resulted in over $2 million of savings for this carrier. The lesson this carrier clearly demonstrated is "Those with the most accurate and timely access to call records win" disputes. The call event data repository is the key to protecting revenue that might otherwise be lost during the settlement process. Secondarily, it can significantly reduce labor costs associated with validating settlement charges and revenue.

Marketing and Sales

Most data warehousing initiatives in telecoms focus on sales and marketing applications. At first, telecoms data warehouses were designed to store and provide access to billing data, service order records, and other customer related information such as SIC codes and demographic data. Increasingly, telecoms recognize the need to access and analyze call detail records in order to understand customer behavior. Summarized billing information is not adequate to model customer buying patterns. What's needed is access to call detail records that support the advanced analytics telecoms require to develop "one-to-one" marketing initiatives.

What are some of these advanced customer, product and channel profiling applications? Following are examples applications identified during numerous Discovery engagements with telecoms carriers around the world.

- Predictive customer churn modeling
- Predictive product/service churn modeling
- Rate plan matching
- Sales channel optimization analysis
- Usage-based market segmentation
- Tariff elasticity modeling
- Campaign effectiveness tracking
- Campaign target list modeling
- Early adopter identification
- Identification of future high-value customers

Three of these analyses will be discussed further. The cumulative business benefits of advanced customer, product and channel profiling will result in significant top and bottom line benefits for the telecoms that implements them. One senior telecoms executive claimed that these capabilities would

> "…help us increase sales by 15% and improve (customer) retention by 10%."

Usage-based Market Segmentation: The same signature analysis described in an earlier section of this paper is used to segment customers based upon their network usage patterns. Usage signatures are created for every individual customer, both private and business, and updated daily. Market segments are created by scoring signatures and grouping those with common scores. The telecoms sales and marketing initiatives are designed to stimulate network usage. Only by fully understanding *how* customers use the network can the provider affect usage to its maximum benefit.

Rate Plan Matching: Telecoms providers commonly match one another's tariff or rate plans. One carrier introduces a new rate plan and its competitors respond with one of its own. One could conclude, therefore, that the telecoms market is not price sensitive. Upon further investigation, however, telecoms providers may find that over half of their customers are on rate plans that are not suited to their calling patterns. One leading wireless carrier in the U.S. estimated that as many as 80% of its subscribers were on the wrong rate plan. This carrier was looking for a way to analyze its customers' calling habits (starting with high value subscribers). It wanted to proactively recommend a rate plan that matched the customer's usage characteristics. When subscribers are on the wrong rate plan they are likely to be price sensitive and susceptible to a competitor's offer. Subscriber's historic call records are a pre-requisite for matching the carriers' rate plans to its customers needs. Rate plan matching is an effective tool for customer retention.

Sales Channel Optimization: For most wireless telecoms providers, the cost of acquiring customers has remained virtually unchanged over the past several years. Unfortunately, the average monthly spend of most subscribers continues to fall each year as service becomes more ubiquitous and competition drives prices down. This means that the payback period for an average subscriber has grown. One U.S.-based wireless carrier we studied spent $400 to acquire each new customer. During a four year period the average spend fell from $200 to roughly $50 per month. Therefore, the payback period for an average customer grew from two months to eight. The adverse effect this has on customer profitability is obvious. Coupled with high churn rates, this carrier lost customers before they could contribute the company's profitability.

To address this business issue, the carrier began implementing new, less costly sales channels. For instance, it introduced Kiosks at certain shopping centers and began distributing its service through discount retailers to avoid paying high sales commission rates. The carrier needed to know which customers it should target with each sales channel. The issues here of course are that each customer will prefer to be served by a particular sales channel. Kiosks will work well for some subscribers while others will prefer traditional retail channels. The telecoms provider may want to serve high value customers (and future high value customers) through higher cost/higher service channels.

Predictive Churn Modeling: Customer and product churn are significant business issues associated with competitive telecoms markets. Wireless carriers in the U.S. experience customer churn rate of 20-25% per year. If a carrier plans to increase its subscriber base by 25% per year, then it needs to achieve 50% growth in new subscribers to compensate for customers that disconnect!

To compound the problem, once a subscriber decides to terminate service, the telecoms provider has little hope of turning that customer around. In most cases, the turnaround success rate is no more than 10%. In other words, 90% of the time a subscriber notifies the carrier of his intent to terminate service, the carrier is unable to retain the customer.

Analytical applications can, with a high degree of certainty, predict which customers will disconnect and when. Once known, the carrier can take preemptive sales and marketing action to retain the subscriber, *before* he decides to leave. Several vendors have introduced analytical tools that assist the carrier in identifying "at-risk" customers. These tools require the analysis of calling patterns to be most effective. Network usage is easily the most frequent means by which customers interact with the carrier. Churn models use call records to detect significant changes in how individual customers use the network as an indication of "at-risk" status.

Marketing organizations, like other telecoms business functions, have many potential requirements for call event records. Network usage analysis, at the individual customer level, is ultimately required to fully understand customer behavior.

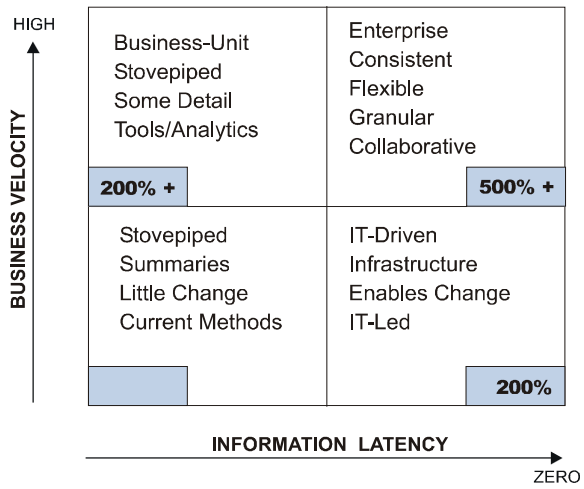
Regulatory Compliance

Subpoena Compliance: Telcoms providers are mandated to retain historical records which are used to comply with a variety of regulatory requests. The "compliance" infrastructure is a cost center for most telecoms company today. Depending on the jurisdiction, the carrier is required to keep 5 to 7 years worth of call records. Call details may be used to resolve customer billing disputes, respond to police subpoenas, and justify tariff structures. Some of these mandates such as subpoena compliance have strict limits associated with how much time a telecoms provider has to respond to a request.

A large telecoms carrier may spend as much as $10 to 12 million annually simply maintaining the call detail record infrastructure required to meet regulatory mandates. AT&T decided to re-architect its subpoena compliance environment to reduce the very high labor and information processing costs it incurred. The company also realized that the same call record data it maintained and managed for compliance could be used for marketing, sales, network planning and financial applications. The signature processing application described earlier uses the compliance Call Detail Warehouse to draw its data. Signatures are used for fraud analysis as well as by marketing to segment its customers. AT&T has turned an environment that was once considered a cost center into a "profit generating" environment. All while meeting its regulatory commitments.

Summary

The business value of call event records may be found in any one of the telecom's business functions. Network planning and operations, marketing, sales, finance and regulatory compliance each have applications that benefits by the use of call records. The power of a call event detail repository is that it can support multiple telecom business areas.



The cumulative business benefit of the call event detail repository will depend on two factors – the speed with which an enterprise needs to move and its ability to deliver business information when it is needed in the form it is required. These dimensions are referred to a Business Velocity and Information Latency. A call event detail repository is essential to the telecom's ability to approach zero information latency. Industry experience indicates that the Return on Investment for a call detail event repository exceeds 500% in competitive telecoms markets.