Revenue Assurance

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* Content
  + Hoạt động kinh doanh phổ biến được thực hiện trong các doanh nghiệp Cung Cấp Dịch Vụ Viễn Thông
  + Các kỹ thuật Revenue Assurance áp dụng trong thực tế là một hệ thống lớn bao gồm việc phân tích, thực hiện kiểm soát kinh doanh để kiểm tra dữ liệu một cách tự động. RA gần giống với việc lập bản đồ kỹ thuật áp dụng cho các mục tiêu kiểm soát tài chính như tính toán vẹn trong kế toán. Hình thức RA thường được thúc đẩy bởi tư vấn.

RA bao gồm các phạm vi Kiểm tra dữ liệu tự động, tìm kiếm các vấn đề bất thường trong dữ liệu giao dịch, có thể chỉ ra lỗi làm mất doanh thu tiềm năng.

* Là việc sử dụng phương thức Data Quality và Process Improvement để cải thiện Lợi nhuận, Doanh thu và Luân chuyển Tiền tệ mà không làm ảnh hưởng đến hoạt động kinh doanh hiện tại
* SUMMARY: Là giải pháp BI tích hợp sâu vào các hệ thống Charging, Billing (IN, OCS, Billing, ...) nhằm đưa ra các báo cáo nhằm cải thiện Doanh thu của nhà mạng.

* Hiện trạng
  + Viettel tự phát triển hệ thống riêng, đơn vị phát triển: Trung tâm Phát triển phần mềm Viễn thông

* Mobifone VMS sử dụng giải pháp Redknee + Elcom

Làm việc cùng với Elcom - A Local System Integrator, Redknee đạt được thoả thuận support hơn 10 triệu thuê bao MobiFone real-time messaging rating and charging solution.

Our advanced solution will support MobiFone's complex billing requirements and our flexible and functionally-rich charging features offer the ability to interface with multiple content service providers to help VMS enhance their revenue assurance capability.

Giải pháp tiên tiến sẽ giải quyết các bài toán Billing phức tạp của MobiFone, cung cấp các tính năng Charging linh hoạt, phong phú. Hệ thống cung cấp khả năng giao tiếp với nhiều CP - Nhà cung cấp nội dung để giúp VMS tăng cường khả năng đảm bảo doanh thu của họ (Revenue Assurance)

* Vinaphone chưa có

* Problem
  + The most debated part of revenue assurance is where to start checking, i.e. at the network side, the rating side, the billing side, the interconnect side, the CRM side, etc. However, most surveys and reports state that the maximum leakage happens during the flow of Call Detail Records (CDRs) or Event Detail Records (EDRs) from the Switch to the respective rating / billing engines. Some of the common problem areas are:
    - Network
      * Signaling problems
      * CDRs in Switch not sent to Mediation
      * CDRs in Mediation not send downstream
      * CDRs rejected by rating / billing system
      * Wrong duration on the CDRs
      * Incorrect Business rules
      * Subscriber provisioning
      * Incorrect Routing

* Rating & Billing
  + Incorrect Rejection Logic
  + Duplicate CDRs resulting in double charging
  + Incorrect tariff plans
  + Rating & Billing accuracy errors
  + Late rating / billing
  + Incorrect configurations – rating minutes instead of seconds
  + Incorrect Disconnection

* Top
  + Redknee
  + Wedotechnologies

* Provider
  + Wedotechnologies
    - Gartner names WeDo Technologies number one provider of Revenue Assurance and Fraud Management
    - Các nhà mạng thường mời Ericsson tiến hành đánh giá đầy đủ và toàn diện về đảm bảo doanh thu và quản lý gian lận, quản lý rủi ro để quyết định sử dụng Solution nào. Wedo hợp tác chặt chẽ với Ericsson.
    - WeDo Technologies is a worldwide leader in Enterprise Business Assurance, providing software and expert consultancy, to intelligently analyse large quantities of data from across an organization helping to negate or minimize operational or business inefficiencies and allowing businesses to achieve significant return on investment via revenue protection and cost savings.

WeDo Technologies works with some of the world’s leading blue chip companies from the retail, energy and finance industries, as well as more than 180 telecommunications operators from more than 80 countries, through almost 500 highly-skilled professionals.

WeDo Technologies is owned by the largest non-financial Portuguese group – Sonae Group which has 61,000 employees in 18 countries. As well as telecommunications, the group is active in Retail, Real State, TMT, the Wood industry and other business areas.

Revenue and Business Assurance, sometimes also called Profit or Revenue Protection, are the domains where WeDo Technologies - through its Software and Services - has become recognized as a constant innovator and true market leader.

* Redknee
  + Redknee là nhà cung cấp hàng đầu thế giới về sản phẩm phần mềm sáng tạo truyền thông, các giải pháp và dịch vụ. Các giải pháp đã được giải thưởng của Redknee cho phép các nhà điều hành tiền tệ hóa giá trị của mỗi giao dịch thuê bao đồng thời cá nhân hóa kinh nghiệm của người thuê bao để đáp ứng các yêu cầu chủ đạo, thích hợp của từng bộ phận thị trường. Các giải pháp tạo nguồn thu của Redknee cung cấp các giải pháp tiên tiến về thanh toán đồng quy, đánh giá, tính phí và chính sách đối với dịch vụ thoại, nhắn tin và dữ liệu thế hệ mới cho hơn 70 nhà điều hành mạng tại hơn 50 quốc gia. Tham khảo với Redknee về các hoạt động phối hợp của công ty mẹ Redknee Solutions Inc, và toàn bộ các chi nhánh thuộc sở hữu hoàn toàn. Ref: [www.redknee.com](http://www.redknee.com)

* Solution
  + Wedo RAID 7

* Loại bỏ sự rò rỉ doanh thu bằng cách đối chiếu thông tin Tiêu dùng, Giá cả với Hệ thống thanh toán

* Tích hợp nền tảng RAID
  + Platform Integrity (PI) đánh giá thông tin thông qua nhiều nhà cung cấp và Hệ thống hỗ trợ kinh doanh đa công nghệ, trên Cơ sở hạ tầng khai thác, và xác định sự không nhất quán thông tin có thể dẫn đến thất thoát doanh thu

* Một công cụ hoàn hảo đảm bảo rằng "Không thể sử dụng dịch vụ nếu chưa xuất hoá đơn"

* RAID Usage Control
  + Theo dõi tiến trình xDR-Generation, bắt đầu từ Trung tâm chuyển mạch và Nền tảng dịch vụ thông qua các hoá đơn của khách hàng. Tín hiệu hoặc phiên dữ liệu có thể được bao gồm trong quá trình đối chiếu nơi dữ liệu tổng hợp được thu thập từ một điểm dọc theo chuỗi doanh thu và đối chiếu bằng cách sử dụng dữ liệu lịch sử, thông qua hệ thống và các quy tắc xác nhận ngưỡng.

* Vượt qua Các thành phần Switch-To-Bill truyền thống của Telecoms Revenue Streams

* RAID Business Control
  + Một công cụ kiểm kiểm toán mạnh mẽ và tự động cung cấp khả năng để kiểu toán một khối lượng lớn các chi phí và lợi nhuận trong thời gian thực, loại bỏ tốn kém và tốn thời gian công việc bằng tay. Nó có thể truy cập khả năng tự động để chủ động nhận diện, phục hồi và giảm thiểu thất thoát doanh thu trong các dịch vụ. RAID kiểm soát kinh doanh bao gồm:
    - Collections Assurance
    - Partner settlement and margin assurance
    - Đảm bảo ưu đãi

* Đảm bảm tính chính xác trong cân bằng tính toán cho tất cả các thuê bao trả trước trong mạng

* RAID Prepaid Balance Validation
  + Helps Service Providers giới thiệu mục tiêu bổ sung và điều khiển vào quá trình quản lý thuê bao trả trước bằng cách giám sát thời gian thực thanh toán. Prepaid Balance Validation không chỉ xác minh tính chính xác của số dư, mà còn theo dõi và báo cáo bất thường trong IN (Intelligent Network) giống như số Số dư âm, lặp hoặc invalid Balance-Affecting records, và rất nhỏ hoặc rất lớn và điều chỉnh như tín dụng quảng cáo.

* Redknee INBILL 6.0
  + Giải pháp Kết nối thanh toán, hỗ trợ việc thanh toán có nhiều bên tham gia.
  + Redknee - Nhà cung cấp hàng đầu về phần mềm thanh toán và tính phí cho doanh nghiệp và các giải pháp truyền thông cho các nhà cung cấp dịch vụ InBill - Hệ thống quản lý các hoạt động thanh toán kết nối, tạo điều kiện thuận lợi cho doanh nghiệp tối đa hoá giá trị của mạng lưới thông qua việc quản lý một cách có hiệu quả và hiệu nghiệm các công việc thanh toán hoá đơn nhiều bên tham gia, tránh được các vấn đề liên quan đến thất thoát doanh thu
  + Số lượng dịch vụ của nhà cung cấp ngày càng tăng, các yêu cầu kết nối ngày càng được mở rộng đòi hỏi một giải pháp thanh toán kết nối linh hoạt và có quy mô cao để giải quyết nhu cầu đang thay đổi. InBill cung cấp chi tiết các vấn đề mạng lưới bán hàng và thanh toán, InBill có thể giải quyết các kết nối phức tạp nhất, đem lại cách giải quyết chính xác hơn đối với việc thanh toán bán buôn và tốt hơn đối với các tình huống có thể tranh chấp. Trong một môi trường mà các nhà điều hành đang phải giải quyết với nhiều đối tác Cung cấp Nội dung như hiện nay cùng các biên độ ngày càng chặt chẽ, InBill sẽ giúp giảm bớt những khó khăn phức tạp.
  + Các kỹ thuật Revenue Assurance áp dụng trong thực tế là một hệ thống lớn bao gồm việc phân tích, thực hiện kiểm soát kinh doanh để kiểm tra dữ liệu một cách tự động. RA gần giống với việc lập bản đồ kỹ thuật áp dụng cho các mục tiêu kiểm soát tài chính như tính toán vẹn trong kế toán. Hình thức RA thường được thúc đẩy bởi tư vấn.

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* Hoạt động như thế nào
  + Là trung gian của hệ thống mạng lõi (IN, HLR, ...) với các hệ thống, Service bên ngoài (VAS, ...)
  + Data Source
    - Mediation
    - Network
    - Interconnect
    - Billing
    - Payments
    - Customers
    - Roaming
    - System Logs
  + Modules
    - Platform Integrity
    - Usage Control
    - Business Control
    - Rating & Billing Validation
    - Prepaid Balance Validation
    - Fraud Management
  + User Interface
    - SmartContent
    - Balanced Scorecards
    - Business Sensors
    - Configuration Area
    - Case Management

* **RA Process Categories**

The Revenue Assurance processes in many ways can be regarded as an auditing process. The objective is to ensure that policies of the organization are well implemented and that no or minimal revenue leakage is occurring. The RA processes have the capability to cover all departments and service lines in a telecommunications organization. There are many ways in which RA processes can be classified, however in view of an audit function; the RA processes can be categorized into Detective, Corrective and Preventive activities, controls or processes. Let's understand the difference with the help of an example. Supposing the objective is to ensure trunk groups correctly entered in the MSCs. The detective control would be to monitor Trunk Groups appearing in CDRs are harmonized with the master list and any deviations are reported. The corrective control would be to initiative a process and confirm with the Network / Wholesale team of all deviations found. The preventive control would be to set up a process with the Network / Wholesale team where all new trunk groups are first informed to the RA, Mediation, Wholesale and other essential departments and then made live on the Network.

**Detective Processes**

Revenue Assurance Detection is the process of spotting a change in value of a dimension relative to its movement from System A to System B or within a given systems itself. The change in the value is relative to a dimension is question. Detection in RA can be achieved by both manual and automated means. Typical detection activities include monitoring, summarization, investigation and auditing.

* Monitoring: Typically monitoring activities in Revenue Assurance refers to observing data, system or a process for any changes which may occur over a period of time. With the use of automated tools one can typically achieve constant monitoring which can notify the user or administrator (via email, SMS or other alarms) in case of any changes. The various processes which typically are monitored by a Revenue Assurance department include daily network usage, profile and configuration changes, mediation, rating, billing, settlement, roaming, collections and dunning related processes.
* Summarization: When dealing with large volumes of information like network usage, it may not be practical to go through CDR by CDR and compare the same between 2 systems. In such cases summarization will help in quickly examining and finding out the preliminary problems areas. For example one could first summarize information on the basis of few dimensions like events ( voice, sms, data), customer type (postpaid, prepaid, in roamer, out roamer), operator (self, local, national, international) etc. and compare the measures like count and duration of these dimensions between 2 systems. Such rapid assessments help in identifying the problem areas or dimensions quickly and a further detailed investigation can be carried out for those dimensions identified. Summarization greatly reduces the manual effort in identifying problem areas within a large data stream.
* Auditing: A revenue assurance audit is a set of activities carried out to ensure that the organization is taking necessary steps to remain compliant to the evolving changes of organizational policies, regulations and market conditions. Every Revenue Assurance audit has a list of specific objectives which may come from management, regulations or industry standards. The actual tasks of the audit can differ based on the information, system or departmental processes being audited. Some sample RA audit objectives could be like ensuring billing accuracy up to 0.01%, no configuration variances on the Network, rating & invoicing process assurance etc. Each RA audit can span into different departments, each with its own specialized technical requirements.
* Investigation: Investigation is the act of detecting something new, or something "old" that had been unknown. Investigation leads to discovery which is the observation of new actions, or new events and providing new reasoning to explain the knowledge gathered. An RA investigation is a series of processes or procedures carried out to identify the Root Cause of an anomaly. This is also known as Root Causes Analysis (RCA) procedures or activities. Root Cause Analysis (RCA) is a method of problem solving that tries to identify the root causes of faults or problems that cause operating events. An investigation would try to identify and correct the root causes of events, as opposed to simply addressing their symptoms. By focusing on correction of root causes, revenue assurance problem recurrence can be prevented.

**Corrective Processes**

Correction is the set of activities and processes related around getting the process structures correct in order to minimize the changes identified as per the detection techniques. Correction itself is the act or method of correcting a discrepancy. Typically some information, configuration, amount or quantity needs to be added, edited or removed from a system, process or procedure in order to correct the anomaly. In Revenue Assurance activities, the process of correction of a root cause could involve correction of information, processes, technology or people.

* Information Correction: This refers to the process of correcting or updating a value for a configuration element or a reference table. This is typically the result of a missing data set in a particular given table or system file. For example a particular number series may be missing in the Switch and hence not getting connected or updating a missing tariff plan in rating engine leading to unrated CDRs etc.
* Process Correction: Process correction refers to the modification of an activity by adding, modifying or removing an activity step which will prevent a miss-configuration or revenue leakage in the process. Typically process correction is required to have a pro-active revenue assurance step to provide better governance across the operations. For example the pre-bill verification process may be required to be modified when a new service line or product is introduced into the market. The new service line may be required to be included within the pre-bill process.
* People Correction: People correction is required when skills of the resources are in question. Revenue Assurance is a niche business process with limited people present with the right amount of Telecom Network, Mediation, Billing, IT and Business related experience. This leads to may Revenue Assurance teams with inexperienced people on operational departments. Owing to this, most Revenue Assurance operations end up being only re-active rather than moving into a proactive foundation.
* Technology Correction: The very nature of the telecom business changes frequently. There are 2 aspects to Technology correction i) The technology on the Network side ii) Technologies in use by the RA department themselves.

Telecom Network technologies evolve at a rapid pace. Sometimes technologies need to be balanced in the Network. For example having multiple vendors on the Network side could lead to a requirement of having time synchronizer equipment installed just to have CDRs showing consistent time and date related information. Any current implementation of Revenue Assurance becomes obsolete rapidly. As technologies evolve revenue assurance tools and coverage of the tools also need to evolve. This essentially means technology corrections need to be performed either on the hardware side or on the tool / application side. Technology corrections are rare and need to be performed with due diligence as technology corrections can be very expensive to an organization.

**Preventive Processes**

Prevention is the process of performing an activity in order to avoid a high risk situation. It is essentially an action carried out to de-risk a threat. For example if there is risk that a tariff plan is not correctly implemented, then the preventive action could be to simulate calls on test SIMs on the new tariff plans prior to launch and confirm the tariffs coming in the test CDRs against the marketing or advertising department rates. Preventive activities lead to effective risk management around Revenue Assurance.

* Synchronization - A set of activities which ensure that 2 data sets are synchronized over a period of time. For example a set of Revenue Assurance activities would ensure that all prepaid customers on the CRM systems are represented in the IN - SDP (Intelligent Network) and vice versa. Similarly all trunk groups between the whole sale departments are in sync with the trunk groups mentioned in the MSCs. Another example could be to ensure all B number tables between the MSCs are same.
* Integrity Checks - These are individual activities carried out to ensure the integrity of the system or process. This is an effective check in gaining insight into an individual process and to assess whether it has anything in their immediate background that may be a cause for concern. For example performing a sample based credit check for postpaid customers prior to generation of a bill. Another example could be subscriber checks with sanction lists watch lists for involvement in/association with fraud, money laundering & related illegal activities.
* Pre Process Checks - Any checks performed on the input parameters of a process to ensure that the right data is fed into the process. Pre Process checks are necessary for complex processes like rating and billing which involve multiple sub processes and consume a lot of time for each run. Some sample preprocess checks could include validation of CDR sequence number before rating, file count confirmation before rating, subscriber pre check before billing, duplicate CDR check, report all postpaid customers that do not have the correct bill cycle etc.
* Post Process Checks - Post process checks are required to verify the reliability on the outputs of a given process. Some processes of Revenue Assurance can produce multiple co-related outputs which need to be verified before being released to the consumer either internally or externally. Some examples of post process checks are formats checking on the target outputs like TAP 3 files, cross reference subscribers on the bill cycle with pre bill list, numbers terminated directly on OSS systems and not via CRM / BSS systems etc.

**Tool for Revenue Assurance**

Since Revenue Assurance is a very niche area in the telecommunications environment, there are some specific products and solutions supporting this subject. There are various vendors in the market which address either the complete suite of Revenue Assurance requirements or specialize in the specific domains. This section describes the basic features of a generic Revenue Assurance tool.

One must keep in mind that software RA solutions can only help in pointing toward the error locations or problem areas. When one addresses the question of developing an RA solution they need to consider the magnitude, scope and capacity of the systems available along with the intellect, skills, and the number of people accessible. Finally it is the people, their skills and knowledge that make a complete RA solution. An organization should be careful when automating revenue assurance as it may end up with an expensive and inflexible solution which no one can manage effectively. There are a variety of specialized RA products which have different characteristics including probing, RA add on modules on respective OSS / BSS elements. However the most common tool adopted by most Telecommunication companies is one which can simulate the natural process of the CDR flow from Network generation to Invoicing. Given below are some of the requirements (not exhaustive) of such a Revenue Assurance product.

**Extract, Transform and Load**

Telecommunications is an environment where there are many heterogeneous systems creating a multitude of data. Typically a single day’s information runs into many Giga Bytes or in some cases Tera Bytes also. This creates a need to have very proficient and rigorous extraction, transformation and loading tool for a Revenue Assurance application. Some of the common features of this tool are:

* It should be able to import data in all common formats of data (ASCII, ASN, BCD, Binary etc.)
* It should be able import data directly from common databases
* It should have the ability to receive data feeds from various data sources of the Network, Operational and Business support systems
* It should have an extensive audit log to track files and records status - received, processing, duplicate, loading, error etc.
* The solution must provide an integrated environment to perform data integrity checks
* It should be configurable using a user friendly GUI.
* It should provide the ability to normalize, enrich and transform business rules as applicable into a data model
* It should be able to look up large tables or files for reference information
* It should enable the creation of new data fields by manipulating and calculating values based on other fields
* It should provide the capability to monitor the progress and success of the whole ETL process from start to end
* It should handle unexpected errors and continue processing and maintain the appropriate audit logs
* It should support full automation of the ETL procedure from file pick up to record entry in the DB or file system.
* It should have the ability to store historical summary and detail information for a period of time configurable by the user
* It should be able to summarize information on the fly based on configurable dimensions
* It should have the ability to configure ETL level alarms and thresholds on data and notify relevant users of any exceptions
* The solution must be highly scalable so that the data processing platform can be sized to accommodate current and projected, with business growth, traffic volumes & audit points.

**Reconciliations**

One of the primary focus areas of a Revenue Assurance tool is to compare CDRs or XDRs from 2 different sources and checking if all the records from the first system have transferred properly to the second system keeping the appropriate business rules in consideration. This is achieved via comparative analysis of the records between the 2 systems either at the details record level or summary level by evaluating the common dimensions between the 2 data sets. Given below are some of the requirements (not exhaustive) which a Revenue Assurance Reconciliation side of the product should provide.

* It should have a graphical user interface to enable the RA analysts to create/update reconciliation and business rules
* It should support various reconciliation and controls rules types e.g. missing records, unmatched records, problems in source file (duplicates, invalid values)
* It should be able to filter the data prior to the rule executing to ensure efficient system operation
* It should be able to set effective start and end date from which a newer business rule will be applied and valid for.
* It should be to define rules using a naturalized user friendly language or a “drag and drop” GUI.
* It should be able to associate monetary values with discrepancies identified based on predefined business rules
* It should support the creation of a hierarchy of rules, when the results of a rule can become a source for further rules definition.

**Analysis and KPIs**

Once all the information has been received into the Revenue Assurance systems it time to crunch numbers and generate reports. The critical part is the analytical capabilities of the tool. The tool needs to have the ability to make sense of the problems in the vast set of data that it has gathered. This can only be done by a high performance analytical engine which should be capable of the following activities (non exhaustive):

* It should have the capability to create measures based on the output of selected reconciliation and control rules and/or other user-definable criteria e.g. Customer Account Number, Product Code
* This tool should be able to create alerts based on the application of thresholds to measures and dynamically change the thresholds based on business logic
* It should be able to create KPIs based on various measures (such as count, sum, average, etc..) and multiple dimensions.
* It should be able to showcase trends based on KPI values over the period of time and raise alarms when thresholds are crossed (for example alarms could be raised on a) Zero duration CDRs; b) Short duration calls; c) Long duration calls; d)Duration discrepancies; e) Invalid structure code/call types etc.)
* It should be able to forecast information based on past records and raise alarms or reports
* Users should be able to set thresholds of KPIs on the total value as well as on the value per specified dimension, e.g. the system should be able to alert on the situations when the threshold per a specific attribute is violated.
* It should be able to categorize alerts and alarms based on priorities (e.g. critical, major, minor)
* It should enable users to create new, and update and delete existing, KPIs and measures at any time through a simple graphical user interface. This should include full KPIs definition – calculation, dimensions, thresholds, calculation frequency.
* The solution must have the ability to support detection, investigation, validation and correction of discrepancies resulting from audit comparisons
* It should be able to co-relate gaps in the reconciliations with missing profile information or missing reference information or other system errors and prepare a consolidated report.

**Dash boarding**

A Revenue Assurance dashboard is an easy to read, often single page, real-time user interface, showing a graphical presentation of the current status (snapshot) and historical trends of an organization’s Key Performance Indicators (KPIs) to enable instantaneous and informed decisions to be made at a glance. For example, a prepaid dashboard may show KPIs related to prepaid CDRs reconciliation, prepaid user profile reconciliation, balance reconciliations and voucher reconciliations carried out in real time or near real time.

* It should be able to provide a fully personalized dashboard screen to present concise summary and/or detailed information
* It should be composed of ‘building blocks’ or ‘sections’, each containing valuable information for the user e.g. summary of all currently defined dimensions & measures
* It should allow different building blocks to display the information of different types (e.g. grid tables, trend graphs, bar graphs, line graphs, pie charts, gauges, URLs, Maps etc..).
* It should enable each block or section to be linked on a functional level e.g. once a user selected a specific gauge, for example, in one building block, a specific relevant pre-defined table or graph in other building block(s), is being refreshed accordingly, to reflect the selection of the user
* It should provide information on each source on the dashboard with drill down capabilities to investigate detailed information related to the building block whether presented with textual of graphical means
* It should provide a designer module with full flexibility in defining data sources based on any information type stored in the RA database as well as the ability to use external information sources
* It should enable users to search on a predefined set of fields within the source data for records using a complex combination of logical operators e.g. “=”, ”<”, ”>”, including wildcards
* It should provide drill down capabilities from the list of records resultant from a search into specific record details.

**Case Management**

A case management capability in Revenue Assurance should be able to provide a 360 degree view of a given case. The tool should be able to track and resolve the identified discrepancies. The tool should handle each “case” in the system from the point where the system detected it, and manage follow up through the correction and reclamation processes, until the case is resolved. Based on a discrepancy in one given area, It should be able connect relevant information from various sources. For example if a CDRs reconciliation has a problem, the case tool should be able to co-relate with respective user profiles, non-usage information, credits risks, network configurations etc. The case management component may have some of the following non exhaustive capabilities:

* Ability to create a unique case identification reference for each discrepancy (or group of discrepancies) where user-defined criteria are met
* It should enable users to manage and track cases by updating different case’s attributes such as: Status, Value, Priority, Assignee, Description, etc.
* The user should have a full case history mechanism associated with cases and the case details. The history should be kept throughout the case life cycle including when the case is reopened by the system
* It should be completely user-definable with content based on any data field available in the RA database by a simple drag and drop mechanism
* It should enable users to include in case details all case related information and also any additional information (not necessarily case related) that can help in case analysis
* It should enable users to create new fields in the case that will include either the automatically calculated value or will be opened for the user update. These fields should retain their value throughout the case life cycle
* It should support case report output manipulation including sorting, multi-level grouping and filtering based on any one of the displayed attributes
* It should have the ability to “multi-assign” cases (such as changing the assignee or closing a large number of cases) to one another
* It should enable users to print the displayed discrepancies and export them to Excel, Word, Csv and PDF etc. files with restrict user access so that they can only see and update only the cases that are assigned to them