AUDIT ANALYTICS
and
CONTINUOUS AUDIT

Looking Toward
the Future

AICPA®

AUDIT ANALYTICS and CONTINUOUS AUDIT

Looking Toward the Future

AICPA®

Notice to Readers

Audit Analytics and Continuous Audit: Looking Toward the Future does not represent an official position of the American Institute of Certified Public Accountants, and it is distributed with the understanding that the author and publisher are not rendering legal, accounting, or other professional services in the publication. This book is intended to be an overview of the topics discussed within, and the author has made every attempt to verify the completeness and accuracy of the information herein. However, neither the author nor publisher can guarantee the applicability of the information found herein. If legal advice or other expert assistance is required, the services of a competent professional should be sought.

NOTICE TO READERS

This publication has not been approved, disapproved, or otherwise acted upon by any senior technical committees of, and does not represent an official position of, the American Institute of Certified Public Accountants. It is distributed with the understanding that the contributing authors and editors, and the publisher, are not rendering legal, accounting, or other professional services in this publication. If legal advice or other expert assistance is required, the services of a competent professional should be sought.

CASE STUDY D

Implementing Continuous Monitoring at Vodafone Iceland

María Arthúrsdóttir
Hörður Már Jónsson
Sindri Sigurjónsson

INTRODUCTION

Vodafone is one of the world's largest telecommunications companies. It provides a range of communications services including voice, messaging, data, and fixed communications. With revenue of GBP 43.6 billion at the end of the 2013–14 financial year,[1] Vodafone has mobile operations in 26 countries, partners with mobile networks in 53 more, and fixed broadband operations in 17 markets. As of September 30, 2014, Vodafone has 438 million mobile customers and 11 million fixed broadband customers.

Vodafone Iceland, registered on NASDAQ OMX Nordic stock exchange, is a quad-play service provider with mobile and fixed voice, broadband Internet access, and IPTV services. Vodafone Iceland was established in 2003 following the merger of three telecom companies. In 2006, Vodafone Iceland became the first single brand partner at Vodafone Global, with full access to the latter's know-how, ready to market products, marketing assistance, procurement, and consultancy in networking.

---

[1] http://vodafone.com/content/dam/vodafone/investors/financial_results_feeds/preliminary_results_31march2014/p_prelim2014.pdf

María Arthúrsdóttir, head of financial planning and analysis (FP&A) at Vodafone Iceland, is responsible for the company's financial analysis, budgeting, business intelligence (BI), management reporting, revenue assurance, billing, and structuring. Arthúrsdóttir is also the main driver in Vodafone Iceland's project of implementing BI solutions and continuous monitoring (CM) within the company.

In the often complex telecom business, correct flow of data and data quality is vital to both employees and customers alike. Employees must be able to evaluate and make correct decisions on short notice even if systems and networks don't work according to plan; it is therefore crucial that information about Vodafone Iceland's customers and its services is correct at all times. Customers in the telecom industry are known to have limited loyalty to their operators, and because it is relatively easy to change providers, customer churn is quite high. It is therefore critical for service providers like Vodafone Iceland to know about errors and/or discrepancies in the customer relations data processes as soon as they arise. This enables Vodafone Iceland to resolve these errors quickly and even proactively suggest new and altered services when appropriate. Vodafone Iceland's main focus is to maximize customer satisfaction, as Arthúrsdóttir stresses the following:

> We want to keep our customers content and happy. We need to be sure all customer data records are delivered from the user, through our network, into our billing gateway and ensure this data ends up on the customer invoice, correctly and in a timely fashion.

CONTINUOUS MONITORING IN VODAFONE ICELAND

In 2009, Vodafone Iceland embarked upon a project of designing and implementing a new business intelligence solution. The company wanted to improve the efficiency of the financial closing process and at the same time make financial information more easily available to the management team. The company soon discovered that it had too little control over the quality of the data in the management reports delivered. The reasons for the low quality of information provided varied between months; in some instances data got lost on the way, while in others attributes such as new departments or account numbers were not mapped in a consistent manner as products and services had been incorrectly set up within internal systems before they reached the financial ledger.

Arthúrsdóttir observed that many of the internal processes, such as the preparation of the financial statements, included a lot of manual work and re-work (thus increasing the potential for error), resulting in delayed monthly closing, with work around the clock at the end of every month

to discover and repair errors that had occurred during the period. Arthúrsdóttir saw the potential benefit of automating the process further, including continuously detecting and repairing errors as soon as they occurred, thus shortening the financial closing cycle, as well as avoiding peaks of intense work at the end of every month.

Other potential areas of benefit using CM were defined by Arthúrsdóttir and her team, such as identifying possible revenue leakage, improving customer relationship management, streamlining processes such as the billing process, and monitoring the quality of data flowing between different internal systems and even external third-party systems.

"At Vodafone Iceland we are rating millions of Call Detail Records (CDRs) per day, for hundreds of thousands of customer services. The CDRs are being received from dozens of different network elements and systems. We need to ensure that all these events are handled correctly and quickly, and validate the integrity of all customer services. We also have to spot and stop potential fraud in our network," says the company's revenue assurance project manager. Consulting with Vodafone Iceland's BI service provider, Arthúrsdóttir and her colleagues decided to begin using some new CM software, exMon.[2] The producer of exMon, Expectus Software, is the only CM technology vendor with a local presence in Iceland.

Revenue Leakage

In the first phase of the project, Arthúrsdóttir and her team implemented exMon for revenue assurance. Revenue leakage is a known issue in the telecom industry. According to TM Forum, "Convergence and lack of visibility across an ever-expanding value chain are causing growing revenue losses for Service Providers, as evidenced in a one-of-a-kind benchmark study conducted by The TM Forum. The most surprising breakthrough was the tangible proof that Service Providers incur an average of one-percent revenue leakage with a maximum recovery of 50 percent."[3] The study's authors also note, however, that collected data across five continents indicates that prevention really works and that service providers that validate a large percentage of their data see significantly lower revenue leakage.

This was also the case with Vodafone Iceland. The company tries to minimize revenue leakage where possible, but because it is not a large organization, operating a dedicated revenue assurance department is not financially feasible. The company evaluated the risk involved and used automated CM for situations where the stakes were assessed as high, gradually working their way down the list to less important items.

---

[2] http://exmon.com/cm/#home
[3] www.tmforum.org/TMForumPressReleases/RevenueAssuranceStudy/36002/article.html

One example of revenue leakage identified involved blocked accounts due to debt. When a customer is terminated or blocked (that is, his or her account sent to a debt collection agency), it is important that he or she is no longer able to use the service, and blocking the account requires actions in many systems. Blocked accounts are now under continuous monitoring and if something in the closing process has failed, the system will flag usage on the terminated telephone number.

Another example showed certain Internet connections or fixed lines not being charged to the retail customer, yet being charged to Vodafone Iceland by their backbone supplier. By analyzing the exceptions, the origin of the problem in the workflow was identified—in this case a software bug—and that information was delivered to software engineers who fixed the problem. The process owner continues to monitor this via CM, should a similar exception arise again.

If not managed correctly, the complexity of discount business rules and price changes can also result in revenue leakage. Vodafone Iceland therefore also uses CM to detect failing discount rules in the systems that result in missing discounts and/or illegal discounts being issued by employees. The execution of price changes is also being monitored closely, ensuring that tariff price changes are always correct. The system regularly compares (daily or monthly) all price changes against the "golden copy" owned by the company's marketing department to monitor and verify all price changes implemented on the billing system.

# Process of Monthly Financial Closing

As previously mentioned, the initial goal Arthúrsdóttir and her team decided to address early on in the project was to decrease the time required to process the financial closing each month. This challenge was resolved through two key initiatives—improved BI capabilities using Microsoft Business Intelligence solutions and implementing CM checks with exMon at various points in the closing cycle. Using these two methods, both management and analysts were able to analyze their financial information in a much more comprehensive manner, as automated checks were performing their detective work behind the scenes at all times, ensuring accuracy throughout the process.

After several months of trial and error and fine-tuning of monitoring check points, the Vodafone Iceland team was experiencing exceptions being detected and fixed on a daily basis. This dual approach of addressing management reporting requirements through state-of-the-art BI solutions and ensuring underlying data quality through means of CM resulted in the financial closing process now being finalized within hours instead of days.

The Billing Process

An example of the data flow monitored by exMon is that of customer data, from first entry through networks and IT systems, into correct invoices being sent out from the billing system (figure 1). To facilitate this, a mobile user is registered in the customer relationship management (CRM) system along with the chosen product and tariff plan. This registration needs to be delivered to the home location register (HLR) in the mobile network, giving the customer access to the services he or she should be able to use (make and receive calls, send SMSs, use data via Internet, and use data roaming abroad). The customer also needs to be registered correctly in the billing system, with the same tariff plan and potential value-added services and discounts.

Figure D-1. Example of How Customer Data Flow Is Checked Within and Between Many Systems to Ensure Correct Billing
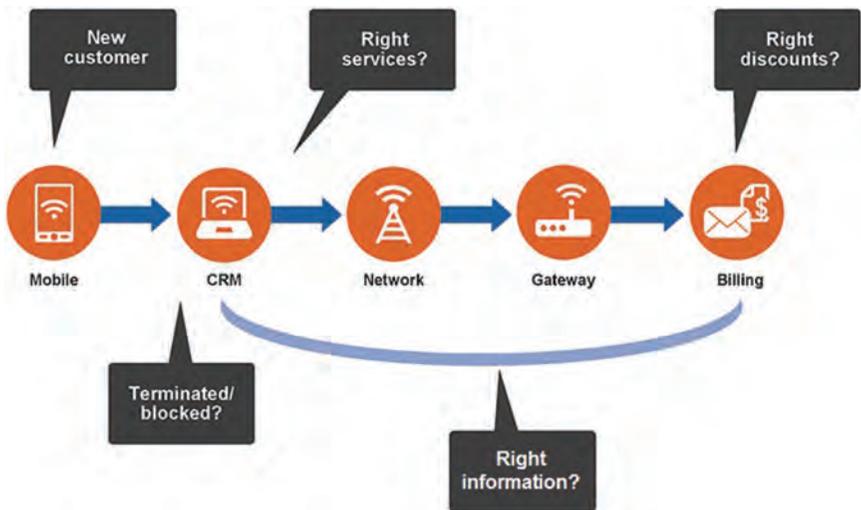
Customer charging records can fail, rendering the billing system unable to process the records correctly for them to be billed to the customer. Such errors may include a missing link between the customer's IP address and the customer usage data, or traffic on a cell phone number not recognized by the billing system. By monitoring these and other similar issues in an organized manner, receiving lists every week with errors, spending time analyzing and trying to find out the root cause instead of focusing on the symptoms, the billing department at Vodafone Iceland observed a 74

percent drop of billing data processing errors within a period of 12 months (figure 2).

Figure D-2. Monitoring Exceptions in the Billing Process Resulted in a 74 percent Drop in Billing Data Processing Errors Within 12 Months
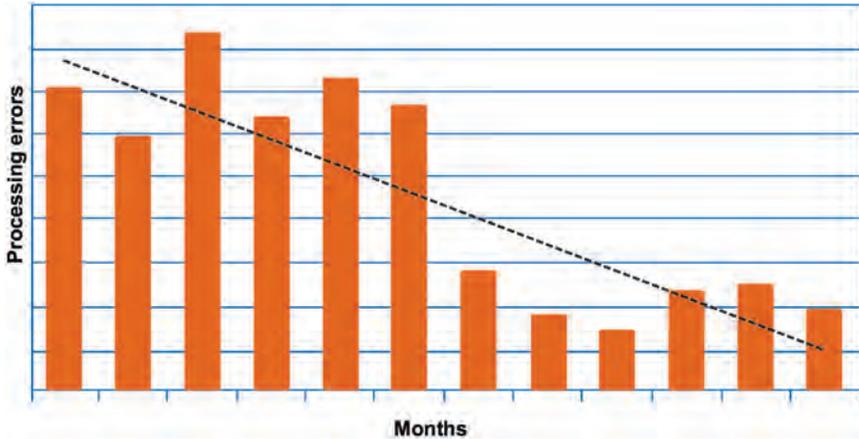
Other CM checks implemented to ensure end-to-end reconciliation of CDRs from network elements to billing include

- ensuring that all CDR files have been delivered from network elements to the billing system;
- reconciling that the all CDRs within each file have been rated in to the billing system;
- ensuring that all CDR files are being delivered in a timely fashion;
- reporting on potential mediation or rating errors in CDR-based erred events;
- reporting on missing subscribers or subscriber services based on erred events; and
- reconciling all rated records against the customer bill.

All exceptions identified the exMon CM system enables easy follow-up and handling through a web user interface. Within this portal, cases are assigned to the responsible parties, who can actually fix the root cause of the problem as soon as it is identified and prevent exceptions from reoccurring. The follow-up function immediately gives the relevant teams and employees a clear overview, enabling them to fix the problem without having to look into other systems or databases. The system logs all actions and escalations, and the responsible person can assess the age of exception cases, status, and level of severity at a glance.

Fraud Monitoring

Fraud detection was a high priority in the process of implementing CM. Fraud cases can be of different origin and can cost both the customer and the service provider a lot of money. Fraud can arise within companies through various means, such as by employee abuse of access to systems or financial resources. Fraud can also originate from outside the company. A common example in the telecom sector is abuse of SIM cards from stolen cell phones, where they are used to generate usage to premium numbers and produce revenues to third parties. Another example of external fraud is a break-in into a customer's IP network to generate high traffic to servers in some foreign countries. It is vital to be able to detect and stop fraud being committed in the company's systems as quickly as possible. Investment in an expensive specific fraud management system has not been an option for small- to medium-sized enterprises (SME) like Vodafone Iceland, so they use exMon to monitor certain patterns of behavior for potential fraud. Examples of potential fraud monitored continuously include break-ins into business telephone systems, roaming fraud, SMS spam, fraudulent use of all inclusive packages, and credit card fraud.

Customer Relationship Management

After the initial phases in the project of focusing on the revenue leakage, fraud, and billing process errors, Arthúrsdóttir and her colleagues turned their attention toward how they could use the CM process to enhance the quality of their CRM. According to the head of customer care at Vodafone Iceland, CM of customer relations has enabled her team not only to reactively repair things that go wrong, but also to proactively contact their customers with specific advice on how to get more value out of their service plans. This use of CM checks to detect cross-selling opportunities and areas where the company can add real value to its customers' usage of communication services is extremely innovative.

First, some examples of reactive repair results of monitoring the customer relationship and use of their services:

- If the mobile subscriber has a family subscription, then every family member needs to be linked to and registered to the same account so that each will receive the right benefits and discounts they have been promised. This process is now being monitored and a discount check made on the billing data.

- If a mobile subscription is paid by a subscriber's employee, then it is vital that the subscriber is set up in the correct customer user group, because usually subscribers within a company are allowed

to make free calls within a defined group of users. Today, the correctness of this process is secured by an automated check.

- Vodafone Iceland used to have a problem with sometimes overcharging customers who were switching from fiber optic cable Internet price plans to "Fiber to the Home" (FTTH) price plans. The company had to issue credit notes every month because customers were being double billed, sometimes even for months. Vodafone Iceland therefore introduced CM checks. These identified the problem as system failure within the termination process. The problem was handed over to the software engineers, and the system was fixed. The company thus saved significant time on reactive corrections and reduced customer calls and, most importantly, saved the customer from irritation and inconvenience.

Vodafone Iceland's customer care department is now able to take proactive measures, including that of informing the customer in almost real time when he or she is getting close to his or her maximum amount of data, SMSs, and voice minutes included in his or her price plan. The message directed at each customer then includes information about either how to block further usage, like when a parent wants to prevent a child from further downloading from the Internet, or how to economically buy additional download or minutes to keep using the service. Customers' usage of mobile voice and Internet services abroad is also being monitored continuously to prevent "bill shock" when they roam into expensive international rating zones.

These customer-related measures in CM are very important to Vodafone Iceland, for which the main focus area is customer satisfaction. Thanks to closer monitoring of customer-focused processes, the company can now report tangible results in that area.

Culture Change and Enhanced Quality of Work Flow

The project of implementing CM within different departments and units has resulted in significant positive changes throughout Vodafone Iceland. There is a growing culture of proactively implementing checks in different areas when developing and deploying new processes and services. People are more amenable to and proactive about checking their own work, which results in a culture that is more proactive and preventive. The process has also resulted in an enhanced visibility of internal processes. More people think about the entire process, instead of just their part of it, and are now used to drawing up process maps, discussing them and internalizing them. Responsibilities in every step of these processes are more visible than before and the process of finding the root cause(s) behind each failure is now much shorter.

This enhanced sense of initiative has spread to customer relationship management and the culture of proactive customer care is now quite visible. Customer care agents are more conscious about preemptively detecting errors before they reach the customer and then proactively giving advice to their customers about better and more economical ways to use the service they are paying for.

Today, Vodafone Iceland employees really see and appreciate the value of CM as it has enabled them to prioritize in a more correct manner and focus their energy, time, and skills on the right issues by reducing or eliminating repetitive manual work on problems that used to repeat themselves daily.

CHALLENGES AND LEARNING

There were some challenges associated with implementing CM in Vodafone Iceland. One of these was unclear ownership of processes in the early phases of CM implementation. Implementing CM has helped Vodafone to map and assign ownership to various processes and work flows. Another challenge was to correctly assess the value of each check created. The subsequent alarm and analysis cycle can easily become an unnecessary distraction instead of a benefit if the initial assessment of the check is not thoroughly completed. It has also been important to align the frequency of alarms and exception lists with the human resources available and the time required to analyze and fix the problems. Working with the system for several months has also demonstrated that it is important to remove checks that are no longer relevant and keep the overall set up of checks up to date.

THE FUTURE

The goal of Vodafone Iceland is to expand the use of CM across the entire organization. There are still departments and areas of operation that have not been introduced to the system. Arthúrsdóttir sees opportunities in enhancing and optimizing the use of the system, and in extracting and analyzing statistics from the use of CM, discovering patterns and new dimensions of potential value. PM is taking over an increasingly greater portion of external audit of the company. Several manual checks completed in previous years through computer security audit, have now been canceled and are instead performed automatically on an on-going basis. A process of presenting an overview of checks to external auditors has been in operation for two years. The external auditors then audited selected checks in the CM process. This development will continue and is

expected to increase trust in the quality and flow of data within the company.

CONCLUSION

Overall, Vodafone Iceland's experience with CM has been a good one. The company operates within a complex set-up of networks, systems and services, as is usual with quad-play communication service providers. Their conclusion is that CM is of great benefit to complex operational environments like those in the telecom sector, and that the journey of using the system is just beginning. Arthúrsdóttir states:

> We have high expectations about expanding the use of the CM system. Today, the main emphasis of the company is to build a trustworthy long-time relationship with our customers. Companies are increasingly realizing that investment in customer care pays off, whereas ever increasing acquisition cost per customer doesn't. We see opportunities in using CM in different ways within analyzing customer behavior and customer account data. We still have a long way to go to map up possible ways to use exMon to increase the mutual value of the relationship with the customer, and we expect to discover new areas of usability in the future. Our goal is to steadily enhance the quality of our business processes and establish a positive cycle of renewing the set of checks.

AICPA Assurance Services Executive Committee

The mission of the AICPA Assurance Services Executive Committee (ASEC) is to assure the quality, relevance, and usefulness of information or its context for decision-makers and other users by (1) identifying and prioritizing emerging trends and market needs for assurance, and (2) developing related assurance methodology guidance and tools as needed. ASEC achieves its mission by:

▶ providing guidance and leadership in identifying and prioritizing significant emerging assurance trends and market needs while engaging users, preparers, and influencers toward action;

▶ developing assurance guidance by creating suitable criteria when necessary, and/or performance guidance, as appropriate;

▶ communicating new assurance methodologies, guidance, and opportunities to our members and the profession on a global basis; and

▶ creating alliances with industry, government, or other specialized groups to improve CPA access to new assurance opportunities.

For additional information on the AICPA's Assurance Services Executive Committee please visit **aicpa.org/ASEC**.

AICPA Business Reporting, Assurance and Advisory Services Team

The overarching role of the AICPA's Business Reporting and Assurance & Advisory Services Team is to provide leadership oversight, direction and visioning for emerging business reporting and assurance issues and initiatives that are identified and addressed through input from AICPA members, committees and staff.

For more information on the Business Reporting, Assurance and Advisory Services Team initiatives, please visit **aicpa.org/AAServices**.