



ROC® Data Integrity Management

The Foundation of OSS/BSS Data Integrity

- Reduced Capital Expenditure through Stranded Asset Recovery
- Reduced Operational Costs through Increased Automation
- Increased Revenues through First-Time-Right Service Fulfillment

The Foundation of OSS/BSS Data Integrity

ROC Data Integrity Management from Subex is the industry's first Data Integrity Management (DIM) solution for improving the quality of data driving key telco processes, resulting in lower costs and higher service profitability.

ROC Data Integrity Management is a patent-pending solution combining three powerful data integrity functions: Network and Service Discovery, Reconciliation and Discrepancy Analytics. Now you can run operations with Network-Driven Data Integrity.

DIM is an essential component of efficient and effective service delivery management. ROC Data Integrity Management is the leading solution from the industry pioneer.

The OSS/BSS Data Integrity Problem

Service providers across the industry invest billions of dollars in their network infrastructures and billions more in their Operations Support Systems (OSSs) and Business Support Systems (BSSs). However, the actual connections between the network and supporting OSSs/BSSs are not automated or updated or simply poorly connected, leading to significant, process-affecting data integrity problems.

Without automated and proactive data integrity management, your OSS/BSS systems rapidly grow out of sync with one another and with the actual telecom network. For example, unrecorded equipment changes and service modifications, and failed service activations, contribute to a growing gap between the reality ("as-is" view) of the network and the reflection of that reality ("as-intended" view) in the OSS/BSS.

The absence of a proper view of services in the network, results in the service provider experiencing service fallout issues and also increased turnaround time for trouble-shooting. This results in increased time to activate/resolve services and ultimately an unhappy customer with a high probability of churn.

This gap drastically undercuts the value of your OSS/BSS integration and automation projects. Well integrated systems may just be passing around "dirty data," contaminating the good data that does exist. Industry analysts estimate that the typical inventory system is 15 percent to 20 percent out of sync with network equipment and 25 percent to 40 percent out of sync with the logical layer details of the service infrastructure.

Such synchronization issues drive the need for continuous reconciliation activities and hamper provisioning and troubleshooting, while causing assets to be stranded. The data integrity problem delays and derails inventory management projects, makes revenue assurance more difficult and drags down the efficiency levels of mission-critical processes.

The time-consuming, manual processes traditionally used to improve data integrity actually raise the total cost of ownership (TCO) of the network and get in the way of more profitable service management. Some of the costly inefficiencies caused by the OSS/BSS data integrity problem include:

- Lost assets, especially port cards and available ports
- Stranded resources, including large amounts of bandwidth
- High provisioning fall-out rates and problems automating service-level management
- Slower trouble resolution and less satisfied customers
- Time-consuming manual processes (reconciliation, activation, etc.)
- Difficulty automating service management when underlying data is inaccurate or irrelevant

“ TrueSource has exceeded our expectations, helping to ensure that our critical operations processes are based on accurate data about the network and services. ROC Data Integrity Management is improving our operations in ways that lead directly to a better experience for Sprint's customers.”*

Jim Hansen, Senior Vice President, Network, Sprint

*Presently known as ROC Data Integrity Management

Numerous service providers are making, correcting discrepancies and achieving higher data integrity a top priority. In fact, the data integrity state of a carrier's operations has a direct impact on its ability to manage down costs and enhance service profitability.

As carriers seek to derive the greatest value from their networks and systems, they need a solution to improve data integrity across the OSS/BSS.

ROC Data Integrity Management Benefits

Stranded Asset Recovery

Find undocumented elements, verify availability of cards, ports and devices
Improve financial reporting, depreciation of assets and resource utilization

Enhanced Service Assurance

Operations and fault processes have access to clean network data and topologies to accelerate troubleshooting
Fault and performance monitoring processes pinpoint assets associated with specific services, for impact correlation

Capacity Planning

Accurate view of network "as is," for comparison to network "as intended"
Detailed resources for determining how over-booked or under-booked the network is

Accurate, "Evergreen" Inventory Management Systems

Real-time, relevant data on actual state of devices and services
Ensures network data consistency across the OSS/BSS and processes
Reduces time-consuming, error-prone, manual population and updates

First-Time-Right Service Fulfillment

Up to 70% of provisioning failures are attributed to inaccurate data. ROC Data Integrity Management ensures provisioning processes are based on accurate data, to promote "First-Time-Right" provisioning
Service design activities are based on actual state of the network at all layers
Activation processes are accurate and impact on network is clearly understood

ROC Data Integrity Management Solutions

Inventory Reconciliation:

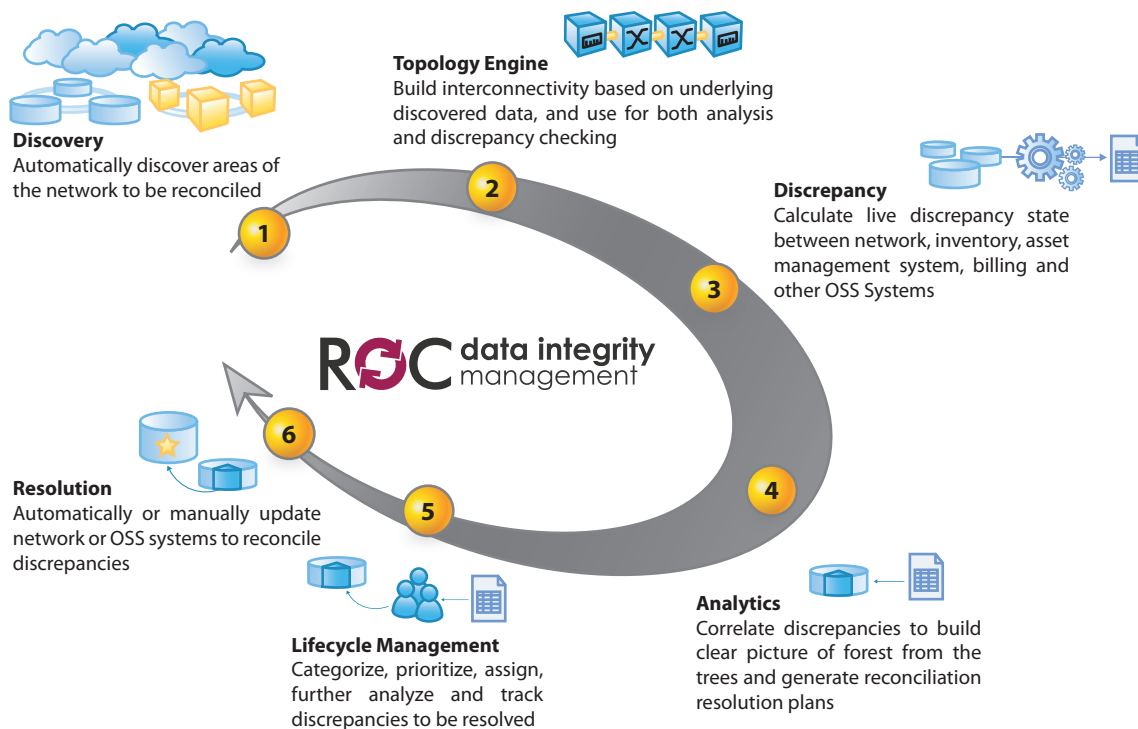
Automatically discovering the network "as is" and reconciling inventory management systems for more accurate operations processes.

Asset Tracking:

Validating financial asset tracking solutions, such as bar-code scanners, with discovered data to ensure that assets are properly recorded and financial reporting is accurate, aiding with Sarbanes-Oxley compliance.

Provisioning Efficiency:

Ensuring that data driving service design and the provisioning process is accurate, increasing activation success rates



ROC Data Integrity Management - Network-Driven Data Integrity

Subex ROC Data Integrity Management is the industry's first system to provide an operations-wide approach to solving your Data Integrity Management problems. ROC Data Integrity Management combines three powerful data integrity functions: Multi-layer Discovery, Multi-source Reconciliation and Discrepancy Analytics and business-rule driven Reconciliation.

ROC Data Integrity Management discovers network resources, identifies them and reconciles them with your OSS/BSS databases. ROC Data Integrity Management also can reconcile between databases, such as between an inventory management system and an order management system and a billing system or an asset tracking system based on Service Provider business rules.

It's advanced Topology Server helps recreate a view of the services available in the network and also determines other services associated. This information can then be used to reconcile with an external source like an inventory system. With the help of this information, Service Providers can identify broken circuits/services and accordingly help customers free up stranded resources and assets. The physical topology pack is capable of discovering physical connectivity between devices in the network which can then be reconciled against inventory to ensure design of services is based on accurate links between physical devices in the network.

ROC Data Integrity Management provides consistent, relevant data throughout operations, enhancing the effectiveness and value of service fulfillment, service assurance and billing systems.

ROC Data Integrity Management is the first system that can discover devices and logical services in multi-layer, multi-vendor, multi-technology environments and reconcile this data with OSS/BSS on a continuous, controlled basis. This powerful capability enables inventory and other systems to be continuously current and relevant, creating a solid foundation for automating key operational processes.

ROC Data Integrity Management tackles three major challenges to reconcile OSS/BSS with one another and with the reality of the network itself:

- **Multi-layer discovery of physical and logical attributes:** Multi- threaded, parallel discovery of network elements including port, processor function cards, chassis structure, power supplies, memory, software and firmware versions
 - Logical component discovery includes connection segments (virtual circuits, etc.) and service components (cross-connects, bridging points, etc.)
 - Discovery is non-intrusive and dynamically throttled to prevent management traffic and device overload
- **Reconciliation:** Comparing data in OSS/BSS databases to identify discrepancies and permit the reconciliation of these systems with one another and with the network. ROC Data Integrity Management permits operators to rapidly and easily update databases, or define automated, flow-through reconciliation that permits certain discrepancies to be handled without operator intervention. Reconciliation provides validated, categorized and prioritized data that can be used across operations to support fulfillment, assurance and billing tasks
- **Discrepancy Analytics:** Comparing the network to a database or one database to another can result in literally millions of discrepancies. Discrepancy Analytics automatically investigates and analyzes these discrepancies to help operators identify the most significant and costly discrepancies and rapidly resolve them. ROC Data Integrity Management couples Discrepancy Analytics with discrepancy management workflow that captures the best practices for discrepancy detection, analysis and resolution, providing a foundation for highly efficient methods and procedures Together, these data integrity management functions permit service providers to better understand how data inaccuracies are affecting operations and correct errors that drive up operations and capital costs.

ROI in days, not years

Many customers have found that ROC Data Integrity Management pays for itself in less than six months by recovering stranded network assets and by quickly improving the accuracy of data available for processes such as provisioning. For example, one regional carrier improved its operations and network utilization by 25 percent by having real-time resource knowledge and better data for planning. The solution quickly paid for itself by recapturing lost physical and logical assets that were put back into service.

Before ROC Data Integrity Management	After ROC Data Integrity Management
<ul style="list-style-type: none"> • Inaccurate data derailing service fulfillment, assurance and billing process 	<ul style="list-style-type: none"> • Accurate data foundation driving key processes
<ul style="list-style-type: none"> • Slow, error-prone manual data audits and OSS/BSS updates 	<ul style="list-style-type: none"> • Automated discrepancy detection, management and resolution
<ul style="list-style-type: none"> • Huge masses of discrepancies that are undecipherable 	<ul style="list-style-type: none"> • Discrepancy analytics that pare down and prioritize millions of discrepancies into manageable groups
<ul style="list-style-type: none"> • Excessive provisioning rework 	<ul style="list-style-type: none"> • Clean data to support "first-right" provisioning
<ul style="list-style-type: none"> • Delayed troubleshooting 	<ul style="list-style-type: none"> • Faster troubleshooting with clear view of network "as is"
<ul style="list-style-type: none"> • Low network utilization, caution because of unclear capacity commitments 	<ul style="list-style-type: none"> • Clear picture of "as is" network and services to fine tune capacity planning
<ul style="list-style-type: none"> • Stranded network resources 	<ul style="list-style-type: none"> • Recovered resources for reuse and capex avoidance
<ul style="list-style-type: none"> • Unrealized ROI on inventory management, asset tracking, provisioning projects 	<ul style="list-style-type: none"> • Greater success rates for key OSS/BSS projects by incorporating accurate picture of the network and services for loading, planning, process design and other steps

ROC Data Integrity Management Features

Multi-layer Discovery

- Discovers devices, components and service elements at layers 1, 2 and 3: TDM, SONET/SDH, DWDM, ATM, Frame Relay, DSL, Ethernet, IP
- Support for discovery of Mobile Infrastructure, including BSC, BTS, MSC, SGSN, GGSN both directly and via EMS systems.
- Discovery of configured interfaces such as Abis are also supported
- Multi-threaded, simultaneous discovery of physical networks and logical service components in multivendor, multi-layer environments
- Scales to support the largest carrier networks while remaining nonintrusive
- Scheduled, periodic discovery or directed, on-demand discovery to support key processes
- Intelligent Discovery Throttling regulates discovery traffic to control management network load and automatically adjusts to network element CPU load
- Supports device discovery via multiple methods, including SNMP, TL1, CORBA, CLI, Telnet, XML and others
- Extensible on-the-fly for new devices with plug-in Network Equipment Models (NEMs)
- Powerful NEM Software Development Kit permits rapid addition of new device support
- Discovers hundreds of intelligent network devices, including widely deployed equipment from Cisco, Nortel, Tellabs, Fujitsu, Alcatel-Lucent, Ericsson and many others

Rules-driven Service Discovery

- Service Discovery assembles representations of end-to-end logical services, such as VPN
- Service definitions can be easily customized via configurable rules to fit existing service models
- Ensures proper service configuration in relation to service commitments
- Provides logical service topologies, such as Full Mesh versus Hub/Spoke VPN configurations
- Identifies fragmented or incomplete services for capacity recovery
- Stitches end-to-end services for multiple technologies
- Drill from discovered data to Topology
- Identify broken circuits/services
- Perform circuit-based reconciliation
- Display physical connectivity between network elements
- Helps current IP VPN topology to benefit from framework features (e.g., integrated technologies)
- Covers International L1 services and xWDM services
- Stitches end-to-end services across technology domains

Reconciliation Engine

- Automatically compares data in one data source with another, such as the discovered network “as is” with the network reflected in the inventory system or other database of record
 - Classifies and prioritizes discrepancies in the physical network and logical services
 - Contains workflow for discrepancy management based on the best practices for data integrity management as determined by carriers across the industry
 - Displays discrepancies in alert grid format, automatically highlighting differences between the network and the inventory
 - Serves up reconciliation options appropriate to type of discrepancy and desired process
 - Integration Server permits updating of OSS databases to resolve discrepancies, or the triggering of other systems to support appropriate reconciliation process
 - Permits bulk reconciliation actions for groups of discrepancies requiring identical resolution actions
 - Flow-through Reconciliation permits touchless resolution of certain discrepancies without operator intervention
-

Discrepancy Analytics Engine

- Analyzes the mass of discrepancies to discern most critical and service-impacting discrepancies to speed correction
- Uses pattern-recognition algorithms to identify chains of linked or related discrepancies
- Investigates and consolidates groups of related discrepancies requiring common resolution
- Enables operators to identify “root causes” of multiple related discrepancies and prioritize corrective tasks
- Speeds discrepancy prioritization and supports advanced discrepancy management workflow tasks
- Offers Recommended Reconciliation Plans, automatically generated based on type of discrepancy groups analyzed

Fully distributed, extensible and scalable

- Multi-tiered architecture with redundant, distributable servers
- Solaris, Oracle and Java
- Development Kits for rapid extension and customization

Powerful, full-featured information retrieval and reports

- Dynamic queries enable users to see instantly how network resources and logical components relate
- Queries serve up data on physical device attributes, all services of a given type, bandwidth commitments, port availability and many more
- Dynamic graphical displays provide physical network and logical service topologies across multi-layer and multi-vendor environments
- Reporting tools provide accurate data to aid design, planning and service maintenance, such as port availability, device discrepancies, contracted bandwidth by device or subnet, service element summaries and many more

Easily deployable and user friendly

- Thin Web GUI Client enabling Service Providers to run ROC Data Integrity Management over a WAN like environment
- Enables a Hosting/Managed Services model where Subex/ Partners can administer components remotely

“OSS databases today in a well-run operation are at best 80% accurate, while more typical rates are 40%-60% accurate. With reconciliation tools and proper operational procedures, database accuracies above 95% can be achieved.”

Yankee Group

Subex Limited is a leading global provider of Business Support Systems (BSS) that empowers communications service providers (CSPs) to achieve competitive advantage through Business Optimization - thereby enabling them to improve their operational efficiency to deliver enhanced service experiences to subscribers.

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

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

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

*RCR Wireless list, 2010

#Forbes' Global 2000 list, 2010



www.subex.com

Subex Limited

Adarsh Tech Park,
Devarabisanahalli,
Outer Ring Road,
Bangalore - 560037
India

Phone: +91 80 6659 8700
Fax: +91 80 6696 3333

Subex Inc.

12101 Airport Way,
Suite 300 Broomfield,
Colorado 80021
USA

Phone: +1 303 301 6200
Fax: +1 303 301 6201

Subex (UK) Limited

3rd Floor, Finsbury Tower,
103-105 Bunhill Row,
London, EC1Y 8LZ
UK

Phone: +44 20 7826 5420
Fax: +44 20 7826 5437

Subex (Asia Pacific) Pte. Limited

175A, Bencoolen Street,
#08-03 Burlington Square,
Singapore 189650

Phone: +65 6338 1218
Fax: +65 6338 1216