Revenue leakage can often go unnoticed due to inaccurate or missed service usage data. Inaccurate billing can also dent customer confidence. This whitepaper discusses the role of usage data integrity as a key element within an end-to-end revenue assurance framework.
Introduction

According to many industry sources revenue is leaking from the communications industry at an annual rate of 3 percent to 11 percent of gross revenues. Assuming the global telecommunications market revenue is $1.3 Trillion (US) this represents an annual loss of up to $143 billion.

In today's margin sensitive market, network operators are under increasing pressure to improve performance within tight fiscal and technological constraints and must now look at internal operational processes and systems as the key to success in this market. Strategies such as identifying and preventing revenue leakage are now business priorities, and literally can make the difference between an operator's success or failure.

This report explores the role of usage data integrity as a key element within an end-to-end revenue assurance framework; outlining the need for quantifying the scale of the problem, identifying methods for detecting areas of revenue leakage, describing methods for correcting issues and highlighting techniques to minimize their future recurrence.

The Importance of Revenue Assurance for Usage Data

Revenue assurance may not have been a high priority when an operator's infrastructure was initially deployed and this can often lead to inaccurate or missed service usage billing. The impact on revenue and cash flow associated with this leakage can be significant, with some operators losing millions of dollars a year in unbilled revenue.

With more customers having the ability to check invoices, especially high-value customers such as corporations, call centres or resellers, inaccurate billing impacts customer confidence. Additionally, when third parties, such as resellers, rely on information provided by network operators to bill their own customers, inaccurate billing information cannot be tolerated.

Revenue assurance is also a critical component in meeting new industry regulations that require network operators to demonstrate an unprecedented level of accuracy in their end-to-end billing processes. What often makes the situation worse is that such leakage can often remain undetected, largely because the systems in the revenue management chain do not generally monitor end-to-end integrity of the flow of usage data. Many organizations simply may not be aware problems exist. Even if problems are suspected, it is unlikely they can be quantified accurately, leaving revenue leakage unchecked. Lack of such management information can inhibit establishing effective revenue assurance strategies.

The effort involved in introducing a revenue assurance program to detect billing discrepancies and to identify and diagnose such revenue loss as it occurs should not be underestimated. However, the rewards of a strategic revenue assurance program include significantly increased revenue, decreased operational costs, improved cash flow, higher profits, increased customer confidence and shareholder value.
Executing effective revenue assurance strategies can be constrained by the fast moving environment of the telecommunications industry, limited labour resources, tight budgets and competing operational requirements on existing systems. A pragmatic approach based on industry proven solutions and techniques is essential for successful revenue assurance programs.

The Operational Environment
Usage based billing is a complex task, especially when considering the full end-to-end flow of usage data from switch to bill within a telecommunications organization. This is complicated further by the constant demand for changes in the infrastructure to accommodate the introduction of new products, services, tariff structures, billing models and network elements, as well as the implementation of switch upgrades, new billing systems and other operational support systems.

Many different devices and software systems are involved in the delivery, management and accounting of telecommunications services making integrated operations difficult. In fixed line networks, a number of switches and intelligent network nodes support advanced services such as number translation, number portability, interactive voice response units, voice mail servers, and remote access and calling card servers. Additionally, mobile networks may employ short message service centres and prepaid platforms.

Most of these devices produce usage information in the form of call detail records (CDRs). However, no common structure exists for this information resulting in a wide variety of formatting, content and encoding of CDRs.

For a given call, usage data may be produced at more than one place within the network, and not all of the data may be relevant to billing. Sometimes a set of related CDRs are generated that must be matched before a billing record can be produced. Longer calls often result in a series of CDRs being generated at different points throughout a call, requiring the need to be aggregated prior to billing. A single generated CDR may require delivery to more than one system, and in some cases, a CDR may be incomplete, requiring additional information for the mediation or billing processes. Since all of the information generated within a network is not relevant to each end system, usage information must be distributed selectively and presented in the correct format for each business support system.

At the heart of a usage data management system in most organizations is a mediation system. The mediation system is responsible for collecting network usage data from a wide variety of network devices and distributing this data to the various business support systems, such as retail billing, corporate billing, service number billing, out-payments, interconnect settlement, roaming clearing, fraud management and data warehouse systems.
To perform the collection and distribution process, mediation systems must apply a range of functions to network usage data, such as decoding, validation, filtering, aggregation, splitting, replication, augmentation, selective routing and conversion. Once delivered to the various business support systems, the usage data goes through further information processes, including rating, pricing, discounting, bill generation and production.

The end-to-end coordination, control and management of the various functions applied to usage data as it flows from the network to the business support systems is critical for accounting service usage.

Potential Problem Areas
Given the complexity of the end-to-end usage data management process, problems affecting the integrity of the usage data flow commonly occur. Our experience has shown that issues regarding usage data integrity arise in a number of different areas.

- Activation and deactivation failures may cause the provisioning of service without an associated account in the billing and accounting systems, resulting in unbilled usage.
- Network configuration issues can produce incomplete usage information or cause unexpected call routing, resulting in higher costs or lower quality. In some cases, entire CDRs are missing.
- Inaccuracies in the metering and recording of CDRs affect billing accuracy.
- Misidentification and mishandling of CDRs within the mediation and billing environments can result in incomplete and inaccurate invoices.
- Errors in tariff structures can cause incorrect prices to be applied to calls.
- Unauthorized usage may result in unbillable usage or revenue that cannot be collected.
- Information can be duplicated. For example, a retransmitted usage data file or multiple charging records from a switch can result in over billing rather than under billing.

Other issues that affect usage data integrity include missing usage data files, unexpected number prefixes, duration discrepancies, zero duration calls, CDRs with incorrect service types, long duration call handling, missing IN (intelligent network) information, missing related information, non-optimal routing, incorrect handling of call status, out of date reference information and unexpected changes.

Planning Usage Revenue Assurance Strategies
The primary role of usage assurance is to ensure that invoices to all customers, as well as interconnect and roaming partners, are accurate, complete and issued in a timely manner. A successful revenue assurance program involves raising the visibility of revenue affecting issues within an organization in a timely fashion. Processes and procedures must be established to detect revenue leakage, correct problems effectively and ensure leakage does not occur in the future.
The following basic questions should be considered when planning a revenue assurance program:

- Is all network service usage being accurately recorded?
- Are there any customers with service not linked to an account for billing?
- Is there any unauthorized usage of network that should be billed?
- Do invoices contain all of the required subscription and usage elements?
- Are the traffic and charges with interconnect partners correct?
- Are the traffic and charges with roaming partners correct?
- Are all customers on the correct tariff?
- Have all tariffs been implemented correctly?
- Are all invoiced amounts being paid?
- Taking quality issues into account, are we routing traffic in a cost effective manner?
- Are we getting the best prices from external suppliers?
- Is there an unacceptable level of substantiated customer complaints regarding billing accuracy?
- Are individual products and services providing the financial performance expected?

The answer to these questions will help identify potential areas for usage data revenue assurance initiatives.

**Usage Revenue Assurance Strategy Roadmap**

Implementing a successful and effective revenue integrity framework can at first appear to be a complex and daunting task. However, the following structured approach provides immediate business benefits and establishes a maintained, effective revenue integrity framework.

1. **Review the Business Infrastructure**

   It is essential that an organization’s usage data management requirements be understood fully. This can be achieved by reviewing the products and services offered, understanding the various ways in which subscribers can use those services. Combined with an understanding of the network topology and how it delivers the services, individual call scenarios and the associated generation of usage data can be identified. Matching this usage data with the requirements of the individual business support systems will determine how this information should be distributed within the organization.

2. **Detect the Scale of the Problem**

   Before starting a revenue assurance program, it is important to understand the level of billing inaccuracy within an organization. An independent end-to-end reconciliation between an invoice run and the original network usage data will quantify the degree of billing inaccuracy and illustrate revenue impact. This can be achieved by analyzing usage data at the CDR level, independently from existing mediation and other associated systems.

   To accomplish this analysis, a CDR database of the raw network usage data information must be established. This will enable a detailed end-to-end, crosscheck with billing, interconnect settlement and other business processes. Key audit points within an organization can be inspected for conformance to business requirements. This metric can then be used as the basis to establish a justifiable business case for prioritizing and addressing the underlying issues.
3 Correct Discrepancies
When discrepancies are identified, the CDR database will support the investigation and diagnosis of the underlying causes. Problems can be pinpointed and supporting evidence generated, allowing the problem to be rectified. The ability to search and report on network CDRs should also cover error and suspense files within the revenue management chain, as well as the CDR feeds from mediation to billing, interconnect settlement and other systems.

4 Ensure Chances of Recurrence are Minimized
Once the characteristics of the usage data flow are known, key performance indicators such as control totals and activity statistics can be identified. This information should be produced and crosschecked on a periodic basis, a process for which two main reconciliation techniques exist. In-line reconciliation embeds data integrity checks such as file and record sequence numbers, inter-CDR time-based gap checks, and control totals within existing systems. External reconciliation automates the end-to-end cross checking of the revenue management chain by a separate system that monitors all systems involved in the flow of usage data.

In both types of reconciliation processes, alerts or alarms should be immediately generated as discrepancies are identified. By inspecting data flows between systems directly, audit information can be generated on the behalf of existing systems, reducing the impact and risk to the current billing chain.

5 Manage Change
Often, changes are implemented without adequate assessment of the impact throughout the revenue management chain, adversely affecting usage data integrity. Changes should be managed through an effective change control process.

Summary
As changes in the economy force network operators to find new strategies for improving margins, usage revenue assurance strategies will become an important component in business planning. These strategies ensure all revenue earned is realized by finding where revenue is leaking, fixing these problems and improving processes to avoid future leakage. A practical, organized approach to executing usage revenue assurance strategies, utilizing revenue assurance specific tools and relying on the knowledge of industry experts, is required to ensure success. If these requirements are met during the execution process, an in-year return, as well as continuous future benefits, can be expected.
About Subex
Subex Limited is a leading global provider of Business Support Systems (BSS) that empowers communications service providers (CSPs) to achieve competitive advantage through Business Optimization - thereby enabling them to improve their operational efficiency to deliver enhanced service experiences to subscribers.

The company pioneered the concept of a Revenue Operations Center (ROC™) – a centralized approach that sustains profitable growth and financial health through coordinated operational control. Subex’s product portfolio powers the ROC and its best-in-class solutions such as revenue assurance, fraud management, credit risk management, cost management, route optimization, data integrity management and interconnect / inter-party settlement.

Subex also offers a scalable Managed Services program and has been the market leader in Business optimization for four consecutive years according to Analysys Mason (2007, 2008, 2009 & 2010). Business optimisation includes fraud, revenue assurance, analytics, cost management and credit risk management. Subex has been awarded the Global Telecoms Business Innovation Award 2011 along with Swisscom for the industry’s first successful Risk Reward Sharing model for Fraud Management.

Subex’s customers include 16 of top 20 wireless operators worldwide* and 26 of the world’s 50 biggest# telecommunications service providers. The company has more than 300 installations across 70 countries.

*RCR Wireless list, 2010
#Forbes’ Global 2000 list, 2010