# Table of Contents

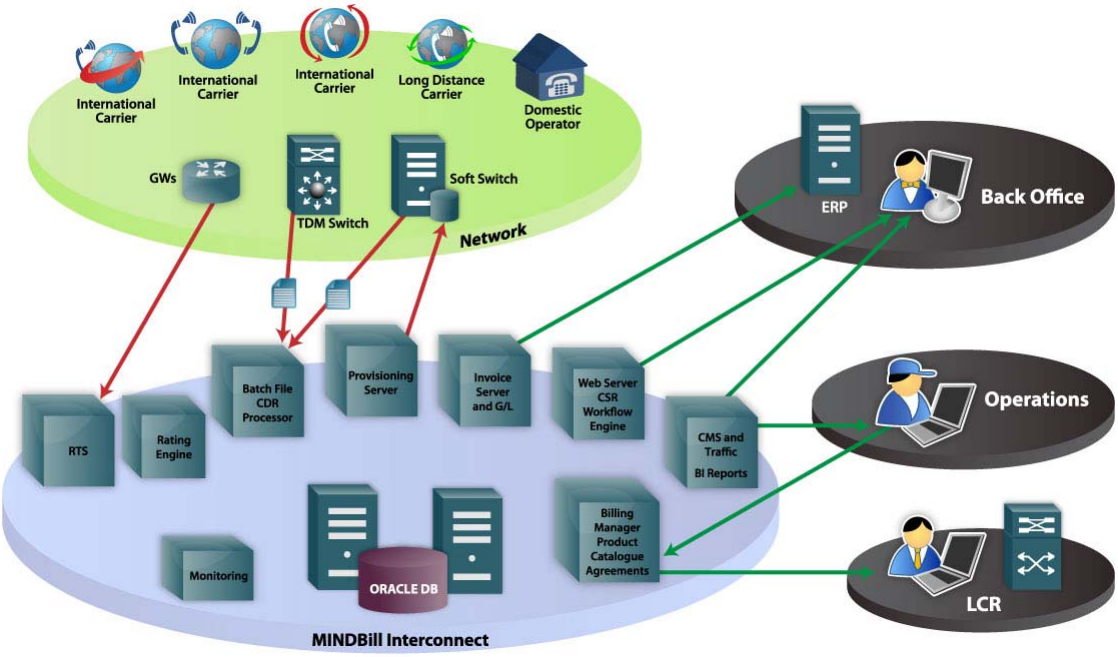
## Executive Overview

Managing the settlement agreements between network and communication providers becomes more and more challenging as new technologies, services and partners are involved, and more complex settlement models are in use. Both incumbent carriers, using legacy non-flexible systems, as well as new entrants, require new interconnect management systems that can cope with the new challenges.

The MINDBill system offers a complete end-to-end solution for managing interconnect agreements with partner service providers that includes billing and settling of incoming/outgoing/transit traffic, volume discounts, accumulative monthly stepped/tiered rating, minimum billing, and flexible rating parameters.

The MINDBill interconnect solution includes the appropriate tools for rating interconnect traffic, applying flexible rating parameters (resolution, minimum call duration, initial charge and more) with a distinction per destination prefix, analyzing traffic with BI tools, exchanging and comparing traffic with the partner, adjusting traffic divergences, generating invoices, tracking payments, and reporting finance transactions to back-end systems.

The MINDBill interconnect solution is built on top of the robust retail Billing and Customer Care system, which means it benefits from all its market-proven features (e.g. flexible rate plans, account hierarchies that reflect agreement models, invoicing and debt collection). In addition it also has specific procedures that are related to the interconnect model (e.g. aggregating traffic by daily and monthly buckets with a breakdown per destination category for better reports performance and drill down for identifying differences, generating invoices after the monthly\weekly traffic is mutually agreed upon with the partner).



# The End of Month Procedure

Traffic is processed, rated, and aggregated throughout the month. At the end of the month, before ***invoices*** are generated, a ***disputes & reconciliation*** process is conducted where aggregated traffic is exchanged and compared to the traffic reported by the partner. In case there are divergences, it is possible to further drill down to the source of problem in order to rectify the divergences.

## Disputes & Reconciliation

The interconnect traffic is displayed in a dedicated GUI, which offers the means to:

- View aggregated traffic per partner and traffic direction within a month
- View aggregated traffic per destination for each day in a month
- View traffic details (number of calls, duration, charges for each destination, etc.)
- Export and/or print aggregated traffic in order to send it to the partner
- Import from files the traffic reported by partners in order to compare it to own traffic (alternatively, it can be manually added )
- View divergences in the traffic reported by partners and compare with your own traffic processed throughout the month
- Edit aggregated traffic according to compensation reports
- Close month (signals that invoices can be generated for the partner)

### Example

The example below shows an end-of-month procedure for the settlement of the partner's originating traffic.

### Step 1 – Comparing monthly traffic per direction

Monthly traffic had been exported or printed and sent to the partner. The partner provided its own traffic, which was imported or added by hand in the system.

As seen in the report below, two out of three destinations have a divergence above the configurable 2% threshold and therefore further analysis is required:

- For the first destination, the problem is clearly detected as a mismatch in tariff configuration. For this case, the system allows editing the tariff rates and running the ***recalculation*** of the traffic.
- For the second destination, there is a difference in the number of CDRs between the number of CDRs of the partner and the number of CDRs in the system. For this case, further drill-down is necessary, using destination dispute per days.

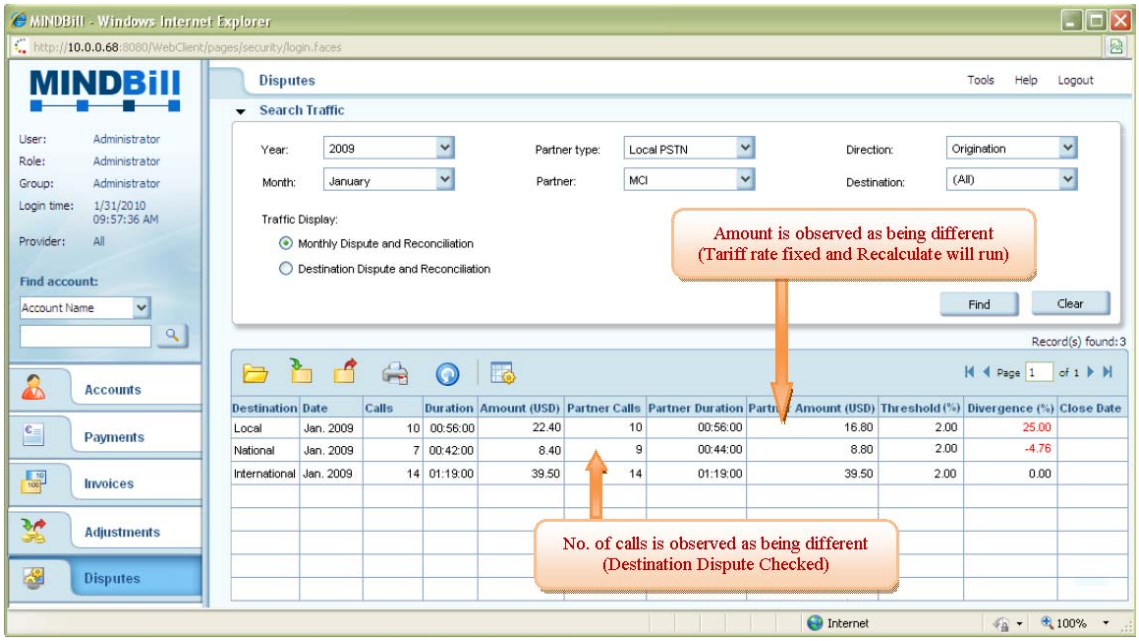



**Figure 1 – Interconnect Monthly Dispute and Reconciliation**

## Step 2 – Comparing daily traffic per destination

For the second destination, the Destination Dispute report is run. This report also compares own traffic to the traffic reported by the partner, so similar procedures are available: editing own/partner traffic, exporting own traffic, importing partner traffic, and printing traffic. The query below shows that for 01/02/2009, 2 CDRs are missing.

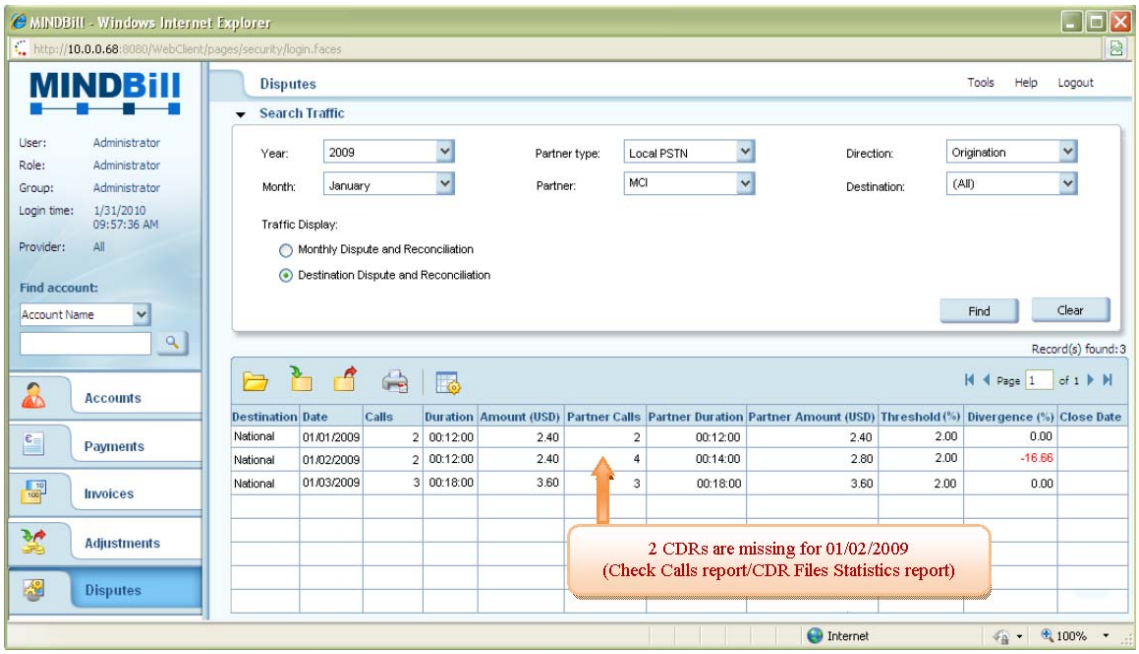



**Figure 2 – Interconnect Destination Dispute and Reconciliation**

Additional reports can be run in order to check why there are missing CDRs: the Calls report that shows the traffic for a period, on a call by call basis, or the CDR Files Statistics report that shows if all collected files were successfully processed (the number of parsed CDRs versus success and rejected CDRs). After missing CDRs are identified and successfully processed, the aggregated traffic is updated accordingly.

### Invoices and Payments

If the divergences are still not fixed, several options are available in order to close the month and generate invoices. According to the compensation traffic agreed upon with the partner:

- The aggregated traffic can be adjusted/edited and will be presented in invoice as is, *or*
- Credit/debit adjustments can be added and the invoice will detail the traffic as processed with additional lines expressing the compensation amounts.

After the disputes and reconciliation procedure is closed, invoices can be generated for the partner:

- It is possible to use different invoice templates for each partner.
- It is possible to manage all partner agreements in one invoice or in separate invoices.
- Invoices can be generated for the entire traffic charges or can be configured to include only the difference to pay between incoming and outgoing traffic charges.

MINDBill provides a real-time payment database for tracking and viewing payments entered into the system. Upon payment acceptance, recording it in the system results in a simultaneous update of the partner's balance and remaining open amount that includes non-invoiced usage.

The MINDBill system includes a configurable credit threshold warning per account where as the system would issue an alert when the partner total debt that includes invoices open balance and current non-invoiced usage exceeds a predefined limit. The purpose of this is to alert the local account manager on a potential credit risk in order to decide on either collecting a down payment, increasing a deposit or in an extreme situation suspending the incoming traffic until the commercial aspects are settled.

The MINDBill Interconnect solution enables defining as a prepaid account a remote partner sending incoming traffic. When the credit limit, which is set equivalent to the prepaid amount is reached the MIND system would issue a suspend notification for the network operations to handle accordingly. This enables increasing the business while minimizing the risks.

## Partners Management

Interconnect partners and their agreements are defined and managed using the MINDBill Customer Care application.

By using MINDBill Customer Care, it is possible to:

- Create, search, view, and adjust partner details (contact details, phone ranges, etc.)
- Add and update agreements
- Review invoices
- Accept and review payments.

The system provides full audit trail and logging journal on all operations made.

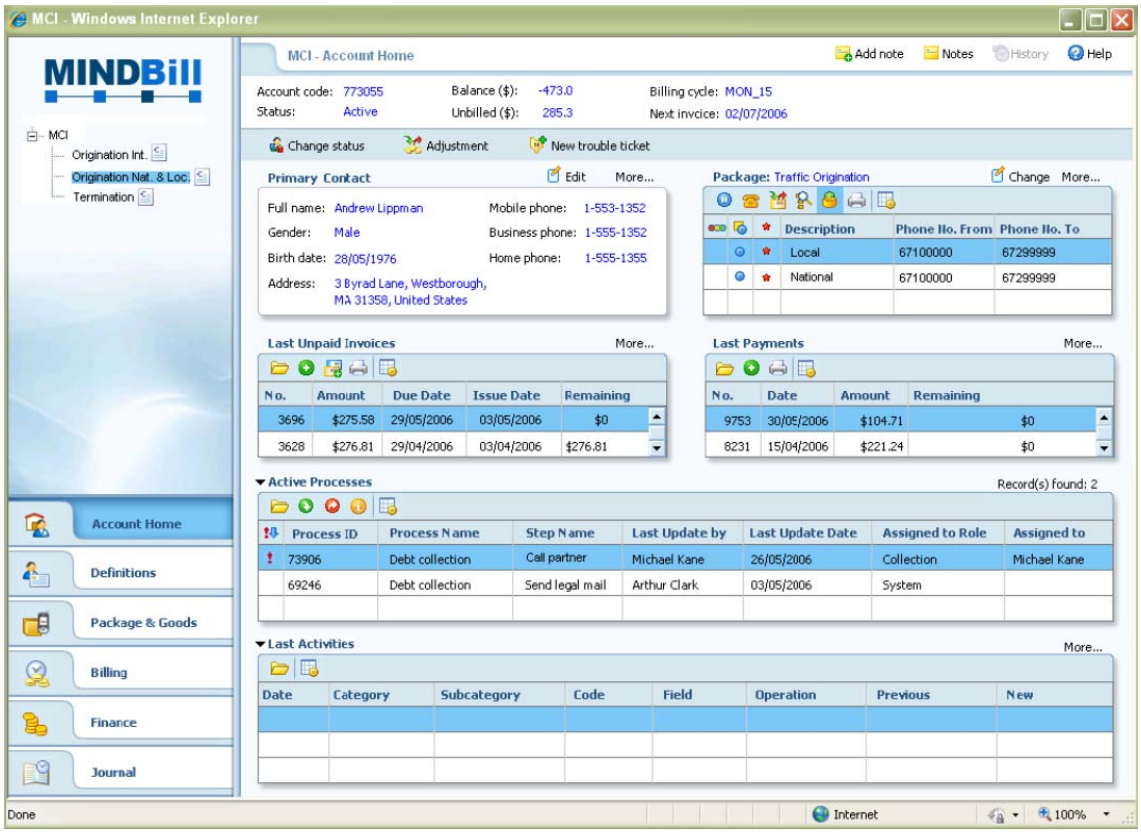



**Figure 3 – Partner Home Page**

Agreements may consist of one service or a list of services. MINDBill enables the definition, rating, and bundling of unlimited combinations of services in the agreement. The MINDBill system fully supports services such as voice, dialup, data, fax, content, e-mail, web hosting, and many others.

By configuration, it is possible to decide if an invoice is generated for termination traffic, too, in order to manage the invoices to be paid in the MINDBill system or not. Another option is generating an invoice that only includes the difference between origination traffic (revenue) and termination traffic (cost).

In the example below, the partner agreements require origination traffic to be managed in two invoices: one for traffic to international destinations and one for traffic to national & local destinations, while termination traffic will be managed in an additional invoice.

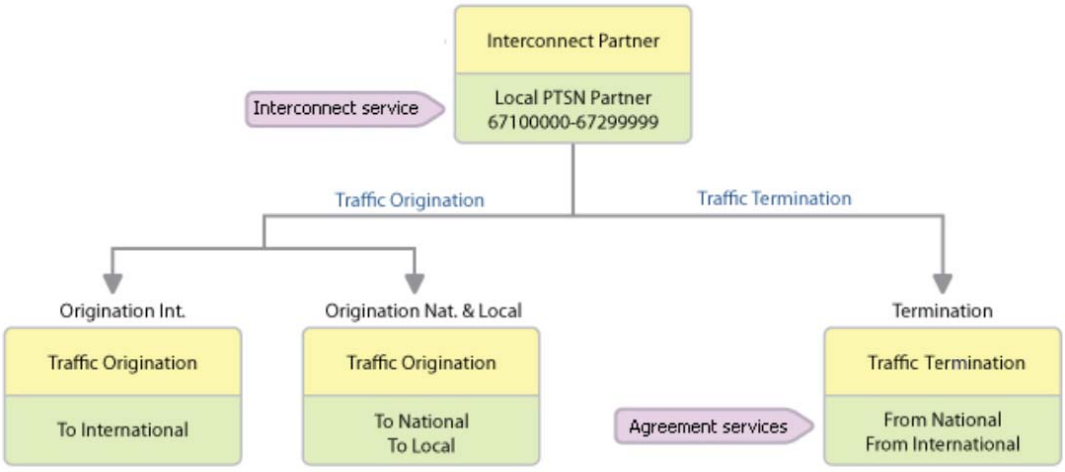



**Figure 4 – Interconnect Partner Agreements Example**

# Business Intelligence & Reports Analysis

MINDBill incorporates a flexible reporting & BI platform allowing the operator to create, manage, and display all required data and activities.

MIND's reporting solution is based on SAP BusinessObjects Edge Business Intelligence (BI). This comprehensive, versatile suite delivers solutions that address any business intelligence requirement – from flexible ad-hoc reporting and analysis, to dashboards and visualization supporting all the interconnect needs. The solution is a powerful business intelligence choice for Telco providers that require a deep insight for traffic analysis, revenue sources, that want to improve costs effectiveness, comprehend resources utilization, discover new opportunities, and gain a competitive advantage.

## Dashboard

The MINDBill system includes an online dashboard that presents the most updated information of the CDRs processed from the switches and presents an updated monitor view of the traffic, allowing the detection of problems and escalation at early stages. It provides useful graphs that show traffic per service type, call type, and time of day, recent calls, expensive calls, frequent destinations, expensive destinations, etc.

The ASR statistics is an important factor for an interconnect environment particularly as an additional factor for the LCR. In the MIND reporting system the ASR parameter is configurable for any value starting with zero, since 1-2 seconds call duration is not necessarily an indication for a successful call attempt.

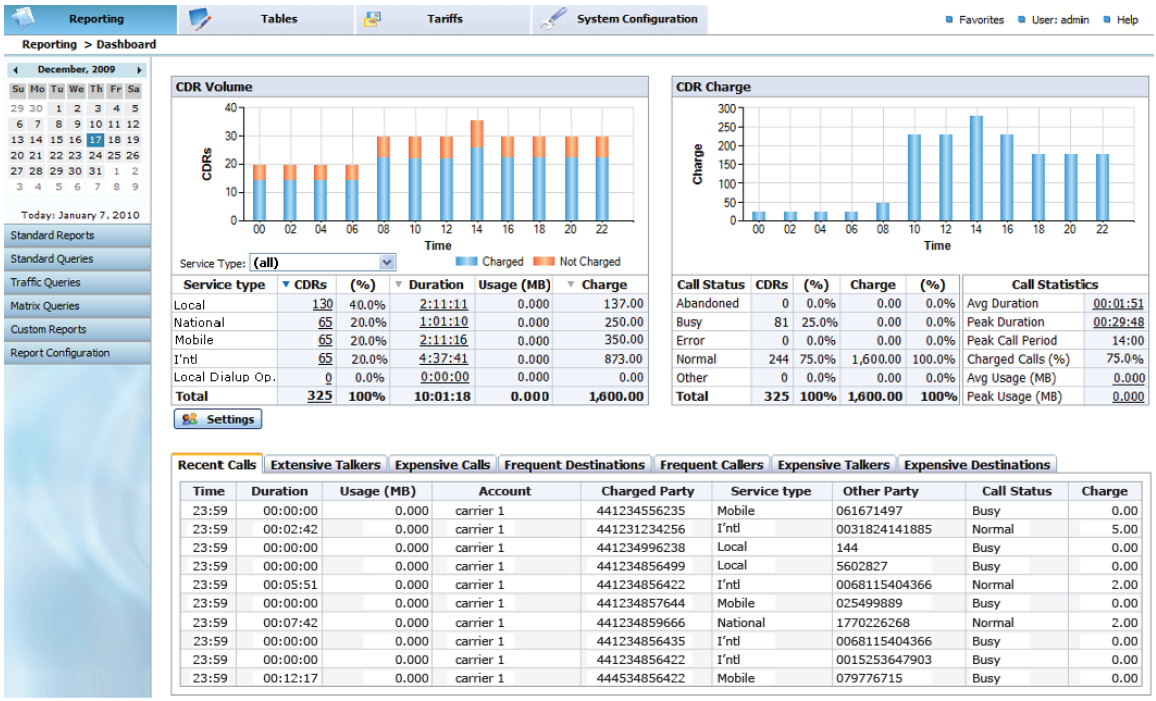



**Figure 5 – Traffic Dashboard**

## Pre-defined & Customized Reports

The standard pre-defined reports available in the MINDBill system enable the operator to categorize the partners' data and analyze revenue, profitability, traffic, ageing debt, and offer financial reporting needed for a dynamic business environment. The standard reports may be customized and new reports may be easily created based on the operator interconnect needs. This is performed using the Crystal reports BI developer kit.

The reports are proven to be a powerful tool to further drill down into the interconnect traffic for identifying the source of problems for disputes and reconciliation process.

The standard reports include, among others:

- Processed CDR files statistics (CDR files collected and processed)
- Monthly and daily traffic per trunk (Inbound, Outbound, and Transit)
- Monthly, weekly, and daily traffic per partner
- Monthly, weekly, and daily comparison per partner
- Monthly, weekly, and daily traffic per destination
- Daily comparison per partner with drill-down per destination
- Total invoices per partner
- Total payments received per partner
- Total debt and debt ageing per partner

The traffic reports are designed to track over a period of time:

- Peak call loads
- Average call loads
- Average call duration (ACD)
- Average seizure ratio (ASR)

The reports can be:

- Accessed instantly or scheduled to run at certain dates
- Shipped to file, printer, or e-mail
- Output in PDF, CSV, or Excel format.

## Call Traffic Analysis

Traffic Analysis reports serve as a basis for deciding on the optimum allocation of resources and other efficient revenue saving measures. This tool generates reports that measure call loads to different destinations, at different hours of the day, the number of calls per minute for a specific gateway or group of gateways, as well as providing a measurement for maximum network capacity. Traffic data is summarized in peak, average and daily traffic reports that may be displayed and printed in various graph formats.

The Call Traffic Analysis tool allows:

- Monitor all call traffic on the network
- Analyze trunk utilization.
- Display and print data conveniently in bar, line and area graph formats.
- Measure call loads to different destinations.
- Select the resolution to calculate the average.
- Export reports and graphs for use in other applications.

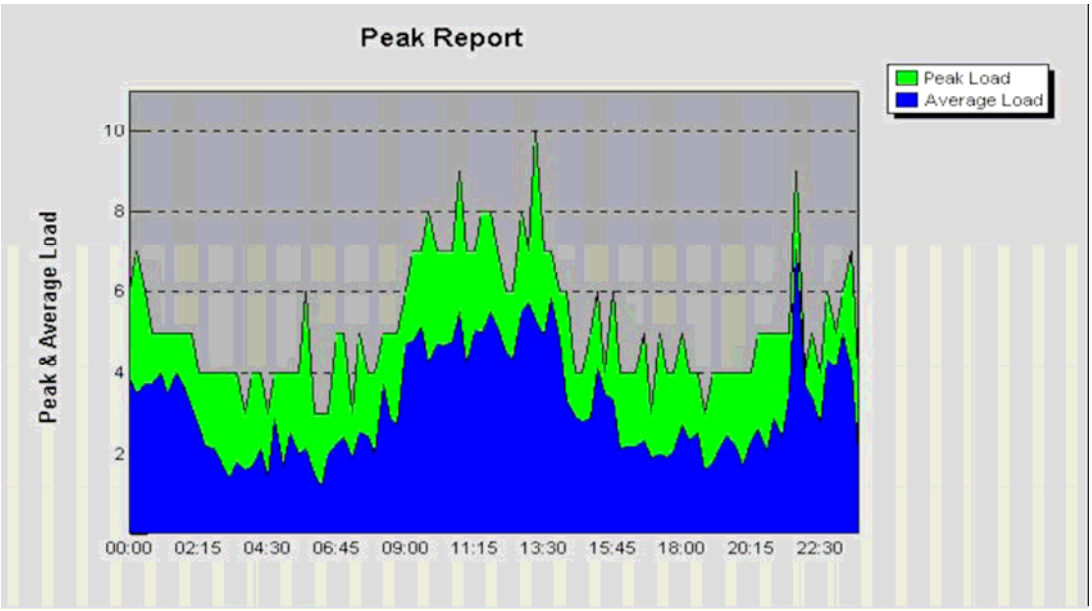



**Figure 6 – Report Graph**

All the summary reports created by the Query Generator can be broken down per carrier, network element, IP address, Trunk ID and are presented in a graph form. The format, colors, gridlines and titles to control the look and style of the graphs can be defined.

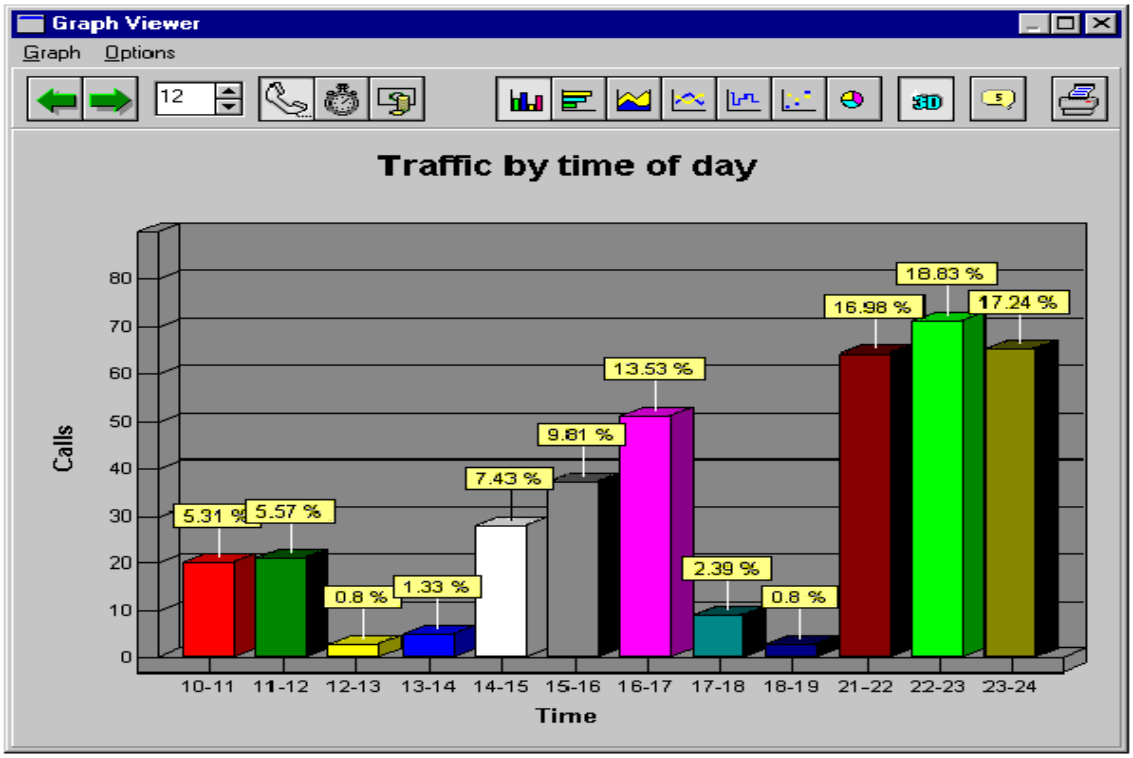



**Figure 7 – Graph Viewer**

Call Summary by Call Duration: The Service Provider can analyze and assess QoS. If more than 50% of calls are less than ½ a minute than there is a definite problem in the quality of the Voice. The following graph (report) displays the distribution of calls by duration.

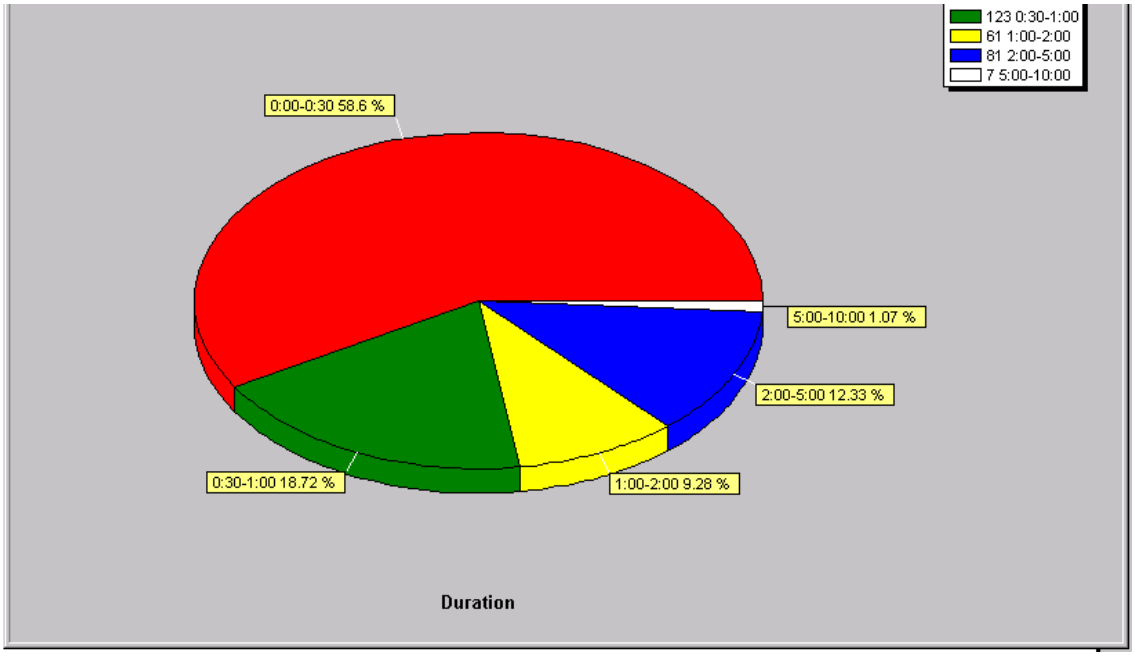



**Figure 8 – Graph sample**

# Solution Architecture

The MINDBill solution for interconnect is based on the industry-proven MINDBill Billing & Customer Care system, with the addition of the MINDBill tools for conducting the interconnect procedures.

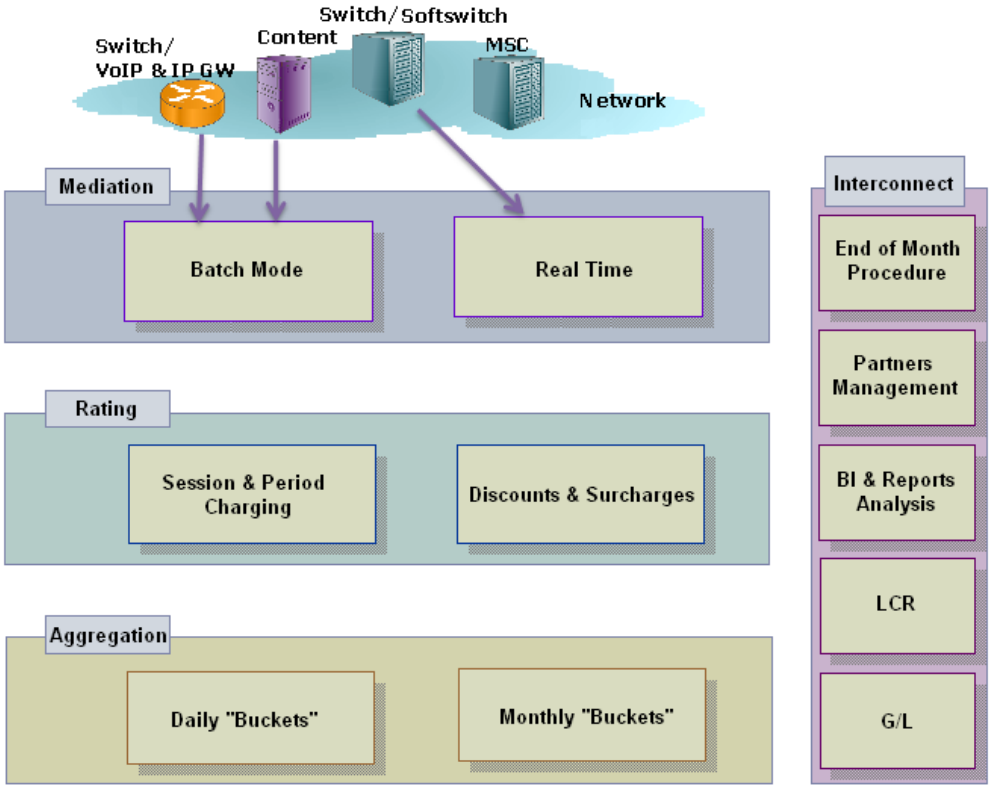



**Figure 9 – Solution Architecture**

MINDBill's Multi-layered architecture is a modular software architecture supporting real-time distribution processing, achieving performance, scalability and high availability. MINDBill uses an open architecture using the latest software paradigms:

Service-Oriented Architecture (SOA) and Document-Oriented Architecture (DOA), thus enabling fast and seamless integration with other systems and third-party applications. MINDBill is built using standardized best-of-breed object-oriented technologies such as Java and XML, and it is J2EE compatible, powered by a commercial Application Server. The Data layer holds the business persistence data. It includes the database Oracle 10g and the common storage.

## Mediation

MIND has vast mediation experience interfacing with various switches and network elements using a wide variety of collection protocols (FTP, SFTP, copy from drive, etc.) and CDR (Call Detail Record) formats for batch mode processing (binary, text).

MINDBill also includes a Real-Time Server component that interfaces with network elements for on-line charging using RADIUS, Diameter, SIP, or CAMEL protocols.

MINDBill processes the CDRs, and based on the configuration setup in the systems, it guides each record to the correct partner agreement and service (based on partner trunks and calling/called number ranges system definition).

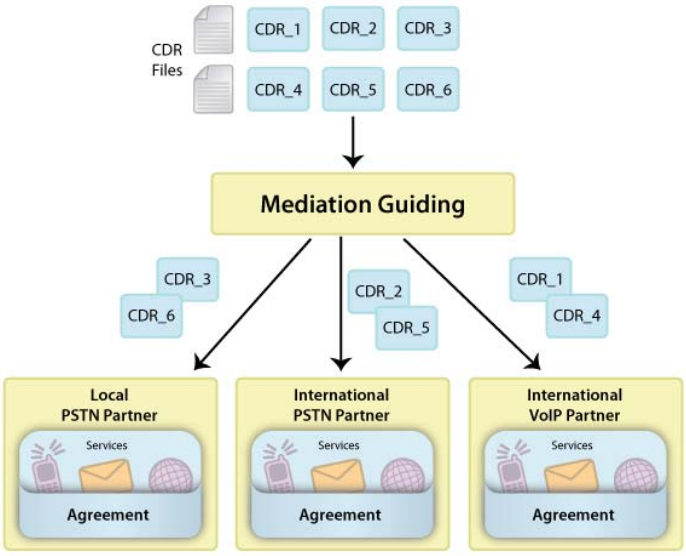



**Figure 10 – Mediation Guiding**

## Rating

MINDBill offers a flexible and powerful rating engine allowing an unlimited number of services rating schemes and billing plans. Different tariffs can be set for different partners and partner groups. MINDBill supports multiple currencies so tariffs are expressed in the currency required by the agreement.

There are three main types of charges that build up to the whole tariff of a service:

- Setup (one-time) charges – charged once at service activation.
- Recurring (periodic) charges (RC) – charged every pre-defined period.
- Traffic charges – the charge can be either for the total traffic per period or per session, based on defined rules regarding the duration and timeframe of the session. Dropping rates are enabled – stepped and tiered. Rating can be based on different metrics, such as duration, the amount of data transferred, number of items accessed, QoS (Quality of Service), and type of application.

There are also the discounts and surcharges which are assigned to a tariff. Discounts can be defined based on a variety of criteria, e.g. the total volume, total duration, and others.

If the traffic was already rated and wrong output is observed because of miss-configured rate plans, it is possible to run an automatic ***recalculation*** process after fixing the miss-configured rates.

The rating parameters consists of:

- Resolution; Minimum call duration; Initial charge; and/or Minimum charge per call
- Rating intervals: Stepped and Tiered (dropping rates)
- Time profile rates (e.g. peak/off peak, weekend)
- Surcharges
- Distinction between different rating dimensions for mobile calls required for Air and Toll rates
- Accumulative rating, Volume discounts

## Aggregation

Since an interconnect system is expected to process large amounts of CDRs per single invoice/statement, after being rated, the traffic and charges are aggregated into daily and monthly *buckets* per service and destination. The aggregation *buckets* are updated accordingly when a recalculation process runs on the original traffic or late traffic is processed.

This enables applying per destination type: volume discounts, accumulative monthly stepped/tiered rating, and minimum billing.

By performing aggregation while processing and rating the traffic, the reports will be produced faster, thus performance is increased. The purpose of this is to enable a quick drill down when a dispute arises over differences and to swiftly identify the source for the divergences.

## Least Cost Routing (LCR)

As the telecom environment evolves and profit margins tighten, more focus is placed on revenue assurance and increasing operators margins.

The MINDBill system provides a tool to create, manage, and monitor the least costly routes per destination and monitor the status.

The MINDBill Least Cost Routing solution provides:

- Importing into the Tariff definition each partners rates (A-Z);

Automatic creation of the LCR matrix that holds the best rates for a destination; The LCR matrix is normally built on the sequence of Primary, Secondary and Tertiary.

- Since the different carriers have individual A-Z lists with a particular breakdown of prefixes there is a need for optimizing a general A-Z destinations list LCR as an input to the network elements. For this purpose a compression algorithm is used for combining common LCRs into a single line. The reason for this is that the network elements are often constrained for a list limited between 1,000-2,000 while the tariffs breakdown can reach nearly 10,000 prefixes.
- Marking on the CDRs with the LCR indicator. The mediation and rating modules mark the CDRs with the chosen route that was performed by the network and the actual LCR priority (1,2,3, and other) according on the LCR matrix. ;
- The result of this is the capability to generate reports that shows the CDRs with non-optimal routes. This is an indication that the network routing tables

have not been updated according to the LCR 1st, 2nd or 3rd priority and a corrective action is required ASAP to avoid continuing with expensive routing. The report is integrated with the MINDBill dashboard and reporting tools, thus allowing the monitoring for the actual LCR status and improving cost effectiveness across the systems and operations.

### G/L

The MINDBill G/L Module provides the full flexibility for handling and supporting all accounting functionality. It follows the financial accounting standards. Furthermore, all the financial transactions are segmented, aggregated into predefined groups, and the system enables posting all the transactions amounts per G/L code to an external accounting system by reports or by files that are generated by the built-in export utility.

Since the G/L account can vary from one system to another, depending on the resolution needed by the accounting system, the mapping between financial transactions and the G/L account codes is done in a highly flexible manner in order to comply with the providers' business model.

## Summary

MINDBill offers a convergent end-to-end interconnect solution that facilitates the management of inter-partner agreements, enabling the deployment of new revenue increasing services in the shortest time possible. The MIND solution gives providers the flexibility and reliability needed to increase profitability, while reducing the cost of ownership and operations and ensuring a fast return on investment due to its end-to-end capabilities combined with a modular architecture and cutting-edge technology.

MIND provides sales and support to its worldwide customers from offices in the United States, Europe and Israeli headquarters. MINDBill has a track record of over 100 successful installations. Service providers working with MINDBill found it to be a reliable tool that offers a fast return on investment and gives them the flexibility needed to meet any market demand. All these, together with the constant commitment toward quality and efficiency, make MINDBill the solution they need to move forward.

To learn more about MIND CTI, please visit www.mindcti.com or call a MIND representative.