Revenue Assurance

Guidebook

GB941

Version 3.4

April, 2012

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Executive Summary

Revenue leakage is often considered a hidden and uncontrolled cost of doing business in the telecom industry. In addition to fraud, reasons for revenue loss include network provisioning, mediation and CDR errors, billing and interconnect inconsistencies, loss of data and corrupted files, fragmented support systems, incoherent databases, and manual or ill-defined business processes. According to various Revenue Assurance (RA) research reports, the degree of exposure lies in the range of 1% to 15% of the Communications Service Providers' (CSP) gross revenue, depending on factors such as networks and services type, geography, carrier type, and Revenue Assurance maturity level.

In the context of Revenue Assurance - the main question for any business is how much leakage is acceptable and how to improve the operations and systems in order to minimize those leakages. An effective RA process must ensure the integrity and synchronization of both data and processes across all the disparate systems and the network itself, in order to sustain operational and financial efficiency. RA provides an analysis of the relationship between network resources, services, customers, and generated revenue, and enables the CSP not only to detect revenue leakage (e.g. un-billed customers, mis-billed customers), stranded assets, and operational inefficiencies, but also to understand the reasons for these undesired occurrences.

TM Forum Revenue Assurance Technical Report 131 (TR131) contains the TM Forum's overview of revenue assurance. The original document was written in 2004 and broke new ground by being the first cross-industry collaboration to achieve a consensus definition of the purpose and reasons for revenue assurance. The second version, published in 2008 contains a number of significant updates that reflect the evolution in the subject that has taken place since then. This document explains what revenue assurance is, its scope and why it is needed. It also covers the topics of Revenue Assurance and Fraud, and Revenue Assurance and Regulation. The TM Forum has also produced a companion publication, this Guidebook (GB941) which gives practical advice on how to tackle the challenges of revenue assurance.

In particular, the Guidebook deals with the following topics, each treated in a separate chapter or addendum

- **'RA for Content Services'** – gives recommendations and highlights some of the new challenges currently posed to CSPs by the delivery of new advanced content-based services.
- **'Information Framework (SID) and Business Process Framework (eTOM) models – support for Revenue Assurance'** – these models are described in detail in GB921, and GB922. This guide book includes a summary of these models adapted for the Revenue Assurance practitioner.

- **'Revenue Assurance Metrics'** – defines 20 KPIs that provides a common framework to measure 3 important aspects of Revenue Assurance: Revenue leakage, Revenue Assurance related process efficiency and Data Quality (Addendum A).
- **'Revenue Assurance Maturity Model'** – provides a common framework to review and describe the relative maturity of revenue assurance in different businesses; states a repeatable method to assign a numerical score to maturity in an organization; provides a consistent framework for benchmarking the maturity of revenue assurance in one company relative to its industry counterparts; and outlines a long-term vision for the evolution of revenue assurance within industry (Addendum B).
- **'Revenue Assurance RFx Guidelines'** - gathers the most important foundations of guidelines and requirements for a Revenue Assurance RFx to assist service providers to ask relevant questions and objectively evaluate responses to procure the solution that meets its needs – Addendum C
- **'Revenue Leakage Framework and Examples'** - includes a compilation of real-life examples of revenue assurance issues from a range of potential failure points at which revenue leakage can occur, demonstrating the breadth of the revenue assurance discipline – Addendum D
- **'Revenue Assurance Controls and Coverage Model'** - recommends a series of controls that operators should consider implementing in order to reduce the risk of revenue assurance related issues and a method of assessing the coverage and effectiveness of those controls. – Addendum E

A background section follows, to briefly highlight some the key aspects of TR131 which may be considered a starting point for this work: Traditional RA approaches, drip tray model, RA maturity model, and RA best practices.

1. Background

Up to 2004 no CSP emerged as credible industry leader, nor was a unique definition available to comfortably align RA practitioners from different business domains. This situation may be understood since RA evolved from several organizational units (Finance Control, Network Operations, Fraud Management, Billing Operations, etc.) each of which has a different perspective, approach to RA and own priorities. Moreover, RA was an over-used buzzword. It often reflected the financial needs as well as objectives related to a business problem. These needs and objectives tended to be defined differently by different stakeholders, hence the confusion associated with the term of RA.

In 2004 the TeleManagement Forum undertook an initiative to better define and standardize the issue of revenue assurance for CSPs. The findings were published in the technical report named ***TMF Revenue Assurance Technical Report 131*** (TR131), publicly available on TeleManagement Forum's web site since April 2005. In 2006, the TeleManagement Forum published the first version of GB941, which covered additional topics. In 2007, the TeleManagement Forum started to work on a clearer distinction between TR131, and GB941, TR131 version 2 was remodelled to contain the more theoretical material regarding Revenue Assurance, while GB941 focused on the practical advices, this change resulted in reshuffle the material between the documents. Version 2 of TR131, and several of the addendums to GB941 version 2 were published in 2008, and the final release of GB941 version 2 will take place early 2009.

TR131 and GB941 are based on the accumulated experience of many operators, vendors, and system Integrators. The TR131 report and GB941 guidebook lay out the revenue assurance de facto standard and best practices by which CSPs operates. These recommendations are today widely adopted by the industry.

Revenue Assurance is a well-known challenge in the Telecommunications sector, mainly rooted in the Telephony world as a set of techniques and methodologies to identify and fix revenue leakages and/or prevent or detect errors resulting in unbilled or uncollected revenues of the CSP. Today's accelerated growth in the data, IP and real-time services market introduces additional complexity and exposure for RA due to dynamically evolving technologies, continuous demand for new services, more complex business processes, new value chains, additional external partnerships, new business models and an ever increasing and more complicated operational and business systems infrastructure.

The above factors, coupled with the tumultuous economic climate that started with the slowdown in 2001, the revitalization in 2004-5, the current regulatory environment, and the economic crisis of 2008, provide evidence and compelling need for RA in more and more CSPs. This need, in turn, together with the acknowledgement of the strategic significance of RA for CSPs, resulted in the formation of organizational units to ensure the accuracy of financial reporting and revenue recognition. Given increased regulatory and competitive pressure and in order to remain competitive and profitable, CSPs are continuingly restructuring their organizations according to new business targets and priorities. These structural change and the response to market conditions suggest the benefits of the acceptance of a holistic RA process to optimize the business process, the usage of existing

assets, the data integrity and as a result - maximizing revenues and in parallel - reducing costs and increase profitability.

1.1. Dimensions to the RA problem

For the revenue stream in the usage-based billing environment (i.e. billing that is based upon data volume, duration of sessions, etc.), a comprehensive analysis of the entire process from capturing and recording a billable event through billing, cash collection, accounting and revenue recognition is required. One example of an approach used by a CSP offering voice telephony services is to compare the network's CDRs (Call Detail Records) to SS#7 events to verify the proper ratio of CDRs to SS#7 events. An alternative technique uses test calls that are generated either manually or automatically, to compare the generated CDRs to the record of the event from the subscriber's perspective.

The subscription-based charging model (recurring or one-time fees) requires an inspection of the data pertaining to the servicing network elements and comparing it to the subscriber's billing data. However, order management, asset/inventory management and provisioning systems should also be part of this assessment because data discrepancies may result in the billing process not being aligned with the number of orders, order details or services actually provisioned within the network. Additionally, stranded assets in the network inventory (assets shown in use by the operational support systems but no service actually utilizing the asset) can result with excessive CapEx due to discrepancies in network capacity and orders or allocated resources.

For event-based charges (SMS, MMS, etc.) the tariff structure could be regarded as even simpler and requiring only reconciliation. Some providers tend to tie such charges to those of content delivery service (video, music, etc.), which include quality of service related attributes; this requires much stricter controls to be performed.

There are other dimensions to the problem such as pre-paid and post-paid issues, wholesale and retail differences, and so on. Each one requires particular care and may even require a distinct approach, since the type of service or targeted customer segment influences choice of methods and priorities for the CSP's RA program.

1.2. Economic Perspective

Assessing costs and benefits is a required first step prior to introducing new often-complex projects within a business. This is also the case for an RA initiative. To address this issue, TR131 includes a detailed discussion of the outcomes of a real life example of a cost-benefit analysis performed by an operator.

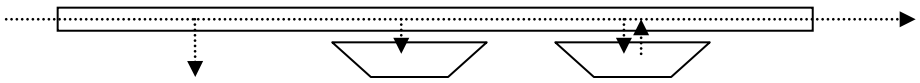
The analysis uses a *drip tray* model; a common metaphor used in describing the effect of errors in processing charges, a term commonly referred to as "leakage". The metaphor is appropriate as the loss of water from a pipe exhibits similar properties to the loss or corruption of data as it is processed from one system to the next.

The amount of water lost by the pipe could be measured by comparing the amount that goes into one end of the pipe against the amount that comes out of the other end of it. Though

simplistic, the comparison of ins and outs lies at the heart of activities intended to monitor, diagnose, prevent and measure the extent of error.

Figure 1: Leakage and Drip Trays

Some drip trays will lead to the capture of errors, some will lead to their capture and



resolution. Capturing errors without resolution means that errors are measured but still take place. Capturing and resolving errors means measurement of errors that would have gone unresolved without the drip tray. A drip tray that captures errors without leading to resolution has a cost, but no clear attributable economic benefit.

The analysis indicates the benefits of an effective and on-going RA strategy greatly outweigh the costs associated with the project and the operation.

1.3. Different Approaches to RA

1.3.1. Reactive, Active, and Proactive RA

There are three different styles of revenue assurance initiatives:

- **Reactive** – doing something as a response to existing leakages, for example a project to identify and resolve the causes of actual revenue loss;
- **Active** – doing something to address problems as they occur, for example by monitoring of problems in real-time. This approach is designed to initiate corrective responses prior to any revenue loss takes place;
- **Proactive** - acting in anticipation, by implementing controls and other measures to prevent problems from occurring

In general, the main difference between the three is the reaction time. When Revenue Assurance anticipates leaks and pre-empts them, it is Proactive.

The three approaches are complementary. A good RA practice must always include Reactive controls, to identify leakages and create the case for the Active and Proactive controls. Active controls are required to discover problems in near-real time, and to correct their outcomes before they cause a real damage. Proactive controls are the ultimate goal. These controls prevent and deal with potential problems during the design and deployment phases. However, it is a bad practice to rely only on Proactive controls since, as a result of the significant complexity of the operations and business systems and processes of a CSP, some problems may not be able to be detected proactively

1.3.2. Data Quality & Data Integrity vs. Process Improvement

An approach pursuing *Data Quality & Data Integrity* focuses on improving the quality of data to ensure accuracy of revenue. This normally involves the extraction of data, from one or a

number of systems and/or the consistency validation of the data when moving from network to billing.

Process Improvement is normally undertaken by a review of the business processes supporting the generation and management of revenue generating events (e.g., Order to Cash processes). The aim is to ensure that processes are designed properly and performed as expected.

In this type of audit style approach, RA tends to identify where potential areas of risk exposure might exist: within system functionality, handoff between systems, as well as supporting business processes and interaction between the processes and systems.

Both approaches are complementary and we recommend combining them. There are RA problems that will be detected only by one of the previously mentioned techniques. For example, an automated provisioning process that generates many errors and needs human intervention, may end with successful provisioning and complete data integrity, but cause revenue leakages (the customer will start to use the product later) and subsequently increase the CSP's costs (the cost of the human intervention). This problem will be detected only by using *Process Improvement* techniques and not by *Data Integrity* techniques.

1.4. Best Practices

Best practices in RA represent a dynamic strive for optimization rather than the static delivery of a particular set of methods, controls and tools. RA best practices are subject to constant review and change over time.

For an RA strategy to be considered effective, it must include all of the following components: technology, people and processes.

Technology includes the process of identifying data discrepancies and prioritizing the correction efforts. This is a daunting task requiring software support to be carried out. The Business Process Framework (eTOM) and the Information Framework (SID), to some degree inherently provide for improved benefits of technology integration that reduce some, but not all of the potential fallout associated with technology components that do not interface without a global standards adoption.

People includes the necessary quick investigation of suspicious data by RA analysts and subject matter experts, intended to determine the validity of threshold violations when abnormalities occur.

Process component refers to the solid understanding of the complex interdependencies among network infrastructure, B/OSS environment and business processes in CSP's operations that the expert should have. The Business Process Framework Layer 0 – 2 processes establish some of the interdependencies and cooperation across business units, departmental approaches and various company objectives.

RA systems should be designed to support data acquisition from network elements, provisioning systems, mediation platforms, billing systems, order management systems, asset management systems, intercarrier exchanges, partner relationship management, etc., according to the specific business scenario. Beyond data access capabilities, RA systems should also implement key functional features to perform appropriate detection techniques (monitoring, reconciling, correlation and so on) and include reporting tools such as dashboards, tracking and correction panels, case management tools and enterprise controls

visibility across all business functions, especially given the new financial regulatory environment such as Sarbanes-Oxley.

1.5. Current RA Trends

To a great extent, Revenue Assurance in telecoms was born of the last recession.

Embattled CEOs were finally forced to come clean about the parlous state of internal systems that had expensively been put in place over the previous 10 years. Typically, even those that were fully functional were no longer fit for purpose, and many intra- and inter-departmental processes were broken. Consequently, RA started its life with a boom – 'low hanging fruit' were everywhere, and demonstrating the business case for any RA related activity, given even the smallest sign of executive championship, was relative child's play.

As we enter a new economic cycle – and the exact impact of the Credit Crunch on the increasingly convergent telecoms marketplace has yet to be revealed – RA has consistently demonstrated its worth, but in many operating environments (although certainly not all) the opportunities for easy revenue wins have been much harder to come by. Consequently, whilst RA has by and large retained its primary focus, the temptations for expansion and scope creep have been great.

In the interim, there have been a number of external factors that have had a significant impact on the RA operating environment.

The first has been the drive towards ensuring shareholder value (sometimes even at the expense of business value) through increasing financial governance, ethical business and compliance requirements. Whilst on the one hand this has thrown into sharp relief the need for the business to focus on processes and risk which has in turn undoubtedly bolstered RA awareness, on the other it has not necessarily done RA any favours as it has in some cases subverted RA activity away from its prime directive and into less strategically significant areas such as process management and compliance enablement.

The second has been the trend – both within the CSP community and the supply chain - for aggregation through M&A. This, too, has had an upside and a downside for RA: group-wide systems environments have again become more complex and the opportunities for RA rationalisation with centralised co-ordination, resources and power have increased, but at the same time the opportunity for Group to leverage economies of scale, impose 'preferred supplier lists', and demand headcount reductions across its OpCo dominions is increasingly being aided and abetted by 'RA justification'. Whilst efficiencies can undoubtedly be achieved and in many cases are both necessary and long overdue, the potential impact on RA as it becomes ensnared in Group/OpCo politics is that by having its interdepartmental

communications skills and connectivity exploited RA will be returned to an environment where it is treated by the OpCo business units with suspicion, and RA will have become the harbinger of bad news rather than the provider of mission critical assistance in delivering operational effectiveness.

Ultimately, if this approach continues without adequate safeguarding, not only RA's 'client' relationships with target business units, but also its bi-lateral relationships with closely coupled functions such as fraud management, internal audit and risk, will suffer.

The third trend, largely in response to the first two, has been the increasing effort to standardise and quantify all aspects of business and operational processes. Again, the monitoring and risk assessment of business effectiveness has to be a good thing, and for many operators who started with relatively immature business reporting capabilities the ability to 'actually know what is going on in their business' has been a revelation. However, these advances also bring with them the potential for business ossification and a tendency for 'death by KPIs' in all of its various forms. Not only are operating environments in some CSPs becoming overburdened with quantitative metrics that are inhibiting the potential for very necessary business transformation in the light of changing new generation requirements, but important projects required to deliver new functionality are being inhibited even from consideration in case they conflict with reference architecture models that have become erroneously set in stone.

Moreover, given the huge variability in market penetration and maturity, customer expectations and regulatory responsiveness, together with the status of internal legacy systems and processes experienced by CSPs around the globe, the concept of 'best practice' as a determination of implementation suitability and success factors is becoming increasingly harder to justify. Whilst on the one hand best practice is a useful benchmark for both ISVs and CSPs to aim at as a reflection of how a specific function can be best optimised, on the other, the fact that Analysts point at a particular solution as 'the way to go' does not necessarily mean it will be optimum in every operating (and legacy) environment, and most certainly it does not necessarily offer a guarantee of optimised ROI, either in the short or long term. Without a doubt 'best fit' has become a much better guiding principle, but this is and will always remain a subjective judgement call. One size definitely does not fit all.

A further problem in this respect has been the levels of understanding at senior management level (and elsewhere within the business) about the nature of standards themselves, and the adoption of an attitude that has assumed that technical process standards developed at the network layer and business process standards developed at the IT and business layers are methodologically the same, and that they can be treated, managed and developed in the same way. This is clearly not the case, and as a consequence – the sterling efforts of the TM FORUM RA Working Group notwithstanding – the overall status of standards evolution within the BSS domain in particular remains something of a mess.

Billing is a good example. As a technical function there are technical standards for device interfaces that can be adopted; there are also process standards that optimise the implementation of these interfaces. However, billing processes also encompass a wide range

of business activities that are dependent on intangible non-technical factors - particularly those that affect customer interaction and marketing. In these areas billing policy is as closely related to corporate positioning and brand management as it is to the underlying platforms on which these processes are enacted. Technical disciplines can be highly effectively managed by technical process standards, but to assume that profitability can be guaranteed by the application of technology-based billing processes to the wider domain of revenue management as a business operation is likely to end in tears.

The fourth trend has been a response to the perceived success of RA itself, and indeed to RA's own attempts to expand its scope. Having successfully secured a degree of proactive control over leakage across a wide range of operational areas, many RA professionals – particularly those in more mature markets – have looked beyond RA towards a more strategic role with a broader level of influence on business operations. Areas such as input to and even sign-off on new product development, increasing engagement in marketing and sales activities, and the development of consistent approaches to 3rd party management and revenue share settlement, are all coming within the remit of this expanded RA sphere of relevance.

Whilst a majority of RA professionals would agree that the TM Forum's root definition of RA ("Data quality and process improvement methods that improve profits, revenues and cash flows without influencing demand." TR131) is sacrosanct and should be left untrammelled, there is no reason why the role and function of RA professionals themselves should not be enhanced, and taking advantage of the wealth of business expertise and operational experience for which RA has become a core repository. Any number of definitions for this wider scoping has been proposed, and various names (with greater or lesser degrees of proprietary influence) have been suggested to explain RA's extended context without treading on too many toes (too hard). These include Revenue Management, Revenue Maximisation, Revenue Optimisation, Revenue Fulfilment, and so on, with the first of these undoubtedly gaining greatest traction.

Unfortunately, at the same time, almost every software vendor across the OSS and BSS domains has laid claim to offering complete or near-complete RA capabilities within their product offerings, often under the banner of Revenue Management. Whilst some of these offerings are genuine (and the need to embed core RA functionality into all operational systems is becoming a necessity for new generation product management and risk amortisation), many are not, and most are primarily designed to reposition the functional set of their product suites on offer across more 'strategically significant' dimensions. In addition, of course, all of the usual 'Guardian of the Gatekeeper?' questions still arise. From a pure RA perspective, this muddying of the waters is not helping.

The big three areas of RA activity with highest visibility still remain:

- Switch-to-bill / Order-to-cash (CDR reconciliation/rating verification & etc.) – [highest historic visibility in Europe]
- Inventory management – [highest historic visibility in the US]
- Interconnection – [highest historic visibility in high growth markets]

To these have been added a fourth key element:

- Analytics & Business Intelligence support

…And these areas remain those within which the 'quickest wins' will continue to rise to the surface most easily. However, as a result of the increasing diversification of RA activity, the championship and sponsorship of RA is becoming yet more heterogeneous, with the heads of Finance, Audit, Risk, IT, Operations and now Marketing all having a vested interest in potentially maintaining strong controlling links over the RA domain, both because of its access to a broad range of business information and its increasing power as a justificatory business mechanism. (For example, new product signs off.) Inevitably, both methodological conflicts and turf wars will increasingly embroil RA as a result (even in cases where RA might have no direct play.)

This is the crossroads at which RA finds itself. Great opportunities for the advancement of both RA and the positive impact that RA professionals can make on the business abound, but at the same time the potential to become embroiled to RA's detriment in the changing political landscape that market and economic factors are driving is also growing.

Of course, politics isn't the only SWOT factor on the horizon. Within the backdrop of ongoing business transformation, the re-purposing of existing functionalities, new technologies, and new skills requirements are all continuously evolving. Here are just some of the new challenges:

- The growing importance of wholesale, and all that this will bring with it. This isn't just an extension of existing interconnect assurance; new factors include: wholesale marketing considerations, 3rd party settlement complications, revenue share complications, distributed rights management, UGC (user generated content) management, attention data, integration with transit and peering management, end-to-end contract (document) assurance, real time inter-business data management complications and the impact of multiple hostile audits that will inevitably follow in the wake of a more competitive wholesale environment.
- An enhanced service support environment, with real time policy & data management complications, active mediation, exception charging, metadata and algorithmic service enactment, increasingly complex customer segmentation and analytics, customer experience/interaction management with augmented personalization and self-care complications (all required on a 'time-to-market yesterday!' basis)
- IP. Whilst RA lessons learned from the unconverged mobile and PSTN environments will still be applicable, IP is both qualitatively and quantitatively different. Even leaving aside the assurance of multiple new platforms, applications and interfaces (and, later, IPv6), managing AAA in a 'best effort' environment with status rather than event information and a refocusing on stochastically modeled non-granular data is going to be a wrench. There is also increased complexity in managing multi-session control and multi-

platform/channel integration securely in an open network environment with unique customer identifiers (A “single view of the customer” and “One instance of me” existing for all customers, whose behaviors will be enacted within multiple personal and affinity groups.)

- Providing RA support for multi-dimensional convergence and continuous business transformation. There is as yet no consolidated RA methodology for business transformation, nor have CSPs paid much attention to evolving skills requirements, either during the interim/transitional phases or in the new generation environment itself. RA has a clear coordinating role as a business enabler, managing cross-functional semantics & methodology integration as well as ensuring that opportunities for knowledge transfer, skills and asset reuse are exploited. (One further note: business transformation needs to be managed on a ‘programme’ rather than a ‘project’ basis, and its successful resolution will unavoidably be asynchronous with the concomitant underlying individual platform and systems evolution projects which will have their own specific technical and business targets to meet. RA will need to safeguard this cultural and mindset evolution as the Credit Crunch will inevitably encourage business leadership to control the scope of projects as tightly as possible and to cut corners wherever business-wide policy and process changes are required for successful deployment.)

…and all of this monetised, and thus of great concern to all steadfast RA personnel. Finally, industry restructuring – with a move from vertical stovepipes to horizontal layers and all that this will entail – is lurking to a greater or lesser extent within the peripheral vision of many CSPs. Although the detail is outside the scope of this review, restructuring will lead to changing systems ownerships, departmental relationships and inter-business processes, all of which will have the opportunity to create new revenue discontinuities that RA will have to fix.

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In theory, the credit crunch is reducing the flow of new implementation projects to a trickle. Given the return to an ‘accountancy-led’ (as opposed to entrepreneurial) business leadership style, CapEx has retreated into limbo, and OpEx focus is firmly on cost reduction. In reality, the hunger for re-systemisation and rationalisation projects has not stopped and continues to grow, and the contribution that RA could and should make to the success of these initiatives is without question.

If CSPs are to compete, not just with each other but with the wide range of new organisations that convergence is bringing into the communications value chain, then the watchword of the next 18 months needs to be ‘simplification’, applied not just to a reduction in and rationalisation of the number of operational systems, but to pricing and tariffing, product catalogues and customer interaction. Our internal operating environments and the relationships we have with both our customers and suppliers are just too complex to manage in any meaningful and profitable way in the longer term. If this does happen as it should, it will be great news, not just for RA but for the telecoms industry as a whole.

In summary, RA is and should always remain RA, but this should not limit the activities and influence of RA professionals within the business and operational domains. Under the guise of Revenue Management, and through the evolution of new generation ecosystems, RA is getting into new areas of activity and influence. The Credit Crunch represents a huge opportunity for both departmental and personal RA growth and development, but significant new skills and knowledge will be required, and there is a significant political dimension to be monitored, managed and overcome.

2. RA – Frameworx, Business Process Framework and Information Framework

Revenue Assurance is starting from version 7 of the Frameworx (2007), part of the Business Process Framework (eTOM) and the Information Framework (SID) (Shared Information and Data) paradigms, GB921 Addendum D, and GB922 Addendum 7RA correspondently.

The Business Process Framework serves as the blueprint for process direction and the starting point for development and integration of Business and Operations Support Systems (BSS and OSS respectively). The Information Framework, as the Frameworx information model, provides an information/data reference model and a common information/data vocabulary from a business as well as a systems perspective. Using the Information Framework in combination with the Business Process Framework business process and activity descriptions, it becomes possible to create a bridge between the business and Information Technology groups within an organization, providing definitions that are understandable by the business, but are also rigorous enough to be used for software development. The integration of RA into the Business Process Framework and Information Framework had a great impact on the standardization of RA, permitting service providers, system integrators, and vendors, to implement RA in a canonical way, reducing costs, and ensuring interoperability between systems and processes.

Below is a short introduction to Frameworx, Business Process Framework (eTOM) and Information Framework (SID) followed by a short summary of the definitions of the RA process in the Business Process Framework and Information Framework. GB921 Addendum D and GB922 Addendum 7RA detail the full and exact definition of RA process and entities in both.

2.1. Frameworx

Frameworx is a comprehensive, integrated framework for developing, procuring and deploying operational and business support systems and software.

- Frameworx is the TM Forum initiative to drive efficiency in and cost out of the operation of telecom networks. Frameworx enables service providers to change the way they think about their business and operations.
- Frameworx is a comprehensive, integrated framework for developing, procuring and deploying operational and business support systems and software. It is available as a toolkit of industry-agreed specifications and guidelines that cover key business and technical areas.
- Through an integrated system of business and technical elements, Frameworx allows OSS/BSS systems to become as interoperable as they have been never before.

- Frameworx positions Service Providers with a repeatable process for automation of complex operational tasks and positions vendors with the most effective open interfaces in the industry today.
- Business Process Automation delivered in the Business Process Framework Systems Analysis & Design delivered in the Shared Information/Data Model (Information Framework) defining standardized Service Oriented Architecture (SOA)-based interfaces called Business Services
- Solution Design & Integration delivered in the Contract Interface and Technology Neutral Architecture
- Conformance Testing delivered in the Frameworx Compliance Tests
- Procurement & Implementation delivered in ROI Model, RFI Template, and Implementation Guide documents

This approach enables all players in the OSS/BSS supply chain to use the elements appropriate for their business but with the confidence that these elements all fit together with a reduced level of "integration tax."

Frameworx -based solutions use mainstream IT concepts and technologies to deliver a more productive development environment and efficient management infrastructure. Frameworx is prescriptive for only those few 'cardinal points' where interoperability is key while enabling ease of customization across a wide range of functionality. This allows Frameworx -based systems to be tailored to provide a competitive advantage while also working with legacy systems.

2.2. The Business Process Framework (eTOM)

The Business Process Framework is the ongoing TM Forum initiative to deliver a business process model or framework for use by service providers and others within the telecommunications industry. The TM Forum Business Process Framework describes all the enterprise processes required by a service provider and analyzes them to different levels of detail according to their significance and priority for the business. For companies adopting Business Process Framework, it serves as the blueprint for process direction and provides a neutral reference point for internal process reengineering needs, partnerships, alliances, and general working agreements with other providers. For suppliers, Business Process Framework outlines potential boundaries of software components to align with the customers' needs and highlights the required functions, inputs, and outputs that must be supported by products.

2.3. The Information Framework (SID)

The Information Framework (SID), as the Frameworx information model, provides an information/data reference model and a common information/data vocabulary from a business as well as a systems perspective. The Information Framework uses UML to formalize the expression of the needs of a particular view.

The Information Framework provides the common language for communicating the concerns of the four major groups of constituents represented by the four Frameworx Views: Business,

System, Implementation and Deployment, defined in the Frameworx Lifecycle. Used in combination with the Business Process Framework business process and activity descriptions, Information Framework makes it possible to create a bridge between the business and Information Technology groups within an organization, providing definitions that are understandable by the business, but are also rigorous enough to be used for software development.

In order to integrate Revenue Assurance into the Frameworx framework, and to gain all the benefits of this framework, RA must be integrated at least into Business Process Framework, which defines the business processes in the telecommunications industry, and into the Shared Information/Data Model (Information Framework). The integration of RA into the Business Process Framework permits telecommunications operators to have a better understanding of the function of RA at the operational level and to comprehend the interactions between RA and other processes. The integration into the Information Framework allows identifying the common data/information model that should be followed by RA solutions, permitting structured and easy integration between RA solutions, and between RA solutions and other entities in the telecommunications operational map

2.4. Revenue Assurance in the Business Process Framework (eTOM)

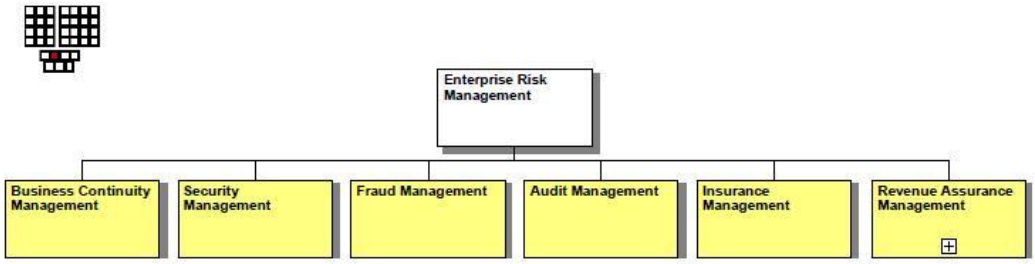

Figure 2: Business Process Framework, Enterprise Risk Management

Revenue Assurance Management was added to the Business Process Framework release 7 in 2007, described in GB921 addendum D. Revenue Assurance Management is located under Enterprise Risk management and parallel to processes such as Fraud Management, Audit Management, etc. It is important to emphasize that the Business Process Framework is about processes and not about the organizational structure that supports those processes. I.e., the Business Process Framework does not recommend the location and hierarchy of the RA entity in the organization, but rather specifies the main RA management processes. It is also understood in the Business Process Framework and Information Framework that the RA activities should not be restricted to a single process, and can interact or be part of any other process in the Business Process Framework, therefore the Business Process Framework defines the Revenue Assurance **Management** process, making it clear that the RA activities are not restricted to this process, or even to any sub set of the Business Process Framework processes.

Below are short extracts from the Business Process Framework of the descriptions of the RA related processes (source GB921 addendum D Version 7.1). The full and definitive text is in GB921

Revenue Assurance Management

Establish an enterprise-wide revenue assurance policy framework, and an associated operational capability aimed at minimizing revenue leakage within the enterprise, without influencing demand.

Revenue Assurance Management is composed of three processes: (see Figure 3)

- **Manage Revenue Assurance Policy Framework**

  Establish and manage a framework of policies and measurable controls that are used to manage the risk associated with revenue assurance

- **Manage *Revenue Assurance Operations***

  Measure the actual revenue assurance performance at defined control points against the expected performance, report anomalies and manage resolution.

- **Support *Revenue Assurance Operations***

  Support the Manage Revenue Assurance Operations processes by managing requirements for infrastructure to support the operational processes, and monitoring, managing and reporting on the capability of the Manage Revenue Assurance Operations processes.

Manage Revenue Assurance Operations is composed of seven processes (see figure):

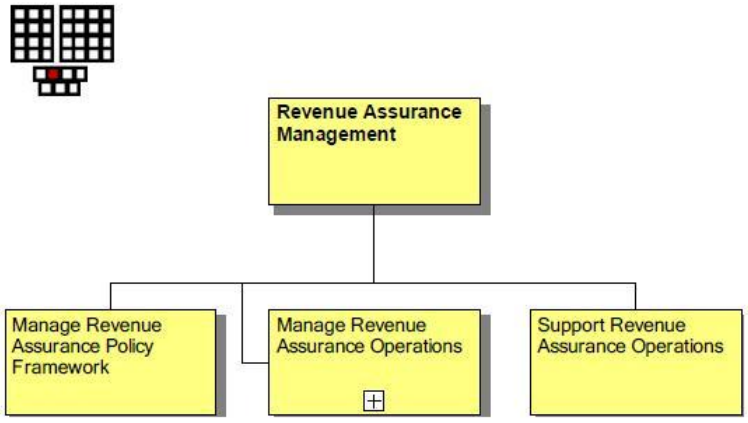

Figure 3: Business Process Framework Revenue Assurance Management

Monitor Revenue Assurance Controls

Monitor defined revenue assurance control points and undertake first-in detection of any violations or degradations of KPIs associated with the control points.

Create Revenue Assurance Trouble Report

Create a new revenue assurance trouble report.

Resolve Revenue Assurance Trouble

Undertake actions as directed to resolve detected revenue assurance violations and degradations

Assess Revenue Assurance Trouble

Analyze the information received to determine the nature and the root cause of the revenue assurance violation or degradation.

Close Revenue Assurance Trouble Report

Close a revenue assurance trouble report when the issues leading to the revenue leakage have been resolved.

Track & Manage Revenue Assurance Trouble Resolution

Efficiently assign, coordinate and track specific revenue assurance trouble analysis, and resolution, and to manage escalation (functional or hierarchical) as required to resolve an open revenue assurance trouble report.

Report Revenue Assurance

Monitor and report on the status of continuous monitoring of revenue assurance control point performance, of revenue assurance trouble reports, to provide notifications of any changes and provide management reports.

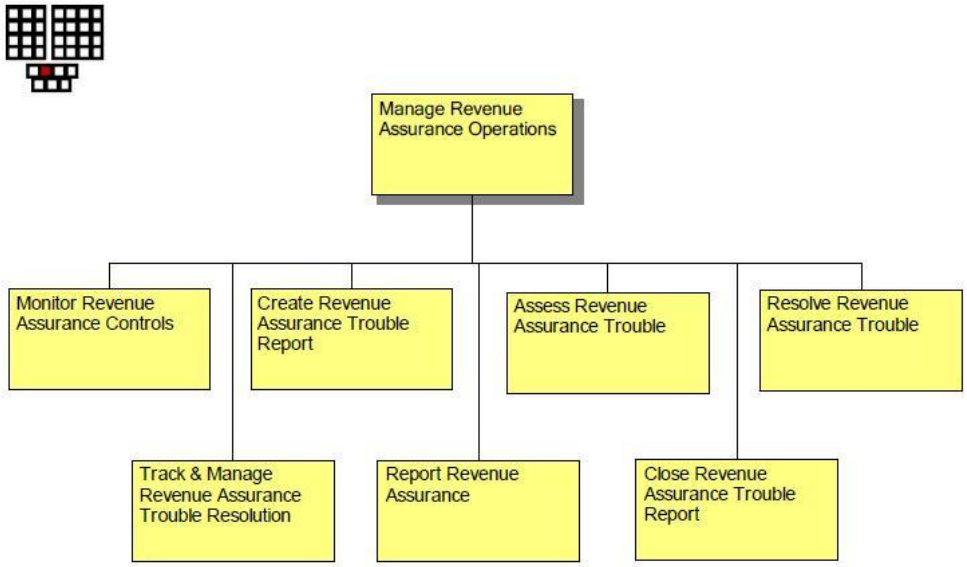

Figure 4: Business Process Framework, Manage Revenue Assurance Operations

2.5. Revenue Assurance in the Information Framework (SID)

Revenue Assurance (RA) business entities in the Information Framework support the complete RA lifecycle as described in the Business Process Framework. These processes range from creating RA controls, KPIs and RA objectives, identifying RA violations and trouble tickets, resolving trouble tickets to assessing an enterprise's RA program. RA Business Process Framework processes were described in the previous section.

Following is a short description of the main RA entities in the Information Framework. A full and exact definition of these entities is in GB922 Addendum 7RA.

The Information Framework includes 7 main Revenue Assurance Aggregate Business Entities (ABEs):

1. Revenue Assurance controls
2. Revenue Assurance key performance indicator (KPI),
3. Revenue Assurance violation
4. Revenue assurance Objective
5. Revenue Assurance trouble ticket
6. Revenue Assurance action/response
7. Revenue Assurance assessment

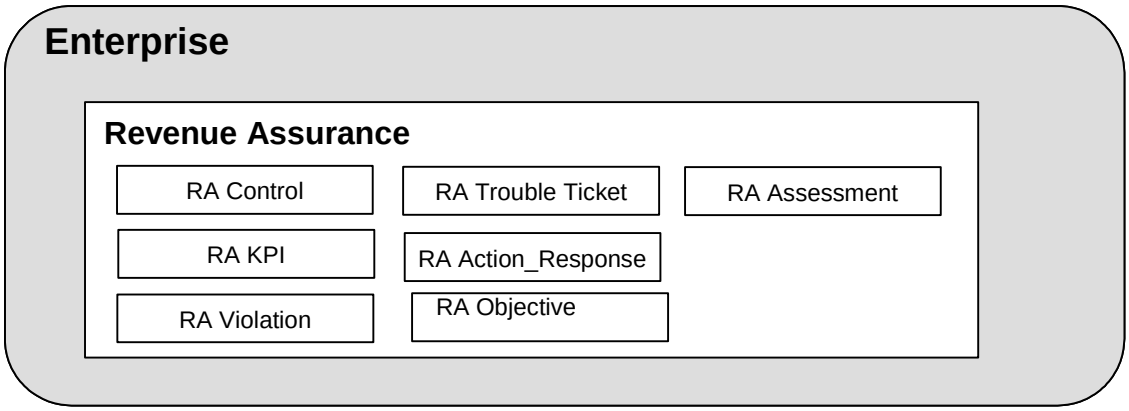

Figure 5: Revenue Assurance ABEs

The Revenue Assurance area of the Information Framework provides revenue assurance controls, revenue assurance violations, revenue assurance key performance indicators (KPIs), revenue assurance objectives, and rules that map revenue assurance KPIs and threshold violations to revenue assurance trouble tickets. Additionally, the scope of Revenue Assurance includes revenue assurance actions/responses that reconcile revenue assurance trouble tickets and bring the trouble tickets to closure.

The Revenue Assurance Control ABE defines policy-based rules that represent the logical definition of comparisons performed on entities to identify Revenue Assurance Violations. For example a Revenue Assurance Control may compare pre mediation and post mediation call details records (CDRs) to identify improperly dropped CDRs, i.e. Revenue Assurance Violations

Revenue Assurance KPIs are defined on Revenue Assurance Violations and on other revenue assurance related entities, such as bills and CDRs. For example a RA KPI may count the number of Revenue Assurance Violations found by the Revenue Assurance Control that compared the pre and post mediation CDRs.

Revenue Assurance Objectives are targets whose infringement may trigger the creation of Revenue Assurance Trouble Tickets. Examples of Revenue Assurance Objective are that the value of the Revenue Assurance KPI that counted the number of dropped CDRs is lower than 50,000, or that the trend of this value over a period of time is negative (the number of violations is dropping). When one or several Revenue Assurance Objectives are violated, a Revenue Assurance Trouble Tickets may be issued. For example if the number of dropped CDRs is higher than 50,000 a Revenue Assurance Trouble Ticket may be issued and assigned to someone, to check the cause of the problem, and to try to recycle the dropped CDRs. Revenue Assurance Trouble Tickets may be created as a result of the infringement of one or more Revenue Assurance Objectives, or as a result of the finding one or more Revenue Assurance Violations.

Revenue Assurance actions/responses reconcile revenue assurance trouble tickets, and Revenue Assurance Violations and may bring the Revenue Assurance Trouble Tickets to closure by initiating and performing a series of one or more activities. These activities may include corrective activities, e.g., correcting and recycling the dropped CDRs, and other activities such as sending reports to all the people that should be aware of the violation of the

objective, e.g., sending a report to the CFO if more than 50,000 dropped CDRs were found. Revenue Assurance Action/Response ABE entities also may consist in root cause analysis.

Revenue Assurance Assessment ABE entities measure the effectiveness of Revenue Assurance Controls, Revenue Assurance Objectives, and Revenue Assurance KPIs. Revenue Assurance Assessment ABE entities include recommendations of refining controls, objectives, and KPIs.

3. Revenue Assurance for Content and Advanced Services

With voice services becoming increasingly commoditized, CSPs are turning to content and advanced services, e.g., gaming services, to boost falling revenues. These services have attracted a large market and are boosting network traffic with the promise of increasing the ARPU. This market will be the mainstay for CSPs growth strategy. Forecast for revenues for this market provided by various industry analysts and research firms validates that content and advanced services promise to amplify the bottom-line for many CSPs pursuing such opportunities.

In every new market and technology, the challenges increase exponentially. Careful attention to the impact on the operational infrastructure and processes is required for CSPs to realize the potential profits that this market offers.

This section of the Guidebook addresses four main challenges,

1. The multi-party value chain
2. Complex Rating and Billing processing
3. Economic impact of errors
4. Complex payment arrangements and revenue stream bypass

We offer general strategies to overcome the challenges to realize the profits that this new breed of services can bring in for the CPSs.

3.1. Challenges

3.1.1. Challenge #1: CSPs and the multi-party value chain

Old Value Chain

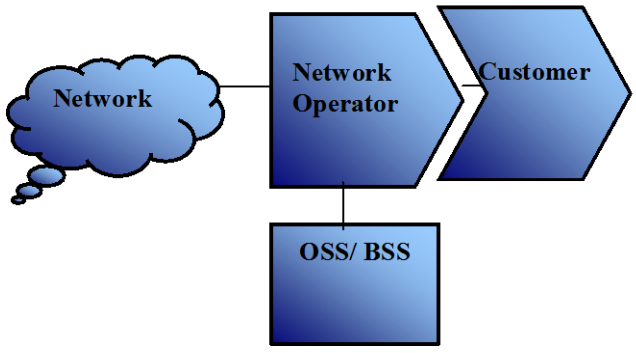

Figure 6: Old Value Chain

Under the old value chain, CSPs owned the network, OSS/BSS systems and owned the bilateral relationship with the customers. Consequently, network operators had complete control of services offered to the customers. Figure 6 describes schematically the old value chain for network operators. As long as network operators effectively controlled their infrastructure (OSS/BSS) from process and data integrity perspective, they were covered from a revenue assurance perspective.

New Value Chain

Figure 7: New Value Chain

Figure 7 illustrates the new value chain. Under this new environment, new roles are formed. This new value chain is more complex as each link has a discrete part to play in providing a service to the customer, from the application developers dreaming up new products to the providers of this content to aggregators to distributors, along with the payment handlers and service operators to the bearer or incumbent providers. The traditional role of Network operators is no longer owning network, OSS/BSS and controlling services. CSPs may choose any or all of the new roles, from playing a role in distributing content, aggregating content, developing content, handling multi-party settlement and managing the new, more complex relationship with end user. Or the CSP might find itself focusing on smaller portion of the value chain, while others take over the traditional roles of the operator, such as network operations, and even handling the relationship with the customers, as it is in the case of Mobile Virtual Network Operators (MVNOs). In place of the familiar bilateral relationship between customer and network operator, operators now have to deal with a multi-party value chain.

Management of new value chain relationships puts forward many challenges for operators.

- One of the challenges that becomes evident with this value chain is the increasing popularity of the revenue-sharing business model. Based on the role and responsibilities a CSP takes, and on who else is involved in the value chain, the CSP has to develop a robust settlement process to accurately bill and settle with the various parties in the value chain including the end user.
- Another challenge with this new value chain is the level of control that the CSP can exercise over the content and advanced services and over the customer experience for the service. This includes service setup, sales, provisioning, and fulfillment processes that now involve many parties, as well as effective control and availability of accurate data from those involved parties.
- A third challenge is that the new value chain relies on multiple parties to provide critical information to enable the CSP to formulate the event record. The CSP faces the daunting task of assembling information from all these parties, a task that poses a great source of process and data integrity challenges. This new way is in sharp contrast with traditional voice service, in which a call detail record

generated by switch has been the main source of information for the rest of downstream OSS/BSS systems.

3.1.2. Challenge #2: More complex Rating and Billing processing

To offer the content and advanced services, a CSP's has to set up its billing system to use the complex set of rules and maintain the transient data for rating, taxing and billing, data that may have been obtained from external sources. There are new attributes for quality of service (QoS), complete versus incomplete transactions, bandwidth used, time of the day, level of service (e.g. silver, gold, etc.), multi-party discount and multi product discounts. Configuration issues, data availability and compatibility, and the need to handle multiple and complex methods for rating and billing pose data and process integrity challenges for CSPs, especially if their systems were not designed to handle such complex processing. Billing On Behalf Of (BOBO), revenue sharing arrangements, display of events, activities and charges accurately on the bill are key challenges that require exceptional revenue assurance controls to maximize the revenue from the content and advanced services.

To highlight the complexity of the new value chain, let's take a simple scenario in which a consumer has downloaded content. This simple business transaction requires careful process and data integrity considerations to meet the demands of the new world. The following questions illustrate the types of processing requirements, to be taken into consideration to avoid the process and data integrity issues with the advent of content and advanced services.

- How does a content provider get paid for download attempts — even unsuccessful ones?
- Is there a re-attempt time frame, perhaps a window of one to four hours?
- Is the customer entitled to download certain content again for free (unrated)?
- How long do subscribers own content? How do subscribers or CSPs migrate the content from one handset to another?
- What are the digital rights to the content in this instance? Is the subscriber eligible to share the content with other subscribers under the same account (family members, for example)?

3.1.3. Challenge #3: Economic impact of errors

Errors in processing of content and advanced services transactions and sessions have a significant impact on the bottom line.

In this new value chain, an event transaction or session has replaced the CDR processing. Therefore, 3rd party content is totally different from a simple voice call. User actions can potentially initiate transactions with multiple third parties such as ring tone and device wallpaper vendors, chat rooms, music and video content and MMS providers– each of which has to be accurately billed. Furthermore, the resulting payment must be shared with the owner of the content or service.

Today CSPs find themselves vulnerable to far more than just the cost of a voice call in the event of billing errors. Error management becomes very complex and may involve resolution of errors by multiple parties.

3.1.4. Challenge #4: Complex payment arrangements and revenue stream bypass

Content developers, content aggregators and content distributors may be independent of the CSPs and work with multiple CSP in parallel. The consumer may pay directly to the content vendors. Therefore, payment for content delivery (i.e. the bandwidth), may be paid directly to the CSP or through the content vendor / aggregator. This is a whole new concept for CSPs. It reduces the control that CSPs have over the revenue stream and increases the risk of revenue leakages.

The CSPs, and all players in the value chain must structure their agreements based on their business strategy and goals. All participants in the chain are interdependent for the production and delivery of the product. This new environment offers many payment arrangements and settlement agreements such as:

- CSPs handle all functions for the value chain. The main justification is that CSPs have some expertise and infrastructure in payment settlements from interconnect settlements.
- The value chain uses an outsourced payment and settlements clearing house (e.g. bank or Credit Card Company).

3.2. Recommended Strategies

3.2.1. Key Strategies

- Clearly define and address the business process, systems and integration requirements to support the new services.
- Identify the control points required in the new value chain, what controls they provide, cost of control and time to implement.
- Define a revenue impact assessment for New Services Launch Process. This process needs to be examined closely and testing of the launch process needs to be evaluated from distribution of content and revenue recognition perspective.
- Do not assume that legacy infrastructure would be sufficient to support the evolving value chain. Assess and review the legacy infrastructure's ability to support the new value chain. Identify the gaps, process and data integrity challenges.
- Segregate the new value chain processes, reconciliation and accounting procedures from existing business processes and procedures.
- Identify and partner with the vendors that can provide infrastructure with in-built assurance framework necessary for mobile content and advanced services
- Define a clear set of rules of engagement with the value chain partners. Carefully define the details on contract terms and conditions with partners of the value chain to address the roles and responsibilities.
- Evaluate the Settlement Challenges as settlement requirements need close examination. Content partners' need to provide the accurate and timely data feed for settlement information. Settlement process robustness from a business requirements perspective and reverse settlement perspective needs to be

evaluated. Configuration of the partners within the settlement and billing system needs to be evaluated from data accuracy and data completeness perspective

- Call Centers Methods and Procedures (M&Ps) related to customer requests for credits and adjustments for content need to be closely evaluated. Customer adjustments need to be closely linked with the settlement process with the partners to ensure the company can realize the adjustments from the content providers in case if they have provided adjustments to its customers
- Event data must be evaluated on a continuous basis in correlation with the common customer problems for these services to identify data and process integrity issues.
- Investigate customers' complaints; look for patterns and commonalities that might reveal either technical problems, or partners' misbehavior.

4. Introduction to Addendum A, Revenue Assurance Metrics Addendum

The addendum defines 20 Standard Revenue Assurance KPIs (RASK) at the strategic level (Table 1) and recommendations on how to break down these KPIs at the tactical and operational levels. The 20 KPIs are divided into 3 segments

- **Data Quality and Coverage**. These are KPIs that measure the *quality* of Data within different company systems and the *coverage* of RA activities (percentage of data validated, percentage of discrepancies in data between systems, etc.)
- **Revenue Leakage.** These KPIs measure the percentage and the value of Revenue Leakages of a company (percentage of discovered leakage out of the total revenues, etc).
- **RA Process Efficiency,** these KPIs measure the Efficiency of RA Process within a company (revenue recovered, recovery period, etc.)

The Standard Revenue Assurance KPIs (RASK) presented in Addendum A, are intended to permit the benchmarking and measurement of quantitative aspects of Revenue Assurance. These KPIs were developed and evaluated by several Service Providers. Special emphasis was given to developing a reduced set of KPIs that gives a complete and concise view of the Service Provider's quantitative aspects of Revenue Assurance both internally and relative to the industry. At the same time these KPIs were meant to appeal to a broad range of service providers (fix-line, mobile, etc.) and require a reasonable effort to implement.

Data Quality	Revenue Leakage	RA Process Effectiveness
Percentage of validated data	Percentage of customer bills adjusted in a bill cycle	Percentage of the recovered revenue value
Percentage of customers included to reconciliation	Percentage of Unbilled and Underbilled Revenue over Total Revenue	Quantitative description of the recovered revenue value
Percentage of misaligned data records	Value of Unbilled and Underbilled Revenue over Total Revenue	Quantitative description of the recoverable revenue value
Percentage of misaligned customers	Percentage of Billable xDRs suspended or errored/Total xDRs	Percentage of the recoverable revenue value
	Ratio of Billing xDRs Records to Network xDRs Records	Quantitative description of the average time for recovery of revenue
	Percentage of errors on Fulfillment orders	Percentage of xDRs successfully recovered, processed and billed after recycling over Total xDRs
	Quantitative description of the cost of assets that were unused or stranded	Percentage of Recovered and Recoverable Customer Revenue over Total Revenue
	Percentage of Verified and Accepted 3rd Party Settlement Reports over Total S/P Settlement Reports	Quantitative description of the unfilled error fixes orders

Table 1. Revenue Assurance Standard KPIs (RASK)

5. Introduction to Addendum B, Revenue Assurance Maturity Model

The revenue assurance maturity model enables strategic planning for revenue assurance within a service provider. It describes a common roadmap for revenue assurance. It is not a checklist of operational activities that CSPs should consider implementing, although it does describe how tactics change in providers as they mature. By comparing the actual status of a provider to the model, it is possible to determine the next major strategic ambitions if the provider is to mature as rapidly as possible. The maturity model is based on real-life observation of revenue assurance in several providers since the year 2000. This is then extrapolated to characterize how the principles of revenue assurance might continue to develop in future. The future development proposed represents an ideal. The model can be used as a source of comparison for widely different businesses because it is based on generic business principles.

Similarities between revenue assurance and software engineering suggested a

model based on the staged software development Capability Maturity Model of the

Software Engineering Institute. See Figure 8 for a simplified outline of the five stages of revenue assurance maturity.

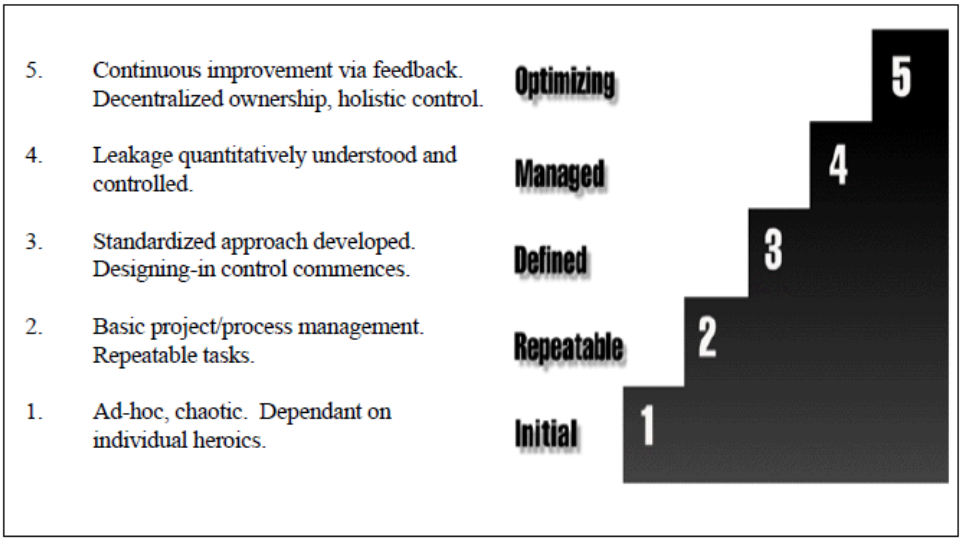

Figure 8: Outline Revenue Assurance Maturity Model

The five stages of evolution are cross-categorized into five distinct business aspects or themes: Organization, People, Influence, Tools, and Process. The maturity of each aspect may develop at different speeds, leading to imbalances. For example, a low degree of influence will obstruct the delivery of benefits even processes are nominally are in place to drive them, or insufficient investment in people will undermine an investment in tools. Maturity imbalances are identified as a fundamental cause of inefficiencies in approach that have been observed in real practice. In turn, imbalances serve to create obstacles to further improvement, and hence must be addressed as a strategic goal. Communication Providers are advised to build their strategic plans for revenue assurance around the need to improve maturity within those aspects that currently lag behind.

The addendum provides a questionnaire that can be used to assess maturity and identify areas for improvement. The objective in all cases will be to raise the maturity of those aspects at lower levels, to bring them to a consistent standard. Once a consistent level of maturity is attained, then management can plan to raise all aspects to the next level in a consistent timeframe.

6. Introduction to Addendum C, Revenue Assurance RFx Guidelines

Today, service providers are increasingly monitoring all expenses with extra care. Consequently, we see an increase in the demand for Revenue Assurance tools and implementations as part of the above process. Revenue Assurance is positioned nowadays as a strategic solution for operators –implementing such a solution will have an immediate effect on their bottom line results.

The growing demand for Revenue Assurance solution results in a growing number of Request for Proposal and Request for Information (hereafter referred to as "RFx") documents issued to ISV's, system integrators and consulting companies by operators interested in new Revenue Assurance solutions. The complexity of the business problem, the extent of systems involved, standards and frameworks available, and the number of industry solutions available can extend the overall process. Poorly crafted RFx documents can result in inconsistent responses making it difficult to properly evaluate proposals and identify the best solution.

This Revenue Assurance Guidebook Addendum C presents the most important guidelines and requirements for a Revenue Assurance RFx to assist service providers in asking relevant questions, objectively evaluating responses and procuring the solution that most meets their needs.

The RFx Guideline covers the following aspects:

- How to structure the RFx in a way that would allow the Service Provider to effectively benchmark competing responses
- The information about the specific characteristics and requirements of the Service Provider that should be provided within the RFx
- How to align requirements with the resources and technological constraints.
- A proposed format / template of an RFP/RFI.

7. Introduction to Addendum D – Revenue Leakage Framework and Examples

Revenue Assurance is a rapidly maturing discipline within the telecommunications industry; the last ten years has seen widespread industry acceptance and increasingly effective techniques and systems to detect, investigate, correct and prevent revenue and cost leakage.

There is now a wealth of operational experience of revenue assurance and the aim of this addendum is to demonstrate this by documenting a wide range of real-life examples and classifying them within a revenue assurance framework.

This framework consists of eight areas:

- Product and offer management
- Order management and provisioning
- Network and usage management
- Rating and billing
- Receivables management
- Finance and accounting
- Customer management
- Partner management

Addendum D includes a classification of more than 100 typical leakage points, accompanied by real life examples that describe the overall scenario and provide an analysis of the cause of the leakage as well as how it was detected, corrected and can be prevented. It should be noted that while these are real issues, no one CSP is likely to encounter all of them. Addendum D provides an extensive but non-exhaustive list of examples of events that have been observed within member organizations.

RA practitioners can use Addendum D to gain insight into the many and varied causes of typical leakage scenarios and find advice on how to detect, correct and prevent these leakages. It is expected that operators will be able to use Addendum D, to review the scope of their revenue assurance operations and expand them appropriately in order to cover potential areas for revenue leakage and reduce leakages.

8. Introduction to Addendum E – Revenue Assurance Controls and Coverage Model

Revenue assurance is a rapidly maturing discipline. Over the last decade it has been evolving from a reactive programme that investigated revenue leakage after it had occurred and tried to recover those revenues, through the active detection of problems that can be corrected before customers are affected, to the pro-active prevention of revenue leakage before it occurs.

The desire to move away from revenue assurance programmes being driven solely by problems that have been discovered and reacting to them, to a top-down method of risk identification based upon risk management principles is reflected in Addendum E.

Addendum E presents, a simple, technology neutral model, applicable to all types of communication service provider that:

- Supports the identification, assessment and reduction of revenue assurance risks
- Provides a method of assessing the level of the effectiveness of implemented controls
- Identifies where additional controls are relevant to an organisation
- Assists operators to create objectives and the priorities for improving revenue coverage of revenue assurance controls
- Enables benchmarking between communications service providers
- Quantifies the contribution of Revenue Assurance controls to overall risk reduction
- Prioritises the implementation of missing controls based on risk reduction

Addendum E includes a comprehensive inventory of Controls/Measures/Checks.

The relationship between this document and other models published by the TM Forum is outlined below.

GB941 Maturity Model	The RA Controls and Coverage Model complements the maturity model by providing guidelines as what revenue assurance should cover.
GB941 RASK (Revenue Assurance Standard KPIs)	The Revenue Assurance Standard KPIs model defines two KPIs related to coverage, however the definition is vague and it is intended to refine this concept in this document.
TR131 Drip-tray Model	This model was used as the basis of establishing the economic impact of placing a control. It is an illustrative model and did not evolve to permit the actual calculations envisaged in Addendum E and therefore it cannot be used to calculate the importance of each of the checks in the revenue assurance controls coverage model developed in Addendum E.
GB941 Addendum D – Revenue Leakage Framework and Examples	The Addendum E extends the leakage framework defined in GB941 Addendum D and the examples contained therein.

9. Administrative Appendix

This Appendix provides additional background material about the TM Forum and this document.

9.1. About this document

This is a TM Forum Guidebook. The guidebook format is used when:

The document lays out a 'core' part of TM Forum's approach to automating business processes. Such guidebooks would include the Telecom Operations Map and the Technology Integration Map, but not the detailed specifications that are developed in support of the approach.

Information about TM Forum policy, or goals or programs is provided, such as the Strategic Plan or Operating Plan.

Information about the marketplace is provided, as in the report on the size of the OSS market.

9.2. Document history

9.2.1. Version History

<This section records the changes between this and the previous document version as it is edited by the team concerned. Note: this is an incremental number which does not have to match the release number>

Version Number	Date Modified	Modified by:	Description of changes
0.1	19-DEC-2005	Mike Willett	First issue of document
0.2	21-DEC-2005	Kathryn Durham	Updates
0.3	26-JAN-2005	Mike Willett	First update with review comments
0.4	10-MAR-2006	Kathryn Dunham	First Revision after TAW
0.5	10-MAY-2006	Mike Willett	Editors review to release to group
0.6	01-JUN-2006	Gadi Solotorevsky	Internal review before release to TMF members review
0.7	9Jun06	D Burkett	Minor edits in preparation for Approval Committee review.
0.8	5th-July-06	T.O'Sullivan	Final modification prior to ME posting.
0.9	11-October-06	Gadi Solotorevsky	Minor formatting and numbering changes as result from review process
1.0	08-Nov-2006	Tina O'Sullivan	Updated for Public sharing
1.1	21-July-2008	Kathryn Dunham	Removal of sections on Regulation

			and Fraud which is now located in the TR131v2.1
1.2	October 7, 2008	D. Burkett	Applied new template in preparation for major overhaul to accommodate new addenda.
2.0	December 29, 2008	Gadi Solotorevsky	Major overhaul to accommodate the new addenda
3.0	March 2011	Gadi Solotorevsky	Minor changes – adding references to Addendum E "Revenue Assurance Controls and Coverage Model"
3.1	April 2011	Alicja Kawecki	Updated Notice, minor cosmetic corrections prior to web posting and ME
3.2	Sept 2011	Alicja Kawecki	Updated to reflect TM Forum Approved status
3.3	April 2012	Gadi Solotorevksy	Updated to use Frameworx nomenclature
3.4	April 2012	Alicja Kawecki	Notice, minor cosmetic corrections prior to web posting and ME

9.2.2. Release History

<This section records the changes between this and the previous Official document release>

Release Number	Date Modified	Modified by:	Description of changes
1.0	19-Dec-2005	Mike Willett	Initial Release
2.0	14-April-2009	Gadi Solotorevsky	New Major Release including 4 addendums
3.0	1-March-2011	Gadi Solotorevsky	New Major Release including 1 new addendum, Addendum E "Revenue Assurance Controls and Coverage Model" and changes to addendum A and D
3.6	1-March-2012	Gadi Solotorevsky	Updated to use Frameworx nomenclature

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9.4. Acknowledgments

The members of the TeleManagement Forum Revenue Assurance Technical Team prepared this document:

The Revenue Assurance Guidebook, GB941, is a genuinely collaborative effort. The TeleManagement Forum would like to thank the following people for contributing their time and expertise to the production of this document.

- *Mike Willett - Telstra, Editor*
- *Kathryn Dunham - The Billing College, Editor*
- *Nitin Patel - Cable & Wireless, Editor*
- *Dr. Gadi Solotorevsky - cVidya, Team Leader*
- *Doron Avidar - cVidya*
- *Alberto Canade - Datamat*
- *Dabra Huneycut – Convergys*
- *Debbie Burkett – TeleManagement Forum*
- *Geoff Ibbett – rrmSolutions*
- *Vinoo P Jacob – Subex*
- *Nilesh Karani - Convergys*
- *Ilya Kuznetsov - Ernst and Young (CIS) B.V.*
- *Eric Priezkalns - Revenue Protect Limited*
- *Hugh Roberts, Logan-Oviss International*
- *John Reilly - MetaSolv Software*
- *Tracy Miller, Infogix Inc.*
- *Stephen Tebbett - Ernst & Young*
- *Junkee Wang – China Unicom*
- *Dmitry Y. Kirsanov - Ernst and Young (CIS) B.V.*
- *Maxim Kulchenko - Ernst and Young (CIS) B.V.*

A number of people provided input and/or formal contributions. Although not an exhaustive list, many thanks to the following for their thoughtful input and contributions

Enrico Angori - Datamat

Sachdeva Deepika – Siemens

