MIND
Billing & UC Analytics

MINDBill®

Billing and Customer Care Solution

End-to-End Billing and Customer Care

Gain Competitive Advantage with a Truly Convergent Billing & Customer Care Solution

CONTENTS

Executive Overview

Today, fixed and mobile networks create new revenue opportunities for service providers by offering a convergence of voice, data, TV, video, smart homes and IoT services. The spotlight has moved from simply increasing the number of subscribers to maximizing profitability by introducing new business models, offering new advanced services and by gaining new markets.

Founded in 1995, MIND is a leading provider of innovative, real-time billing & customer care, mediation and provisioning solutions, dedicating its efforts to drive telecom service providers towards their realization of these goals. MIND's strength derives from its proven expertise in releasing award-winning products, a commitment to building high quality solutions for its customers, constant innovation and the ability to track the latest market trends and keep ahead of industry changes. MINDBill, MIND's convergent end-to-end billing and customer care solution, facilitates voice, data, video, and content services for both prepaid and postpaid subscribers, in mobile, wireline, broadband and cable networks. MINDBill's flexible engine enables support for the entire spectrum of telecommunication service providers, such as Carriers, ISPs, MVNOs, MVNEs, n-Play, Cable operators and more; MIND's end-to-end solution reduces the Total Cost of Ownership (TCO) by providing a single platform for all billing needs. MIND's faster and cost-effective deployment enables immediate Return on Investment (ROI) and ongoing lower cost of operation by providing a user friendly and easy-to-use solution.

MIND offers service providers a billing and customer care solution enabling the flexibility, scalability, and reliability they need to increase customer satisfaction, reduce time to market and operational expenses, and keep up with the often-changing market conditions.

Architecture Highlights

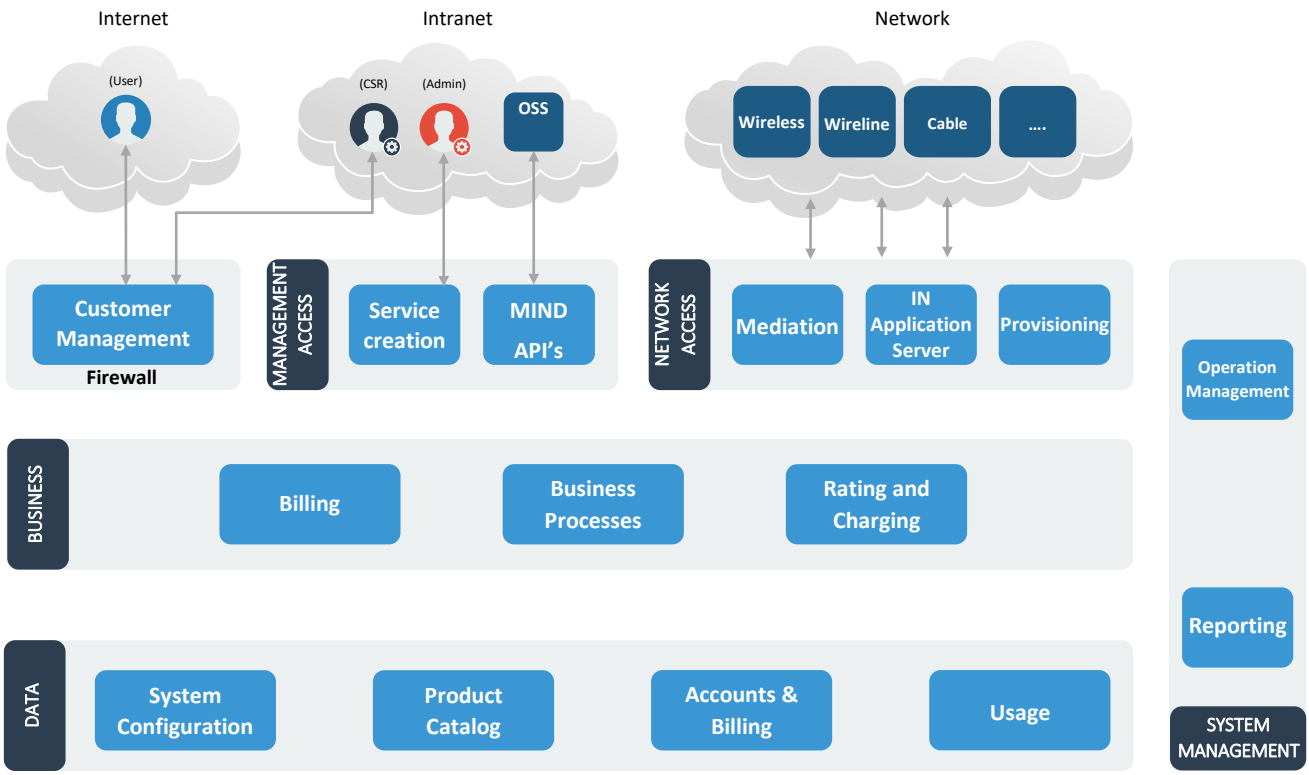
The MINDBill Multi-layered infrastructure is supported by a modular software architecture enabling real-time distribution processing, achieving performance, scalability and high availability.

MINDBill uses an open architecture including 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 as it is powered by a commercial Application Server.

Logical Architecture

The MINDBill logical architecture is based on four layers: the Access layer, the Business layer, the Data layer and the Management Layer.



MINDBill Logical Architecture

The Access Layer

All the modules that interface with external systems (i.e. Intranet, Internet, Telephony Network, etc.) are placed in the Access layer. The Access layer consists of the following sub-layers:

Management Access

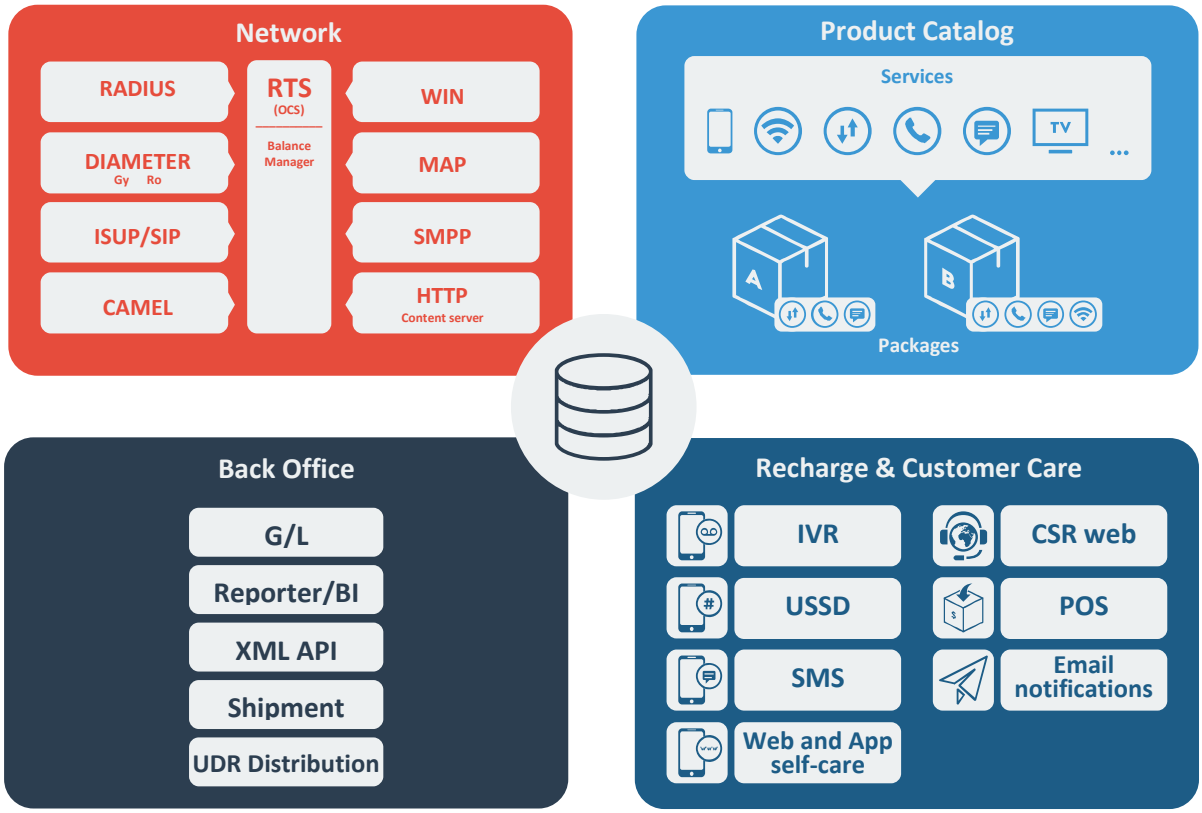
MINDBill Management Access provides the operator with the following main modules:

- Service Creation and Product Catalog - allow providers to configure and launch new services and business models in fast time-to-market;
- Customer Care - Web-based Access tools for both Customer Service Representatives and for subscribers' Self-care;
- MIND APIs – Enabling open interface with external systems.

Network Access

The MINDBill Network Access enables the exchange of business and operational information between MINDBill and the various network elements. It consists of 3 main modules:

- Mediation - Provides both real-time and batch collection, analysis and processing of billing events;
- Provisioning – Updates and activates subscribers' services and features in the network elements;
- IN Application Server – Call Control for prepaid services like prepaid card dialing based on IVR; Customer self care via mobile is available using IVR, USSD and SMS services for top up and more.



Topography

The Business Layer

The Business layer consists of the modules responsible for the various business processes and business logic of the MINDBill system:

- Rating and charging
- Billing and invoice generation
- Customer creation
- Trouble ticket
- Debt collection
- Additional business processes.

The heart of the MINDBill business processes is the Workflow Engine, which provides the operator with the ability to modify and create new business processes.

The Data Layer

The Data layer holds the business persistent data. It includes the database and the common storage. It is based on the Oracle industry-proof database engine.

The Management Layer

The Management layer includes business reports, traffic analysis and operational management (MMTS) tools.

Customer Relationship Management

MINDBill CRM is a bundled solution composed of user-friendly Web-based applications that focus on customer satisfaction and retention, while enabling efficient, straightforward, and easy-to-learn GUI for Customer Service Representatives and Subscribers.

Accounts

The term 'account' is used in MINDBill to describe either a subscriber (end-user account) or any other entity within a customer's hierarchy. MINDBill stores all the relevant information - such as contact and personal information, account status and statement details – for every account.

For every account, there is an assigned package that contains at least one service. In addition to the various attributes and parameters that were set at the service level, more information is added and customized at the account level of the service (such as special discounts, service status and service specific parameters), building a packet which is account specific.

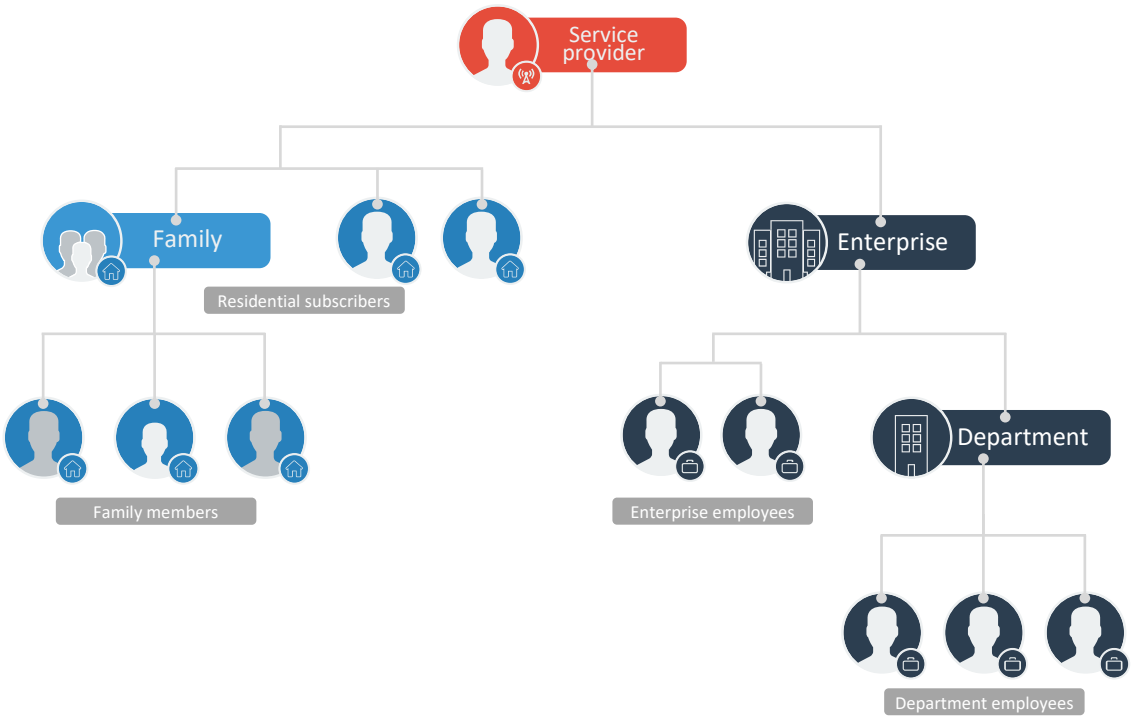
Accounts belong to one of the four categories of billing options: 1) credit account (postpaid customers with unlimited credit), 2) limited-credit account (postpaid customers with a pre-determined limit); 3) debit account (prepaid customers) or 4) debit-card (prepaid disposable calling cards).

Unlimited Hierarchy of Accounts

The complex web of relationships between the billable entities in an organization provides a formidable challenge in allowing billing flexibility and fast processing. Not only large enterprises, but also SMEs and even families are examples of business structures that sometimes have a very complex hierarchy. MINDBill supports these complex models in order to allow the provider to offer special and flexible products and promotions to such customers and bill for these services throughout the hierarchy.

A well-structured system of accounts provides two major advantages:

- The rating and billing of services may be distributed within and between the layers of the hierarchy.
- Rules can be defined at any level of the hierarchy and applied to lower levels.



Account Hierarchy model

Customer care

MINDBill WebCSR is used by Customer Service Representatives to handle and manage the entire life cycle of the account, starting as a prospect, going through the account creation and order management, account maintenance, customer retention and then finalizing with ending the contract and closing the account.

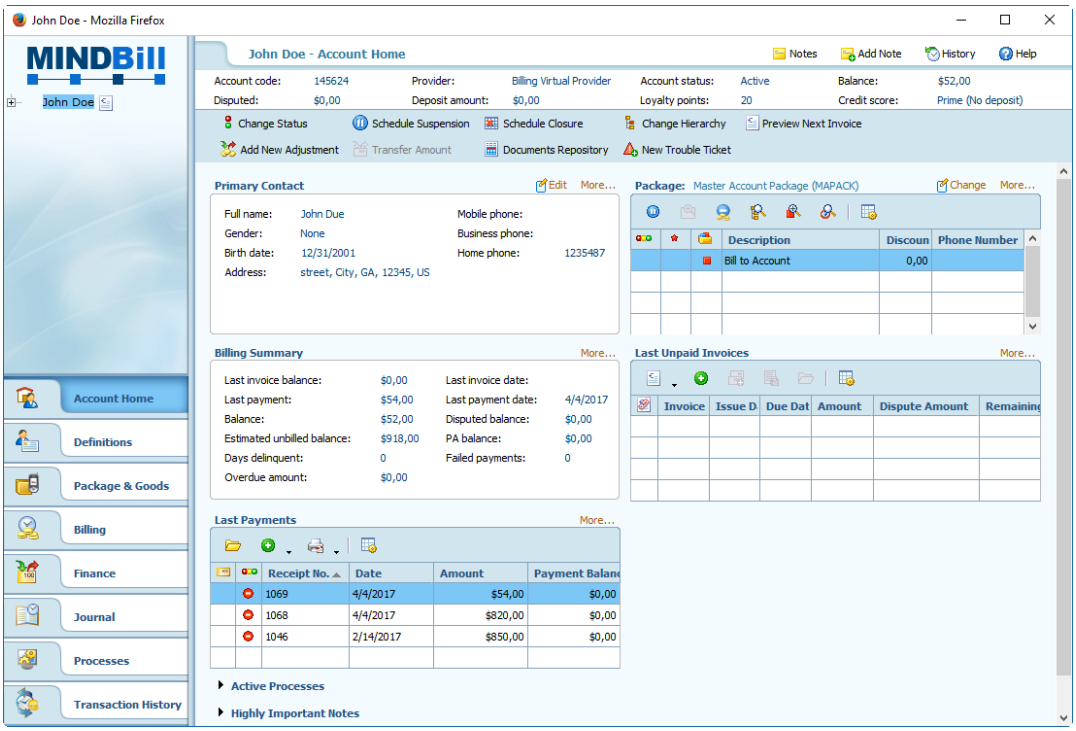
This application gives the operator a complete centralized view on all the relevant aspects of the subscriber, including the services consumed, the generated invoices, finance information, customer's complaints and more. The system enables tracking and recording of all the interactions the CSR had with the subscriber.

Using MINDBill's advanced security mechanism, CSRs' operations are limited according to their access rights profile.

Account Home Page

MINDBill WebCSR Account Home page gives a single centralized and summarized view on the subscriber (or hierarchy of subscribers). It is tailored to the operator's specific needs and business model.

The Account Home page shows the subscribers' contact details, current package and services, discounts, last invoices and payments, active business processes (e.g. debt collection) and the last activities performed on the account. It also enables performing most of the common operations (e.g. adding a payment, adding a service to the subscriber etc).



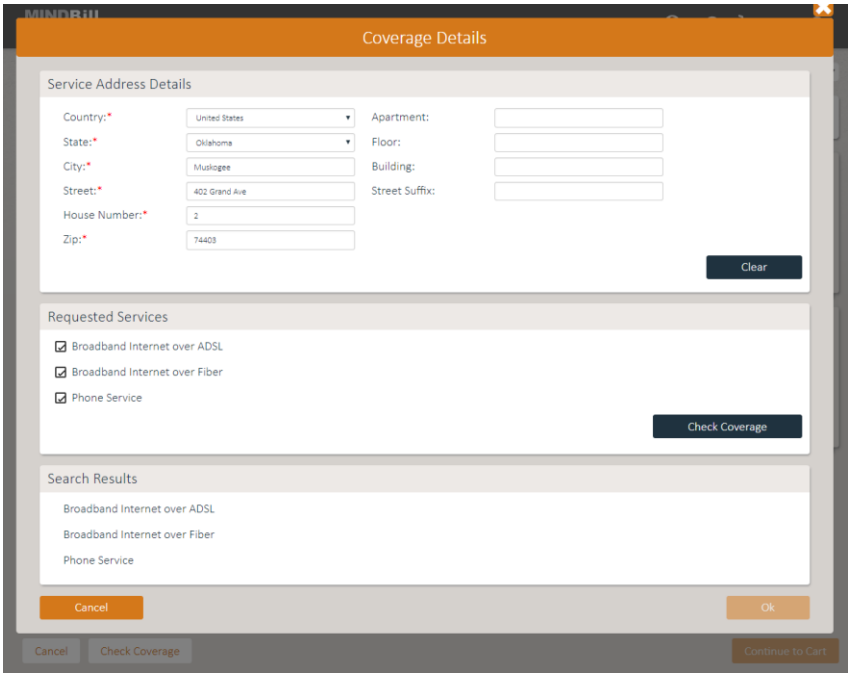
WebCSR home page

Order Management

MINDBill supports a flexible and robust Order Management process that handles orders from the customer's contact, through account creation, registration, package selection, provisioning and activation. The Order Management process involves different users from various departments (e.g. supervisor approval of the contract, technician test, etc.), integration with external legacy systems (e.g. inventory), interaction with 3rd party services (e.g. Address Validation) and more.

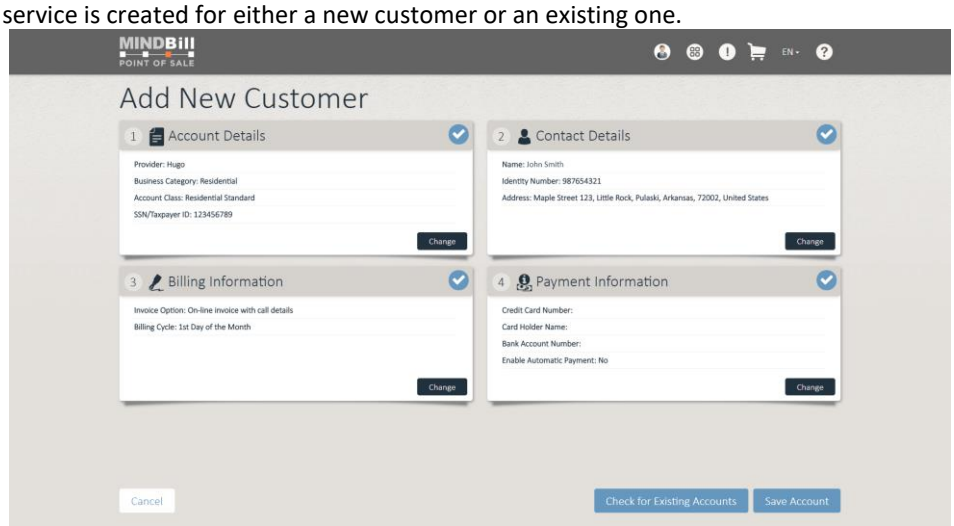
MINDBill uses its robust inherent workflow capabilities to tailor an order management process that meets the operator's business model and requirements.

The MINDBill is integrated with plant management (i.e. FNT, Mapcom) and dispatch solution (i.e. Click software) and enables a strait forward working process that is seamlessly integrated in the MINDBill order fulfillment process.
The MINDBill Integration with Plant Management system enables the CSR to check the area coverage for the requested services, and then initiates the assignment of a technician and sets due date for completing the task based on the scheduling done by Click.
The integration with Click Software solution allows handing the technician flows, the end-to-
Service Orders are triggered from MINDBill Order management interface after performing sale/update operations.



Check Coverage

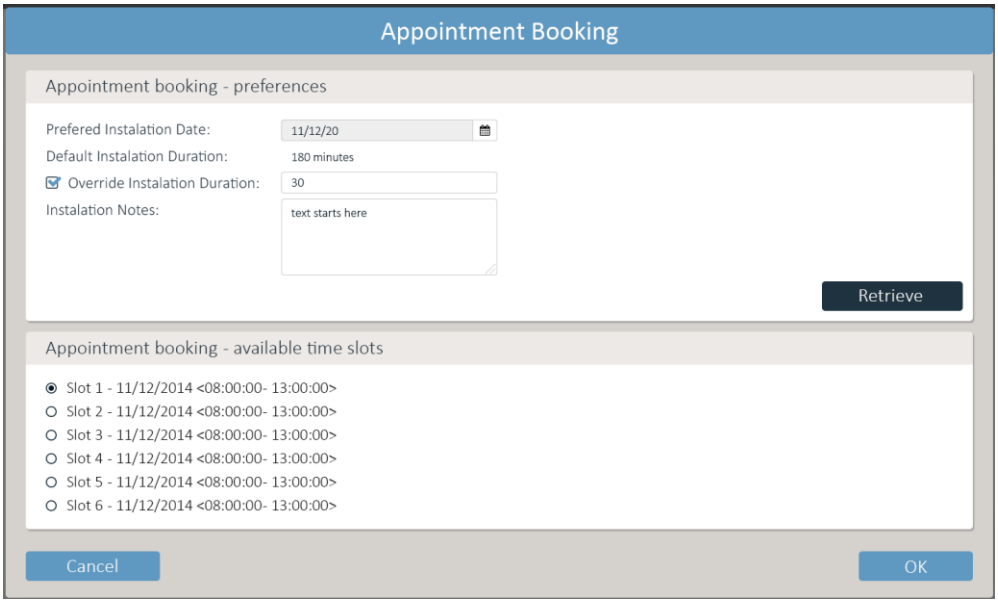
Once the CSR gets the acknowledge of the available services, the order process is initiated and the sale for new service is created for either a new customer or an existing one.



Add new customer

The intuitive order process enables the CSR to fulfil the order in a step-by-step flow minimizing human errors along the way.

The final step for executing the order may involve field technician for services such as wireline voice, internet or TV). The integrated solution with workforce management enables the CSR to directly book an appointment from the MINDBill order management.



MINDBill registration flow – Appointment Booking Preferences step

Account Journal

Customer care is based on having an up-to-date, comprehensive, and consolidated customer profile. MINDBill has a **Customer Relationship Management (CRM) Journal**, which keeps track of all customer-related events and information, creating a complete customer profile. CSRs can manage their customer relationships in an organized way; by accessing information, they can match customer needs with product plans and offers, remind customers of payments or service requirements, or find out what other products or services a customer has purchased.

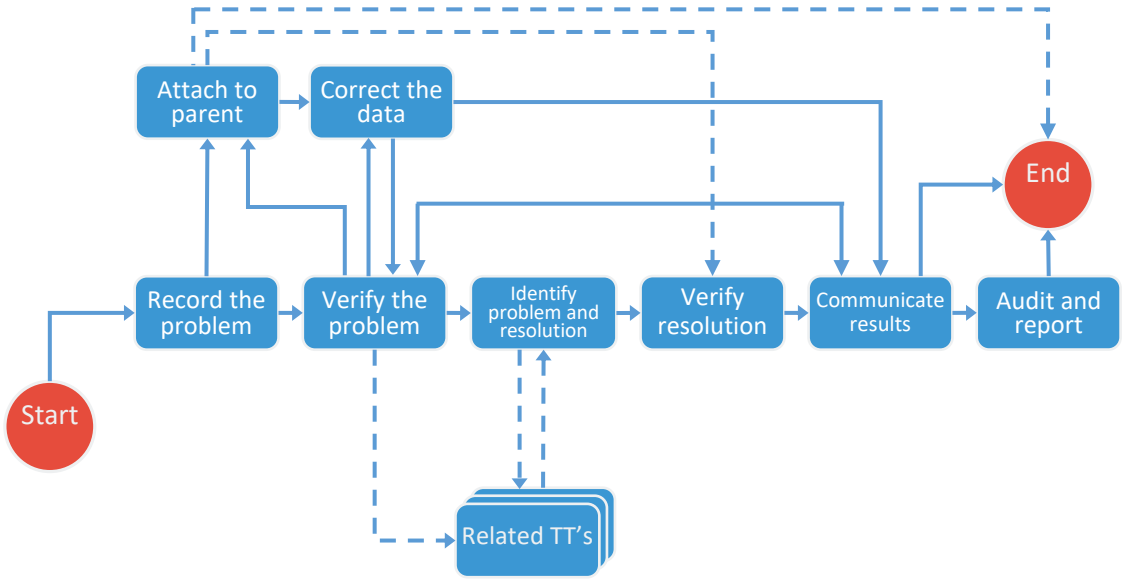
Trouble Ticketing

A trouble ticket mechanism is essential for maintaining high-level service quality. Its aim is to coordinate the work of multiple users who may need to work on a single customer's problem and prevent problems from falling between the cracks.

The MINDBill Trouble Ticket solution is a professional problem-tracking mechanism based on the flexible workflow engine. The system is introduced with a predefined flow designed to fit a wide range of telecommunication troubles ticket handling, such as:

- Technical problems;
- Customer's invoice claims;
- Internal troubleshooting reported by the company personnel;
- Network failures;
- Software failures.

The flow is based on generic steps that can meet almost any required trouble flow, as shown in the diagram below:



Trouble Ticketing

The mechanism has the ability to maintain problem categorization, as well as specific information according to each categorization.

The ticket can be routed between different groups and users of the system according to configurable routing rules. The SLA mechanism manages the allowed period for each ticket or step on the ticket, while a notification mechanism alerts regarding any SLA violation or near violation; this mechanism can be configured according to different parameters of the ticket.

MINDBill Point of Sale Solution

The POS provides a user friendly interface enabling operators to offer their products and services in retail stores and manage the process within our enhanced solutions. POS is fully integrated into the MIND Billing and Customer Care solutions, allowing operators to offer seamlessly services and accessories for new and existing customers and even to non-subscribers. The PoS includes a responsive interface and can be used by any device including PC, laptops and tablets.

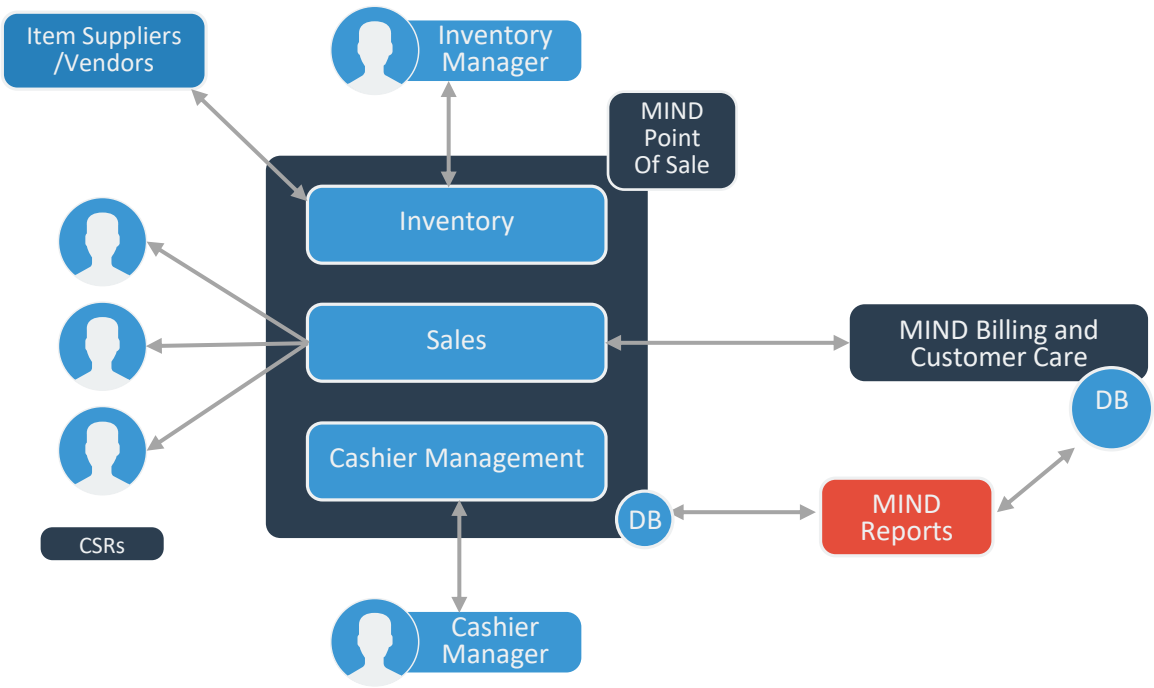
PoS integrates with external systems such as the credit card clearinghouse, the external taxation engine and the address validation. POS includes three modules working together:

- The Resource Management Module
- The Sales Module
- The Cashier Management Module

Solution architecture

The MINDBill POS solution functions within the operation support system architecture, enabling an unlimited number of Point-of-Sale terminal devices to be operated simultaneously.

MINDBill POS system architecture



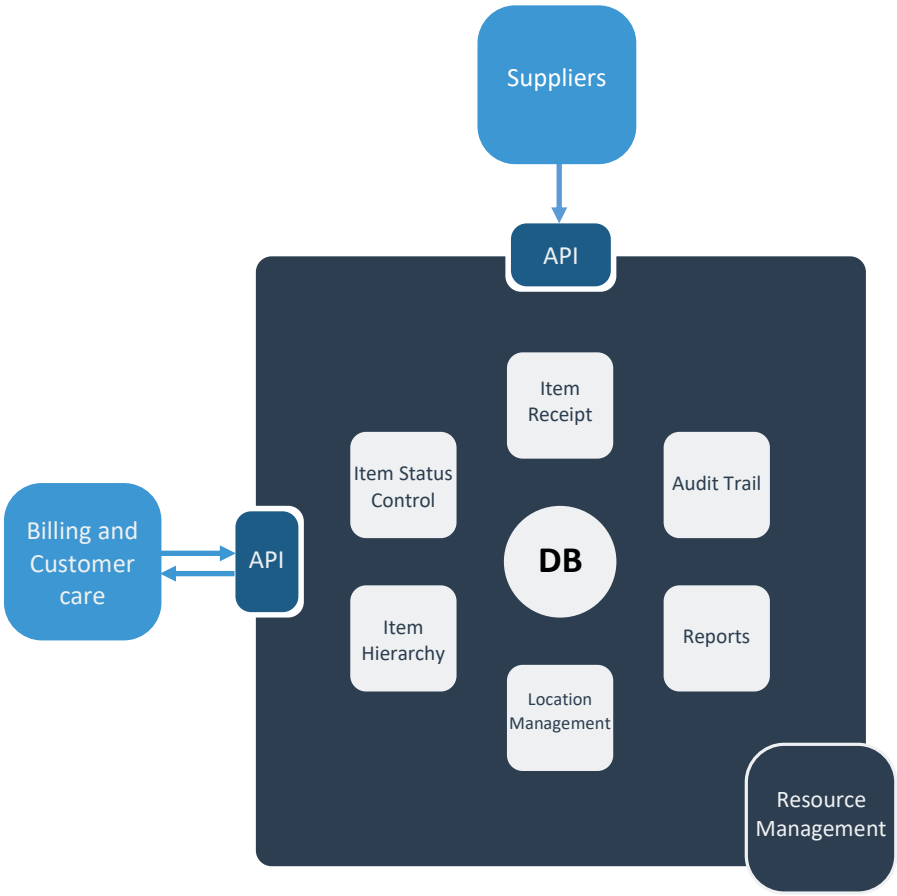
The MINDBill Resource Management

The Resource Management Module is a comprehensive inventory system that supports the warehouse chain of the operator and his stores. It automates the management and tracking of the equipment sold to subscribers.

The solution keeps track and manages the equipment by serial number, status, and location, providing the flow management from the purchase order through the reception of the items shipment, distributing the items to the stores and the allocation of the items to the customers.

The MINDBill Resource Management features:

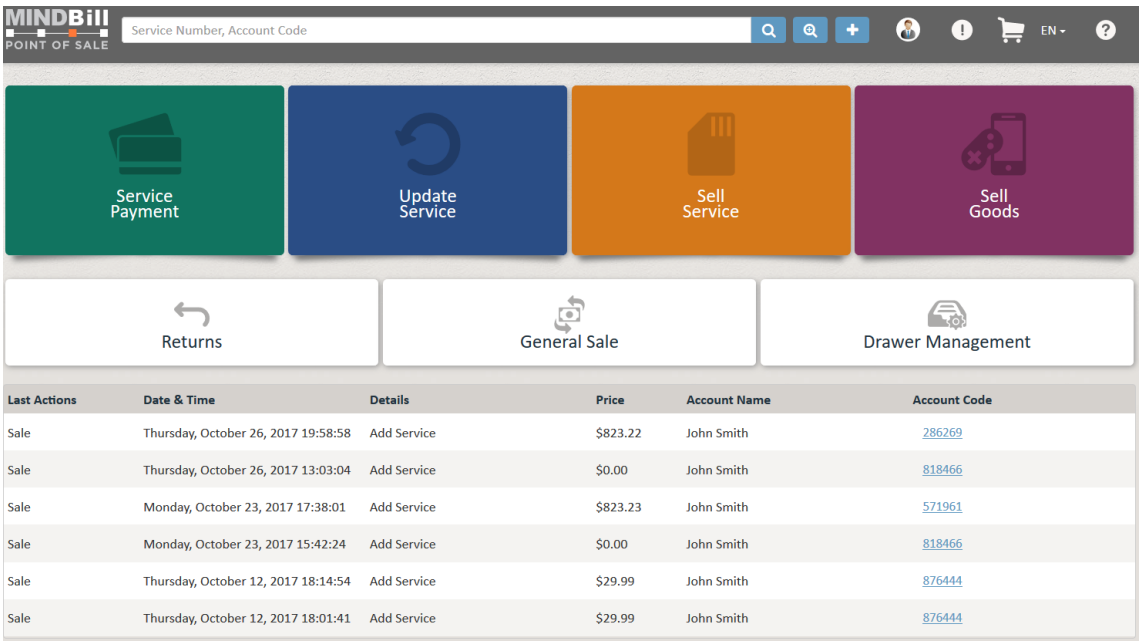
- Handling of item reception including a full management of P.O. Agreements with the suppliers;
- Item catalog and pricing management;
- Item status flow management and control including on-hand count procedures;
- Items locations management;
- Report generation on the inventory items;
- Integrated solution with MINDBill Billing and Customer Care platform;
- Integrated solution with MIND POS;
- Integration with POS hardware devices such as the bar code reader for easily locating an item by scanning.



MINDBill Resource Management Architecture

The Sales Module

The sale module is an easy to use cashier station that supports all service activations, phones and accessories sales through one interface on a single receipt. The Sales module enables all payment methods such as Cash, Check, Credit Card, etc. It provides full control of the cashier devices such as Cash Drawer, Credit Card swipe, Bar Code reader and Ribbon printer. The Sales module interacts with the Resource Management module to show the sales clerk the available items for sale in the store warehouse, to assign sold items to customer accounts, and to enable flows such as returns and repairs.



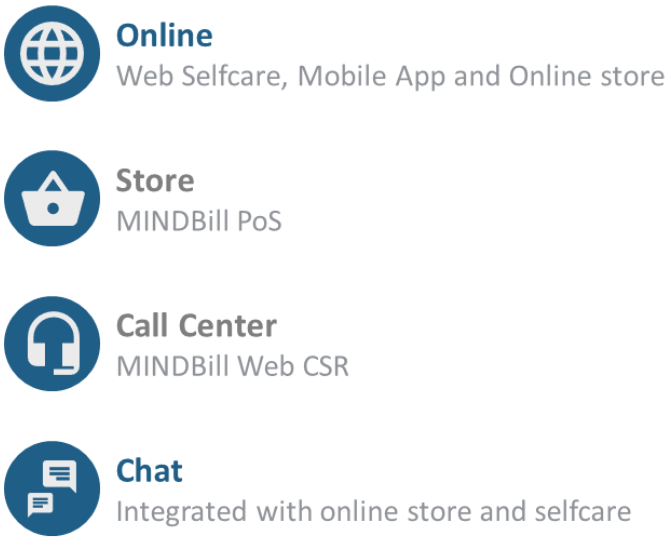
MINDBill Point of Sale

The Cashier Management Module

The cashier module is a comprehensive store management environment that implements, in coordination with the Sales module, drawer and workstation assignments to clerks, Open day and Close day procedures, Cash transfers between drawer and safe, and a rich set of reports.

Omnichannel

The Omnichannel approach enables consumers getting seamless service experience from the same brand in multiple channels.
The MINDBill suite includes several channels to enable service providers to deploy the omnichannel methodology.
Whether the customer initiated the engagement with the service provider in the retail shop, contacted the call center or used self service via web or the MINDBill selfcare app, all those channels are integrated in MINDBill and provides seamless user experience.
The interface for the REPs in the call center and the retail stores were described above, this chapter will focus on the digital tools to be used by the service provider's consumer that are included in the MINDBill omnichannel suite.



MINDBill Omnichannel Suite

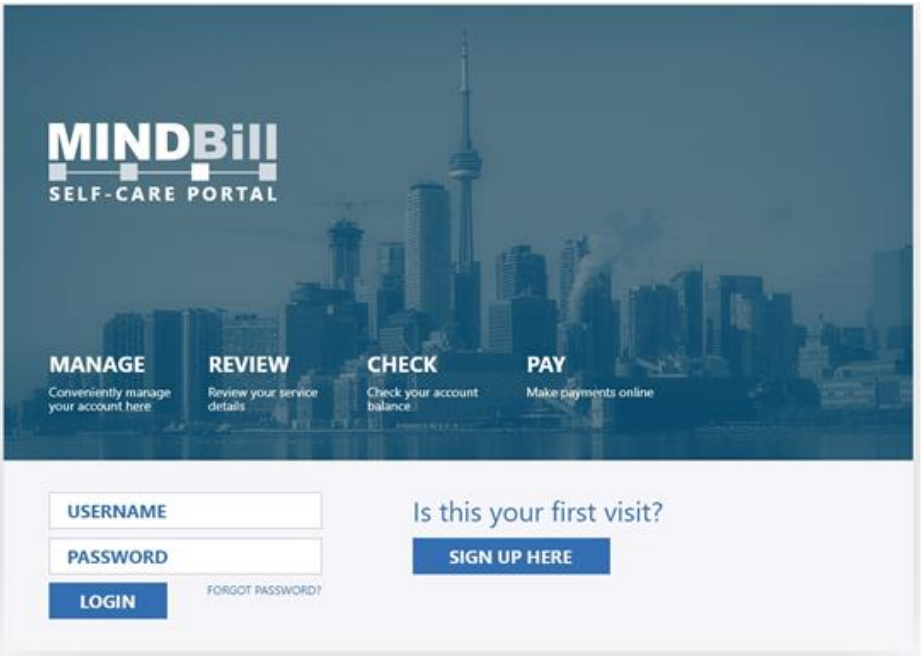
MINDBill Self Care Portal

The **MINDBill Self Care portal** provides an interface for the customer to undertake a variety of business functions directly for themselves. This application interacts to provide fully automated service or assisted service over various customers touch points. MIND offers customers two alternatives, in keeping with today's trends in the industry: a classic, web-based application, as well as a mobile one.

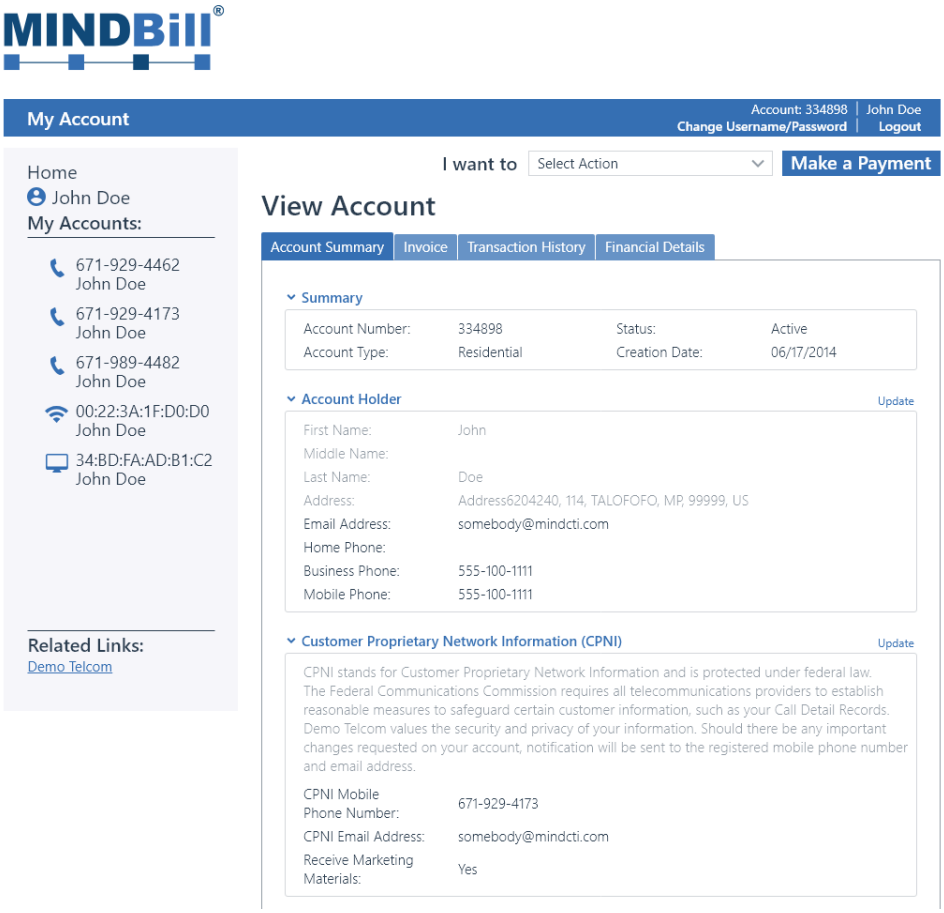
The **MINDBill Self Care portal** helps service providers increase profitability across the organization by optimizing the customer experience and maximizing the efficiency of business operations through:

- Rapid order-to-activation mechanism across service offering;
- Replacing paper bills with paperless bills;
- Rerouting bill queries calls from the call center to the Web;
- Online payment.

MINDBill Self Care portal provides a level of security to protect both the customer's data and the integrity of the underlying systems. Subscribers access the application by entering their credentials.



MINDBill Self Care login screen



MINDBill Self Care Account Home Page

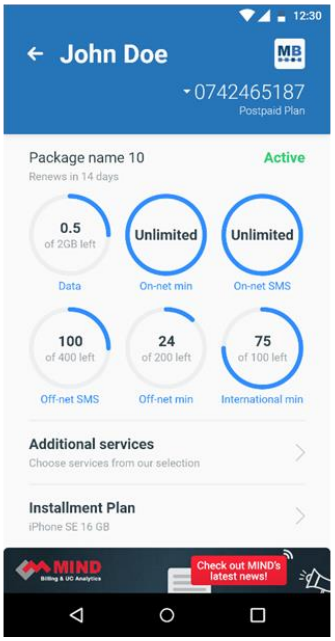
This default configuration can be fully tailored according to the provider needs.

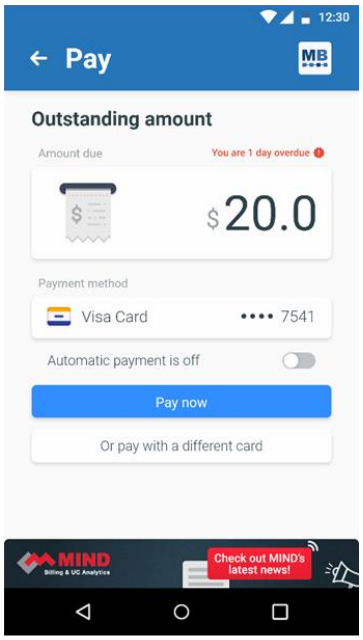
The system has an advanced security mechanism, enabling limiting the subscriber operation as subject to its profile. Based on this profile, a set of security items will be assigned to the self-care user, allowing performing from a limited number of operations to a broad number.

MINDBill Self Care portal can be fully branded, allowing different providers to present their own unique identity while sharing the same billing system.

MINDBill Self Care App

These days a branded mobile app is a mandatory way to engage customers to the service provider brand.
The MINDBill self care app enable the service provider customers to conveniently view their plans, invoices, pay bills and more. The app is available both for Android and iOS and can be branded with the service provider graphical language.





MINDBill Self care App

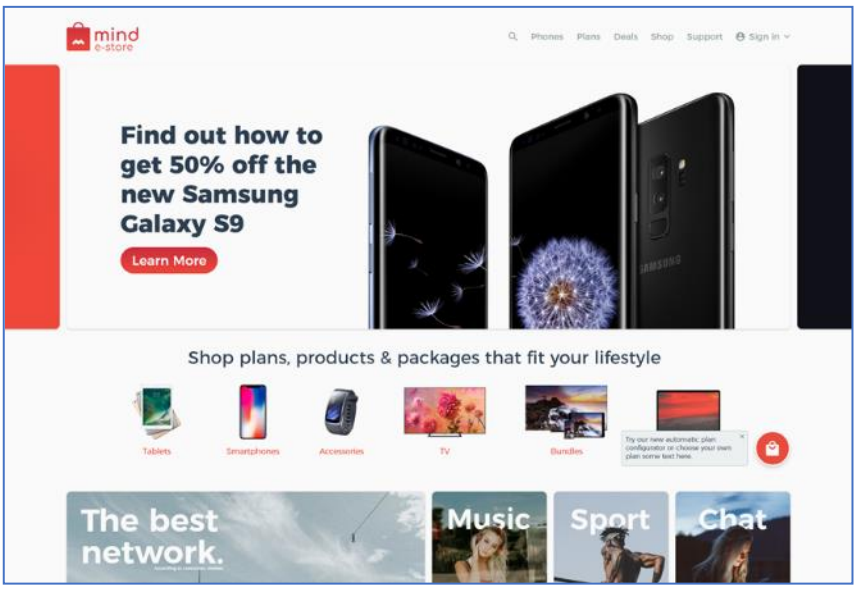
MINDBill Online Store

The **MINDBill** E-commerce solution enables Telco operators to provide an Omni-channel experience to their customers. The omni-channel concept is all about creating a seamless experience for consumers that engage with the brand regardless of the channel they choose - call center, retail shop, web site, mobile app etc. The reality is that online and off-line buying experiences are merging and most of the consumers engage with both while they buy. A telecom operator's online activities are merging with its activities in its physical stores - and vice versa.

An online store is certainly one of the important channels for any business today who wish to provide its customers with a complete buying experience.

MINDBill creates synergy between the various channels so the telco could leverage the digital channels in a cost-efficient manner of products distribution 24x7x365.

MINDBill Online store allows the service provider to sell devices, accessories and services via a responsive designed portal. It is integrated with the MINDBill core billing and customer care solution.



MINDBill Online store Home Page

The **MINDBill online store** enables the following actions:

- Validate address
- Check coverage
- Retrieve inventory details
- Retrieve product catalog details
- Device financing support
- New customer registration
- Get credit score
- Get shipping methods
- Add items to shopping cart
- Cart checkout
- Cart payment
- Generate contract
- Finish sale
- Email notifications for order confirmation
- Start order fulfillment business process

Product Catalog

The MINDBill Product Catalog allows service providers to define, configure, and deploy new packages and services to suit any class of customer, and with respect to the availability and bandwidth requirements for these services, allowing them to take advantage of market developments and increase customer satisfaction. There are different classes of customers with respect to availability, bandwidth, and QoS requirements for these services. The Package & Services framework allows providers to define new packages and deploy new services instantly.

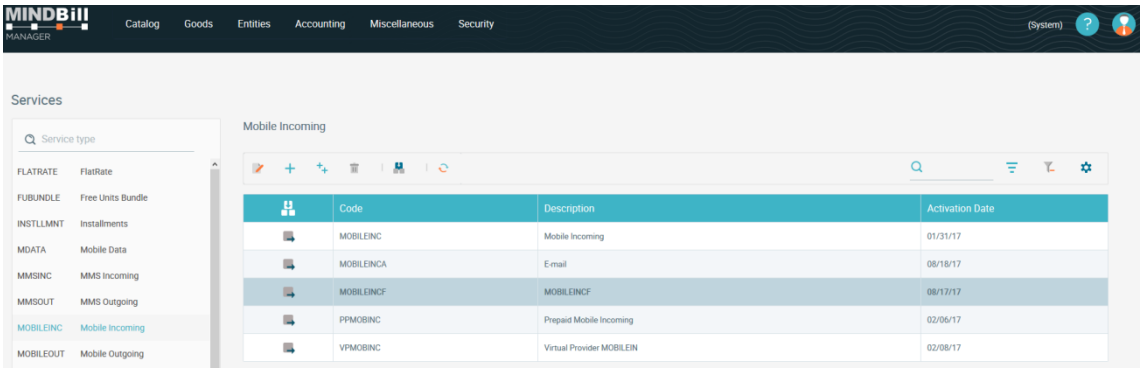
MINDBill enables the definition, rating and bundling of unlimited combinations of services into packages, as well as assigning these packages to customers. The tariffs assigned to a service can be changed to reflect cost changes and promotions. New services can be added to existing packages to be available to all the owners of these products. Services can be enabled globally or for specific customers only. Using the MINDBill Product Catalog, new packages and services can be easily created and new services can be assigned to existing packages.

Following are a few examples of services offered by service providers and that are all fully supported by MINDBill:

- Mobile LTE
- Video streaming;
- Voice and Fax over IP;
- Web browsing and hosting;
- Gaming;
- IP TV;
- E-Commerce;
- Voice-mail and E-mail.

Services

Services are the basic entities supplied by the provider and consumed by their customers. Each service has its own rating scheme (tariff) made up of a one-time charge, recurring charges, usage and value-based charges. MINDBill gives providers the flexibility to define new service types, as well as customize and change existing services before assigning them to customers.

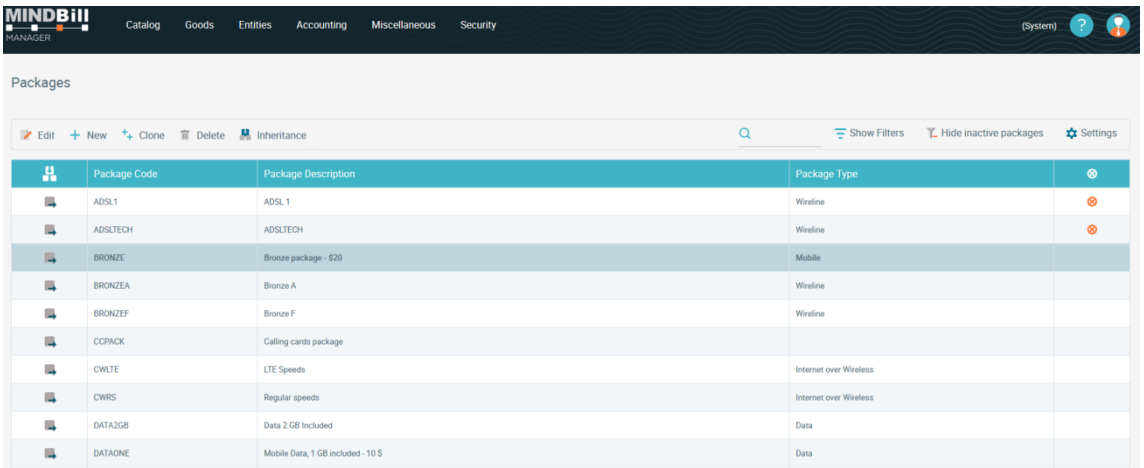


Services

Packages

A package is the bundle in which various services are supplied to a customer. Each package must have a defined currency and only the services using that currency will be available for that package. A service has to be introduced in a package before it can be made available to the customer. Therefore:

- A package must contain at least one service;
- A service can appear in more than one package;
- Only one package can be supplied to a customer. Services within a package can be enabled or disabled. This makes it possible to provide different services even to customers having the same package. Services can be enabled globally or for specific customers only. A set of services within a package can be defined as 'mandatory', meaning that all the customers having this package must have these services enabled.



Packages

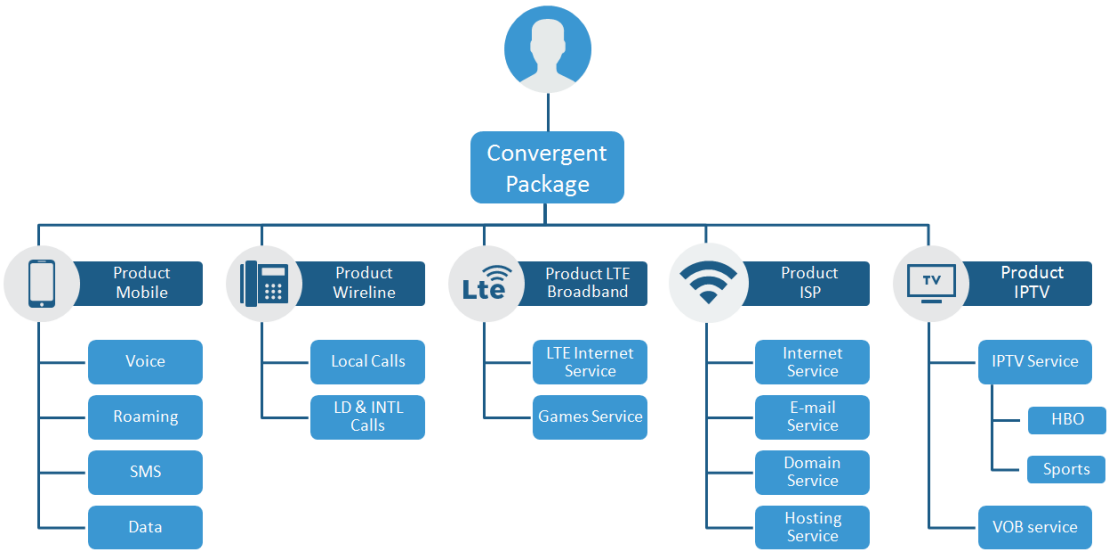
Products

Products enable providers to offer add-ons to the customers' existing packages. The product service helps and eases the administration of services. Instead of adding several services one by one to a subscriber account, the provider can add and assign products containing all the services at once (for example, a Voice and Dialup Package is built of a Voice product and a Dialup product).

A product is a group of services. Account packages are built from services and products.

An account can have a stand-alone product.

Each account can have one package assigned to it. This package can consist of services and products. The package is defined using a hierarchy of services and products. Some of the services are based on other services. These require the existence of the base service in order to be assigned to an account. These "based-on" services inherit the status (activation or deactivation) of the base service. Activating or deactivating the base service activates/deactivates all the dependent services and products. In the invoice reporting, services and products are grouped according to the service hierarchy.



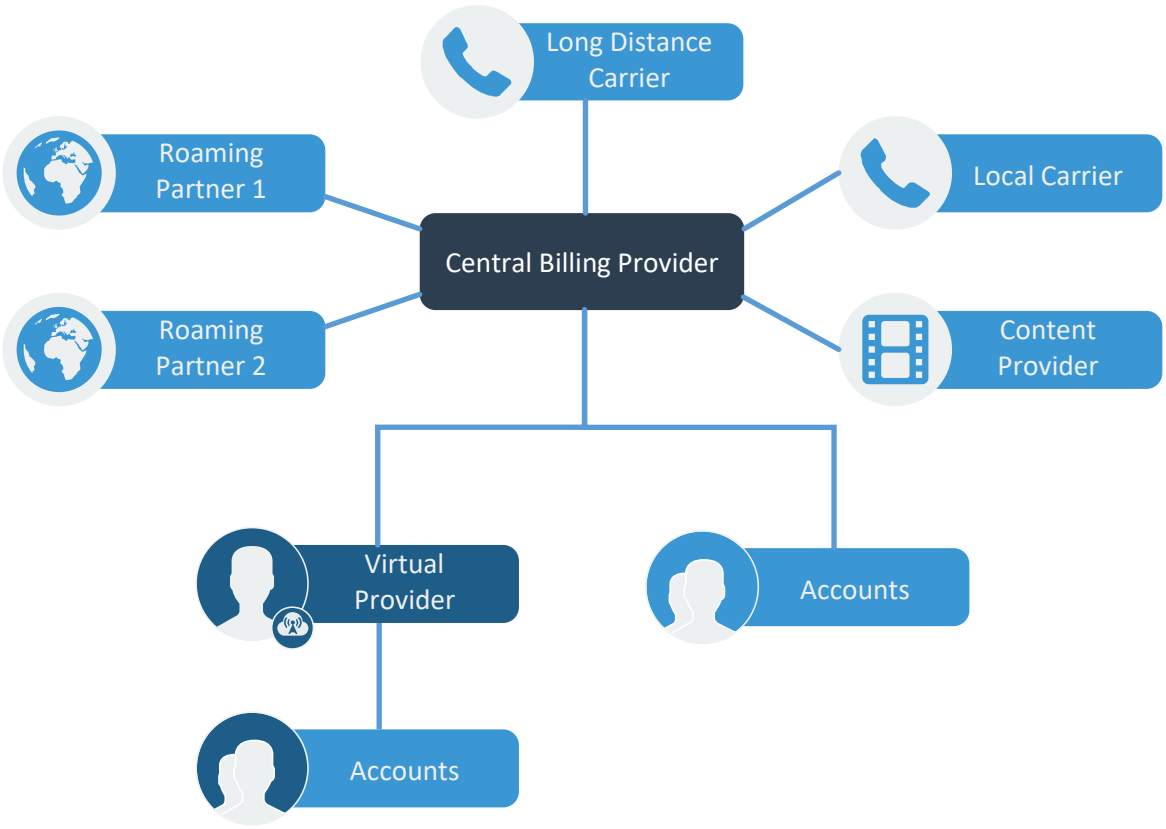
Product Catalog Sample

Goods

Goods are equipment items (e.g. LTE Phones) supplied by the provider and related to specific services, packages, or directly to accounts. They are billed and handled by MINDBill. Goods types and models can be defined and assigned to services using the MINDBill Product Catalog. The customer can receive an equipment item separately or bundled in the package.

Partner Management

Today's network operators must conduct business with an increasing number of partners to successfully meet the business and technological challenges of the communications market.



Partnerships Model

To increase profit margins, service providers need to intensify subscribers' usage by offering a variety of services and applications. The ability to market different, multi-origin services under a unified service brand, as well as deliver a single service under multiple service brands is vital. MINDBill gives service providers a powerful tool to define, track and manage partnership agreements through a blend of revenue-sharing schemes based on a variety of rating metrics.

- Fixed or percentage-based commission;
- Usage-based rating by volume, item, or value;
- Hierarchical and multi-party rating for varying rates throughout the value chain;
- E-commerce transaction rating provided by third parties;
- In the case of transactions that involve multiple partners, MINDBill allows the definition of different rates between any two parties along the value chain.

Business entities and relationships

MINDBill's robust partner management solution covers all types of partnership agreements, ranging from: interconnect agreements and supporting roaming partners; commission-based agreements applicable to distribution and channel partnerships, to usage and content-based agreements applicable to content providers. MINDBill makes it simple to define, manage, rate, and bill a wide range of settlement models including a chain of wholesale-retail markup tariffs.

The features included in MINDBILL cover:

- Issuing statements, invoices, reconciliation and credit notes
- Issuing comprehensive settlement reports
- Dispute handling mechanisms
- Implementation of complex revenue-sharing schemes.

Interconnect

Service providers typically have their own network and central billing system. Services outside the provider's network are provided according to agreements with other providers.

The Interconnect reporting module of the billing system is responsible for rating calls according to the agreements with other providers. Interconnect calls are calls handled by more than one operator. An interconnect charge is the charge for carrying a call that originated or terminated on another network. With the Interconnect reporting module, the Service Provider can claim payments and validate claims for payment of the interconnect charges.

Roaming

Roaming, the ability to provide services to visiting subscribers, on the one hand, and on the other hand, to roam subscribes in other networks, has become an integral part of the mobile service. The MINDBill system provides the ability to generate roaming usage files, TAP files for GSM Partners and CIBER files for CDMA Partners, for inbound traffic of visiting roamers, and to process incoming TAP/CIBER files of outbound roaming usage traffic. Using its partner management capabilities, the MINDBill system provides the ability to define and manage the required roaming contracts terms (IMSI/MIN range, MNC, MCC, cut-off time, etc.) and the applicable tariff plan (IOT) for each roaming partner. Therefore, it enables to apply a markup-based, flat rate based, IOT-based, or any other required rating model for the incoming roaming traffic. As for the outgoing roaming traffic, the MINDBill Roaming Files generator enables to create TAP/CIBER files for all of the applicable roaming partners using either a single IOT plan for all the partners, or multiple IOT plans. Furthermore, it supports processing and generating RAP files and CIBER rejects files.

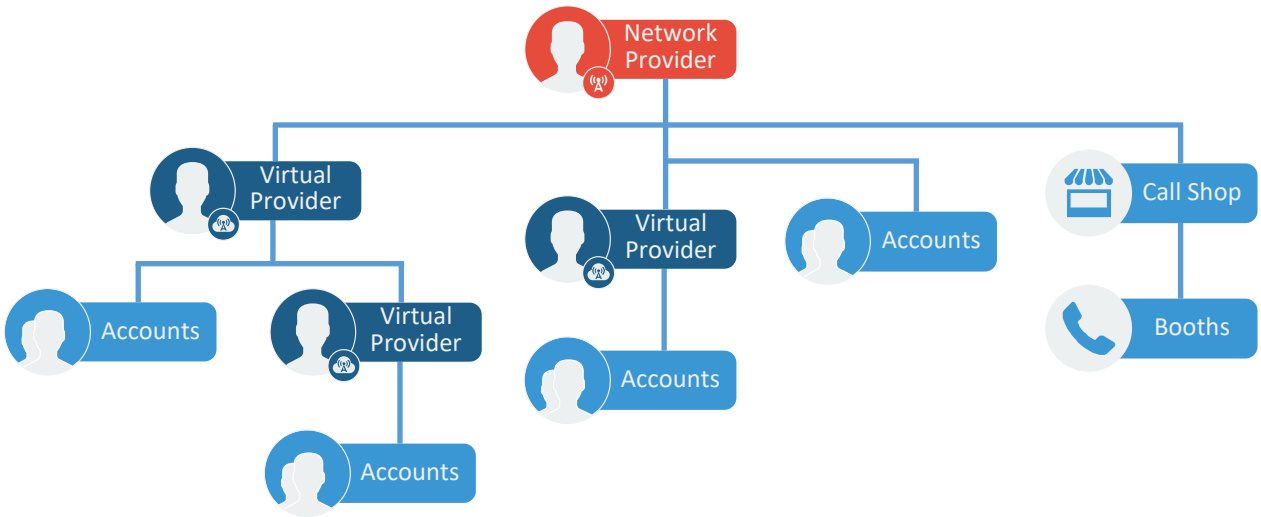
Virtual Providers

MIND offers a Virtual Provider (VP) Architecture, where the main operator can have its **branded offerings** managed from the billing perspective as separated accounts from its own. The VP module allows the network provider to lease its network equipment and its billing system to other providers.

These VPs are able to create subscribers (accounts), assign them and have complete control over the customization of invoice layouts and content through branded invoices and reports.

The VP bills its subscribers according to its business models. Additionally, the parent provider bills its VPs based on diverse business models:

- Usage based (usage of the VPs' subscribers is billed by the parent provider).
- Flat fee – the parent provider bills the VPs a recurring charge, which is not usage dependent.



Virtual Providers - Business model diagram

Key features

- Multi-level hierarchy of providers and virtual providers, accessible according to security permissions.
- Each level can create and manage its own accounts, call shops, and VP descendants.
- The hierarchy is visualized.
- Each level can be billed by its parent provider according to the various rating schemes that exist in the system (e.g. usage-based, fixed rate, a combination of the two, etc.).
- Independency to the VPs to manage their business:
- Complete business segregation (product catalog per each provider).
- Enhanced security enabling the network provider to define the level of VPs' independency.
- Web access to the VP functionalities.
- Ability to pass on parent characteristics to the descendants
- Revenue leakage prevention
- Restricting VP to offer only certain services and features.
- Blocking the VP's subscribers according to VP's balance versus its parent provider; call shops web-based management application.
- Flexible mediation, enabling mapping a business event of a subscriber (e.g. a phone call) to a specific service of the VP (in front of its parent), according to customizable business rules.

Agents

Agents are 3rd party independent representatives that receive a commission based on the revenue generated by the subscribers/customers that they acquire for the provider. The system enables assigning more than one agent per account, reflecting a more sophisticated partner scheme.

Commissions

The commission received by the agent can be calculated either according to one of the rating types, or according to any defined combination. The agent's commission can be a combination of fixed amount per invoice, fixed amount per call, fixed amount per minute, or percentage.

Billing and Finance

MINDBill gives service providers the ability to manage various aspects that concern financial and revenue management, allowing them to know the financial situation of the business in real time.

Rating

MINDBill provides the flexibility needed to define new service types, their attributes and rating schemes, and make them instantly available to the customer. The real-time rating engine allows service providers to offer an unlimited number of rating schemes and billing plans, easily implementing new technologies and service pricing requirements. Providers can set different tariffs for individual customers and customer groups, and offer a variety of service bundles.

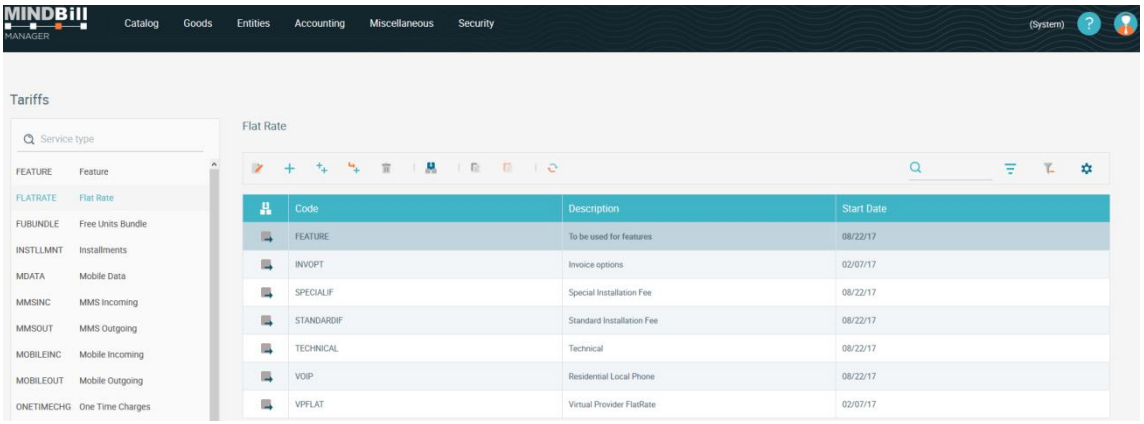
Using MINDBill, providers can introduce promotion packages, discounts, and special rates to specific market segments. International providers can define rates in different currencies using the multi-currency and multi-time zone functionality, facilitating the assignment of special rates for certain days or time-of-day.

The Rating Engine

The Rating Engine provided by MINDBill is a powerful and flexible tool that operates in real time and allows providers to offer different rate and discount plans for different services and products. The MINDBill rating engine is designed to help providers increase the customer satisfaction level by differentiating the product offerings in order to meet client requests. Service providers are able to plan new products, services and promotional packages, and also to rate usage accurately and conveying billing flexibility.

The MINDBill rating engine allows:

- Real-time functionality
- Different tariffs for individual and group customers
- Pricing based on multiple metrics – data amount transferred, number of services accessed, specific content or application, quality of service
- Special discounts based on user-defined criteria
- Rating differentiation based on time of day, access device, bandwidth or location for the same service.



Tariffs

Invoicing

Invoice and shipment processes are crucial for the service provider to generate revenue. MIND provides invoice and shipment servers based on the J2EE technology, which ensure performance, scalability, and stability of the invoice generation, layout & shipment processes.

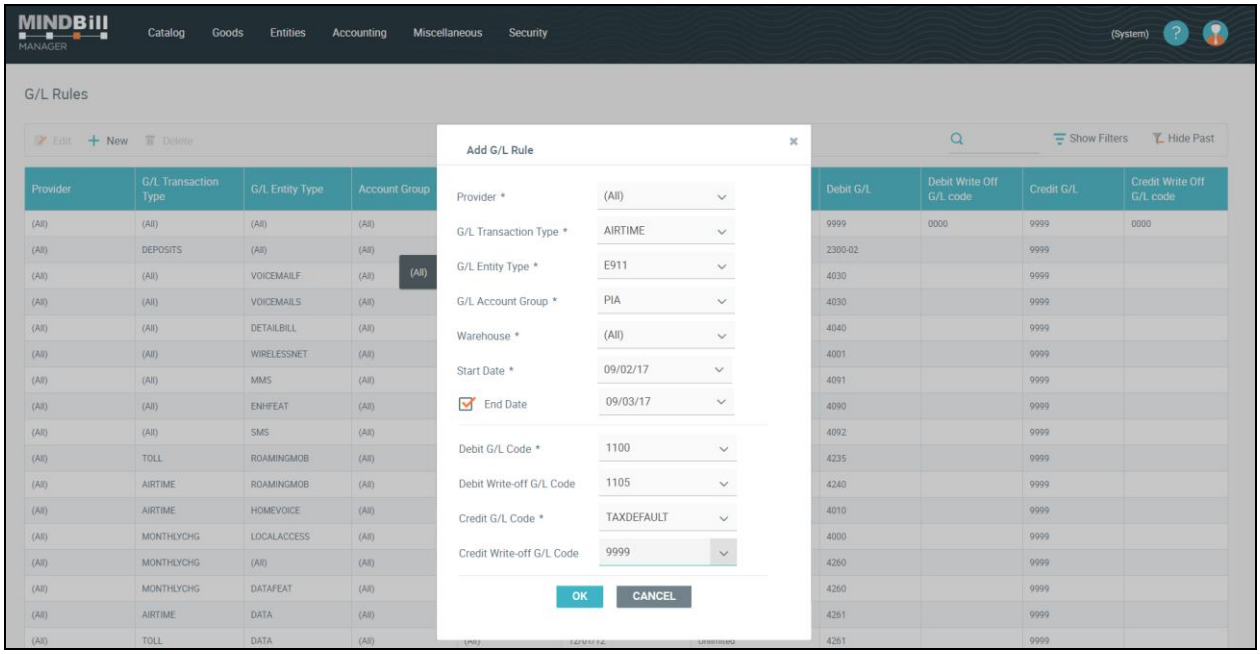
The main features supported by the MINDBill invoice server are the following:

- A single bill for all services;
- Two methods of invoicing:
    - Open invoice – Separate balance per invoice;
    - Closed invoice – One invoice open at all times with balance forwarded from previous invoices;
- Each account can be assigned a separate billing cycle (weekly, monthly, quarterly, etc.);
- Post calculations (volume discounts, fixed charges, adjustments);
- Each step is monitored and revenue assurance reports can be generated;
- Invoices can be shipped by means of one or more of the following ways:
    - Regular mail (hard copy);
    - E-mail (HTML or PDF);
    - Exported file (CVS, EDI);
    - XML format for 3rd party printing house integration;
- Split billing is possible between billable accounts and services;
- A minimum amount required to issue and/or ship an invoice can be set;
- The option to include/exclude usage (call) details;
- Special charges for call details can be set
- Special charges for hard copy can be set per invoice and/or per page;
- Multilanguage invoice;
- The grand total can be displayed both in the main currency and the local currency of the customer;
- The billing process, which includes invoice generation, can be performed in multiple billing cycles, in order to spread the billing operation throughout the month. Service providers can preset multiple billing cycles and then assign an appropriate billing cycle to a customer according to each provider's policy;
- Payment and dunning – MINDBill calculates the due date for invoice payment during invoice generation. This due date is calculated based on the invoice generation date + x days, according to the customer's payment terms. The systems' default payment terms (days) may be overridden at the provider level and the CSR can further modify them per account;
- The invoice can be generated in various methods:
    - Manually by CSR e.g. initiating account closing;
    - Batch invoice generation - the batch method is used when immediate billing is required for particular providers/group of customers. Such actions are usually required to make billing corrections or when there is a need to settle all the accounts and begin a new billing procedure;
    - Automatically, by the billing cycle task;
- Flexible invoice layout customization.

General Ledger (G/L)

MINDBill has full flexibility in configuring the mapping between financial transactions and the G/L account codes, irrespective of the service providers' business model. The financial information is periodically summarized and reports are generated. Furthermore, the information is exported to the providers' financial system.

Various dimensions are taken into account when defining GL codes, such as provider (market/ geographical location), service type and service (e.g. wireless: Voice, SMS, Data, Wireline, etc.), transactions type (recurring charges, non-recurring charges, usage, discounts, etc.) and account characteristics (residential/commercial, account class, prepaid/postpaid). The GL rules are configured in the MINDBill Manager Web application.



GL rules

Payments & AR Account Receivables (A/R)

MINDBill manages all A/R activities, monitors the A/R status online and ensures a continuous cash flow. Multiple payment methods are supported by the system, with interfaces pre-integrated with major financial institutions, banks, clearinghouses and credit bureaus. Management of deposits life cycle, including payments and refunds, is easily done. Disputes can be managed and solved, resulting in the appropriate adjustments.

Collection Procedures

The MINDBill Collection facility provides flexibility in defining the collection policy using different collection paths. The solution provides full monitoring and control of the collection treatment (dunning process). It identifies customers with past due debts and ensures that they are handled in accordance with the company policy. This increases efficiency through the automation of the majority of the collection functions, and helps maximizing the success ratio.

Debt Collection (DC)

Debt collection is an automated business process that manages on a predefined time scale the collection of overdue debts by initiating collection actions. The Debt Collection is configured to automatically initiate a set of actions when an invoice is considered as overdue and any additional grace period has passed. The basic structure of a DC process is a cyclic set of actions followed by pending delays.

The set of actions included within the DC process are divided into the following categories:

- User-based actions – The user needs to perform a certain activity or to be notified of certain information. It is possible to customize the GUI for any of these actions according to the operator's business rules and needs.
- Reports and letters generating actions – The DC process can be configured to generate and ship reports, letters and SMSs to the relevant recipient.
- Services suspension actions – The DC process can be configured to suspend a certain service portfolio pending any given business conditions and time frame. This can be done automatically or pending a system user approval.
- Perform account closure – The DC process can be set to initiate an account closure process, where, among others, it can initiate a final invoice and perform write-off activities.

The module supports the simulation and establishment of payment agreements with customers and controls them from the moment of the request to the conclusion or breach of the agreement. Payment agreements can be a Promise (term for a payment postponed for a predetermined date) or a Payment Arrangement (several installments / amounts payable on predetermined dates). These are defined considering flexible parameters (e.g.: number of installments, period, calculus method, commission fees, interest rate).

The DC module also includes a subscriber web interface that allows subscribers to resolve billing inquiries themselves and a user-friendly customer support representative web interface that allows operators of the system to perform customer care from any location.

With the MINDBill Debt Collection module any enterprise is now able to treat its collection process in a fully integrated way, with a tool that will enable a better integration between departments, a higher level of process efficiency and the complete centralization of collection actions.

Prepaid

Prepaid services are a force driving the service providers' growth worldwide. Prepaid subscribers can be turned into postpaid ones, making it important to ensure a high level of customer satisfaction. The prepaid subscriber needs to have control of his prepaid account and requires the same level of service and customer care as a postpaid subscriber.

The Prepaid Management module features an intuitive and user-friendly web-based interface that allows you to manage prepaid calling card lots and vouchers. The application has two main modules: Lot Management and Cards Management.

Lot Management

The Lot Management module is used to perform various functions on prepaid calling card lots or cards groups. The Lot Management tool enables the provider to manage the lots activation and promotions, to edit the lot and even to keep track of the lot history. Lots usually contain a very large number of cards, which puts constraints on the operators who need to operate with only part of the cards in a lot (e.g. assign it to an agent). In order to simplify such tasks, MINDBill Prepaid Management introduces the concept of Card Groups. Card groups are portions of the same lot (i.e. they have the same S/N prefix) and represent ranges of cards with consecutive S/Ns. There is no hierarchy between cards groups. Each such portion can be assigned, as mentioned above, to agents. The agent can perform several actions on its assigned cards group, such as activate or suspend them. The agent also obtains a commission on the usage of the cards in its groups.

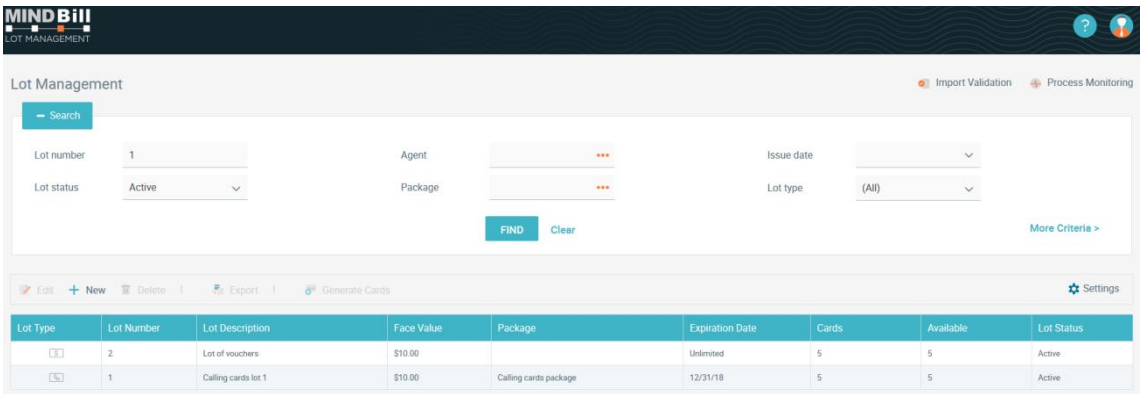


Figure 20 – Lot Management

Cards Management

The Cards Management module enables the user (for example an agent) to view information on the prepaid calling cards and vouchers. The agent can view only the cards that he has rights on. This application is a very useful tool for agents, who can edit calling cards and keep track of them and their usage.

Voucher management

The MINDBill Voucher Management functionality facilitates the automatic creation of voucher lots, each enabling different charging models, access restrictions and services associated. The vouchers can be used as rechargeable cards, one-time prepaid disposable cards, and for refilling existing accounts. Vouchers can be activated and used by accessing the operator's Web portal and typing in the vouchers details, PIN code, and password. Vouchers may have an expiration date and usage limitations measured by time, volume, and location.

Balance management

The MINDBill Balance Manager enables service providers to manage simultaneously multiple prepaid services for a single subscriber. The services can be traditional voice, simple data transmission (basic Internet access), rich content, video streaming, MMS, gaming, and others. For example, in 2.5G and 3G mobile networks, the subscriber may download a video clip, read an e-mail message and have a phone call, all at the same time, using a single prepaid balance.

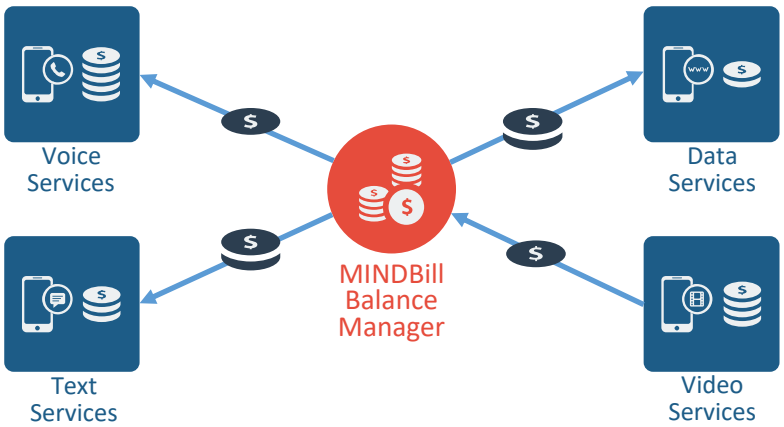


Figure 21 – Balance management

Service enabling

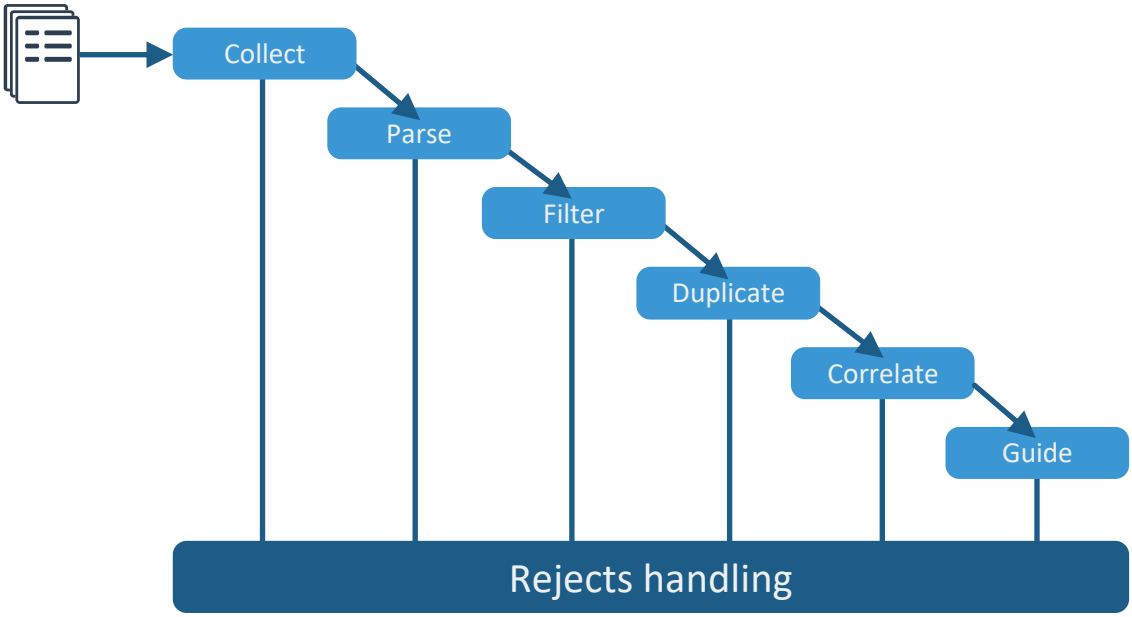
The MINDBill solution is flexible, proactive, and capable of controlling each session and content item. Different rules can be set per service or per specific content category to determine how and when the related sessions would be authorized and controlled. Access to services may be denied in advance or cut off immediately, based on the subscriber's profile and current balance.

Service Intelligence

Offline Mediation

MINDBill provides a reliable, flexible and scalable mediation solution, allowing the service providers to offer high quality services and support their required business and revenue model.

The MINDBill mediation solution is built upon several components:



MINDBill Batch Mediation flow

Using an ordered process through which the CDRs\UDRs are collected in an offline mode, this solution ensures that all CDRs\UDRs are met to their correct specifications and appropriate tariffs as well as enabling vital information on rejected CDRs\UDRs.

Real Time Mediation

Authentication, Authorization and Accounting (AAA)

The MINDBill Real-Time Server provides a full set of real-time AAA functions, including subscriber authentication (by CLI or calling card PIN and password), call authorization based on subscriber balance and dialed number, reverse rating according to flexible multi-dimensional rating schemes and subscriber balance management. Advanced rating features such as rounding of call duration, call setup charge, minimal/maximal charge, minimal/maximal duration, stepped and tiered rates, special discounts and many more are fully supported. The MINDBill Real-Time Server blocks the subscriber accounts during calls in progress, which prevents the usage of the same account simultaneously. It is also possible to completely block an account after a certain (configurable) number of authentication attempts failure. The MINDBill Real-Time Server also supports additional advanced features such as changing of calling card passwords and re-charging of prepaid accounts from vouchers and credit cards.

Using an N+1 configuration, the MINDBill Real-Time Server can be deployed for a full load sharing and automatic failover support. The MINDBill solution provides an inherited load-balancing mechanism between the servers. Therefore, if one of the servers fails, no data will be lost, since all subscriber-related data is stored in the central MINDBill Oracle Database.

The AAA procedure is mostly used within systems that require an online interface with BSS or OSS systems, for authentication and credit control. The RTS supports RADIUS, DIAMETER (Diameter Gy for LTE data and Diameter Ro for VoLTE) protocols and provides the following functionalities:

- A variety of transport protocols – The RTS supports both TCP and UDP transport protocols for the AAA traffic.
- Authentication and Authorization requests - The end user can be identified by various methods, such as user code and password, IMSI/MIN or calling number ID (ANI, MSISDN). Then, based on the customer's service profile and the requested service, the session is either authorized or rejected. Authorization can be done using an external charging server.
- Accounting messages – Periodically or once a session is ended, the RTS can aggregate all of the relevant session parameters, such as duration, volume, QoS measures, subscriber information and others, and use them all to construct a Call Detailed Record (CDR). As an option, MINDBill can apply rating and then the CDR is stored in the database and the customer's balance is updated.

Provisioning and Service Fulfillment

The MINDBill customer database includes valuable information regarding the customers' personal data, identification parameters, and the services provided. The information is crucial for all the other systems integrated with MINDBill to work properly. The MINDBill Provisioning server can provide this information in real time, on demand, and can utilize a workflow mechanism to provide any required business logic to ensure infrastructure efficiency and prevent revenue leakage. Usually, the MINDBill Provisioning server is also triggered by data updates and it exports it to any external system, such as network elements or ERP systems, usually in an XML or text structure. The provisioning interface to these systems or elements can be done using a variety of different methods such as: REST, LDAP, CORBA, HTTP, SOAP, or GCI, and it usually requires a customization to each vendor's specific APIs and protocols.

IN Prepaid Application Servers

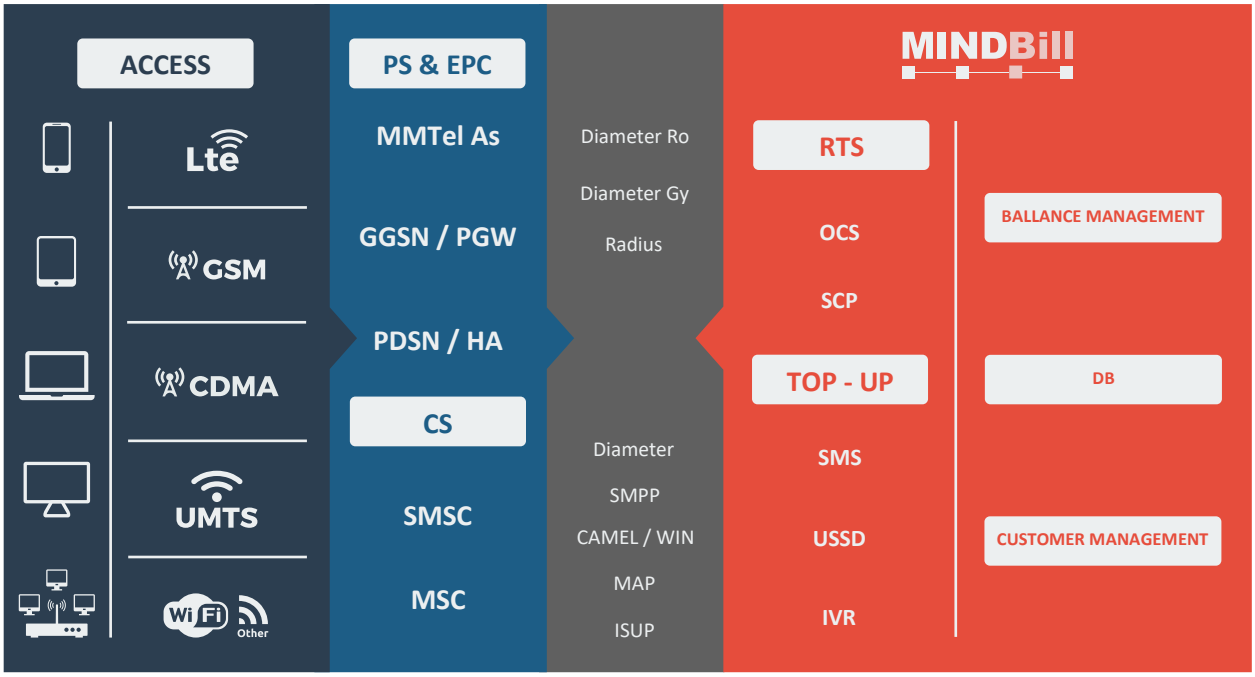
Staying ahead of the competition represents an ever more difficult challenge in today's prepaid communications market. In addition to lowering their prices, providers have to offer more complex and attractive services to the increasingly knowledgeable and demanding customers.

The IN Prepaid Solution

The MINDBill IN Application server provides the ability to deploy prepaid services in traditional SS7 networks. The IN Application server solution is based upon an IN SCP and IVR that are linked together with the MINDBill RTS and Balance Management systems for AAA and quota allocation. The IN Application server SCP is usually addressed by the network switches, and based upon the AAA information it reverts to them the given quota. The IN Application server IVR is used for displaying the required application prompts and collecting DTMF tones.

Being a SS7 signaling node, the IN Application server maintains its own point codes in the SS7 network and it can connect to either ANSI or ITU SS7 signaling networks via E1/T1 connections. This sophisticated IN Application server uses a full redundant solution with load-balancing capability. Furthermore, it manages its own TCAP transactions and at the application level it supports both INAP/CS1 and CAMEL/CAP protocols for the IN part.

The MINDBill Prepaid IN Solution supports multiple protocols such as WIN, SIGTRAN, SIP and more. The multi-protocol supports enables operator providing variety of mobile self care services such as top up using IVR and USSD.



MINDBill Any Prepaid Service Architecture

Infrastructure and Operation Management System

Business Processes Environment

Introduction

Customer Care & Billing processes are one of the most significant practices to drive business performance. These processes are fundamental for bringing innovative and competitive ways of delivering products and services to market. Operator processes are becoming increasingly explicit and business process management (BPM) is evolving from a paper-based diagramming tool to a comprehensive solution that models, monitors, simulates, and redesigns processes for competitive improvement.

MIND's automated Business Processes engine allows operators to excel with today's top challenges. The business processes workflow implemented by the engine provides business intelligence behind day-to-day operations (adding customers, upgrading packages, etc.). The engine also automates the interaction with network elements (HLR, HSS, PCRF, MSC, SMSC, Voicemail) and 3rd party software (credit scoring, address validation, site mapping). All are done following a uniquely defined set of business rules set by the provider.

MIND is offering in its deployments tailored, fully automated, order management process, service fulfillment processes, trouble tickets, and debt collection processes, all unique to its market segment.

MINDBill Business Processes engine provides the scalability and reliability needed for millions of active processes. MINDBill Business Processes Studio enables the flexibility to adapt to any process required by the operator, modify it to maintain the operator's innovation and become a dynamic convergent communications provider.

Business Process Development Life Cycle

The life cycle of a new business process is short and intuitive. Once the **idea** is raised, the concept is translated into graphical representation (**design**), and **deployed** for **testing** and simulations. Once approved, the **production** environment is updated with the revised flow, allowing **monitoring** on the various activities.

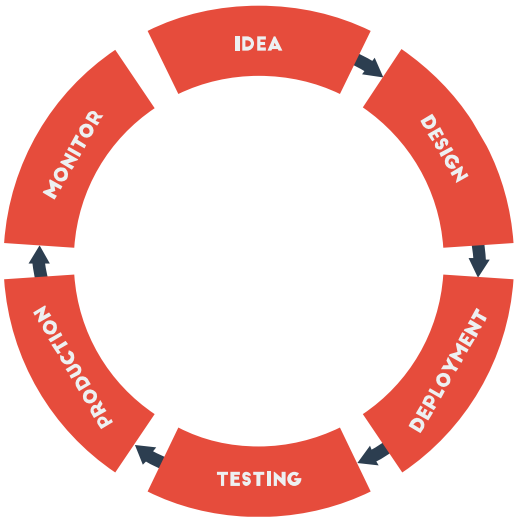


Figure 24 – Business processes life cycle

MINDBill Interfaces

The MINDBill platform is built as an open platform, for easy integration with the existing Operations and Business Support Systems (OSS/BSS). The solution is equipped with a comprehensive set of APIs that cover all CRM needs, business rules and reference data. The interfaces are based on open standards, such as Web Services, REST, Messaging and more, and out-of-box middleware support (Fuse, Tibco, etc.). In addition, import and export utilities enable en-mass updates toward external systems. These

characteristics enable easy integration with multiple OSS/BSS, including billing, fraud prevention, lawful interception and data warehousing.

The Billing API handles account, account-service and payment-related functions. Using this API, any external application, irrespective of platform, can create, update, or query accounts, account services or payment details. MIND's billing API can be used by any third-party application through HTTP requests in standard SOAP protocol. The data is expressed in standard XML format. The application that uses the API can be located anywhere, locally or remotely with Internet or intranet connections to the API server.

MINDBill Analytics

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

The MIND reporting solution is based on SAP Business Objects Edge Business Intelligence (BO). 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 of a Telco operator 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.

The MINDBill reporting addresses a solution for 2 main needs:

1. **The MINDBill Reports Generator** - built in an operational BI approach using SAP BO (Business Objects). The MINDBill report generator includes several templates reports covering several business areas enabling operation, finance and business users to get detailed reports in multiple formats.
2. **MINDBill Analytics** - aggregated reports presented in tables, graphs and dashboard layout enabling management users to make better decisions. The MINDBill Analytics enables users to understand the past, monitor the present and predict outcomes as one moves his business ahead. It relies on data from the MINDBill platform and provides self-service reporting and analysis at everyone's fingertips, so decision makers spend less time looking for answers and more time driving strategic decisions. This makes it easier to share consistent, holistic views of the business and enhances decision-making abilities. The MINDBill analytics views provide drill down analysis to all sales, service, finance and operational information.

The MINDBill Report Generator

The standard reports available in the MINDBill system enable the operator to categorize the customer data and analyze revenue, profitability, traffic, aging debt and offer financial reporting needed for a dynamic business environment.

MIND's standard reports include A/R reports, G/L reports, Agent Commissions reports, calling cards lots usage, and inter-billing settlement reports. All of the business aspects can be summarized and broken down to the necessary resolution like day, month, market segment, product catalog, etc. The layout of the reports is customizable.

The reports can be scheduled to run periodically or to be generated ad-hoc.

Standard reports may be customized and new reports may be created based on the service provider business needs.

MINDBill Analytics

The MINDBill Analytics enables users to understand the past, monitor the present and predict outcomes as one moves his business ahead.

The MINDBill Analytics provides the service providers' management with responses to business questions such as what are the packages sold? Which promotions and campaigns contributed to revenue increase? What did we sell today and in which channels?

MINDBill Analytics provides the ability to drill down to sales, finance and traffics details per market, store/channel, and other parameters provides key detailed measurements.

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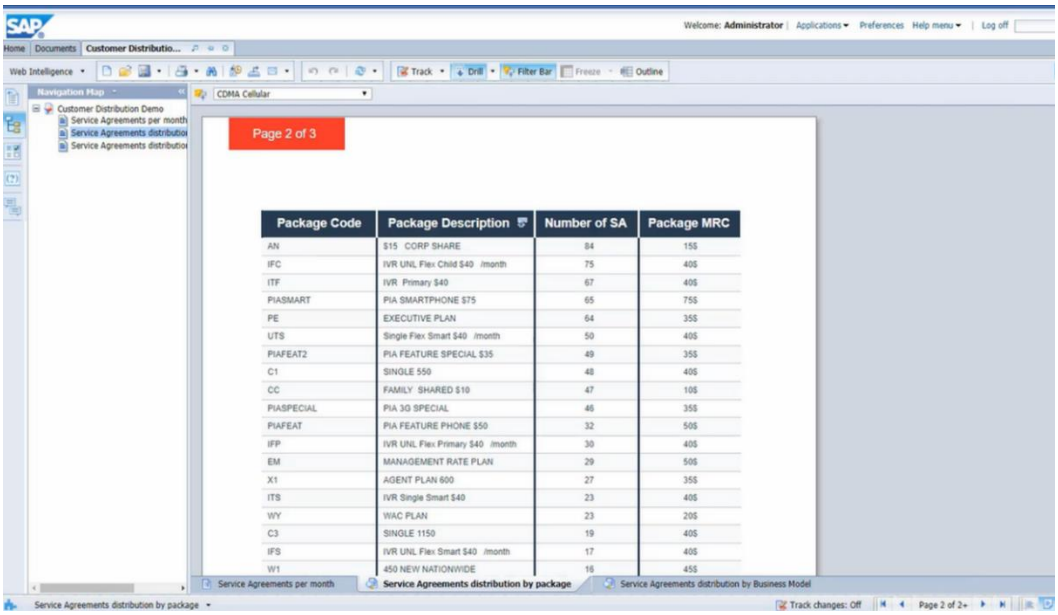
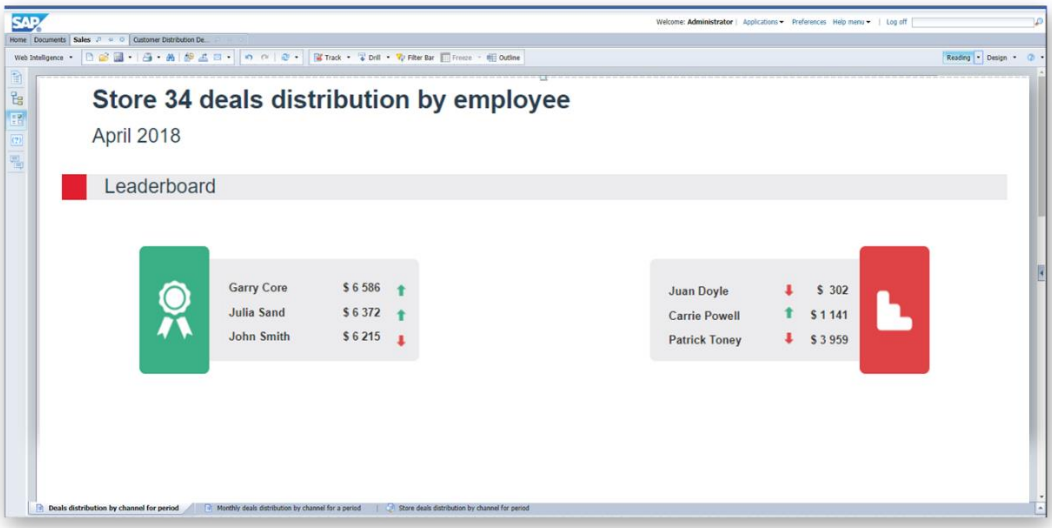


Package Code	Package Description	Number of SA	Package MRC
AN	$15 CORP SHARE	84	15$
IFC	IVR UNL Flex Child $40 /month	75	40$
ITF	IVR Primary $40	67	40$
PIASMART	PIA SMARTPHONE $75	65	75$
PE	EXECUTIVE PLAN	64	35$
UTS	Single Flex Smart $40 /month	50	40$
PIAFEAT2	PIA FEATURE SPECIAL $35	49	35$
C1	SINGLE 550	48	40$
CC	FAMILY SHARED $10	47	10$
PIASPECIAL	PIA 3G SPECIAL	46	35$
PIAFEAT	PIA FEATURE PHONE $50	32	50$
IFP	IVR UNL Flex Primary $40 /month	30	40$
EM	MANAGEMENT RATE PLAN	29	50$
X1	AGENT PLAN 600	27	35$
ITS	IVR Single Smart $40	23	40$
WY	WAC PLAN	23	20$
C3	SINGLE 1150	19	40$
IFS	IVR UNL Flex Smart $40 /month	17	40$
W1	450 NEW NATIONWIDE	16	45$

Graph or leaderboard presentations are available as well:



SNMP and Monitoring Tool

The MINDBill MMTS (MIND Monitoring Tool Suite) enables 24x7 operational monitoring of the MINDBill solution components. It includes proactive monitoring and historical behavior analysis of all the system resources such as Data Base, Operating Systems and more.

MMTS is based on Nagios and enables monitoring information proxy to external network managing systems (NMS) using simple network management protocol (SNMP).

The MMTS provides:

- **Comprehensive Monitoring** of all the mission-critical infrastructure components including MINDBill applications, services, operating systems, network protocols, system metrics, database and network infrastructure.
- **Visibility**: Provides a central view of your entire IT operations network and business processes, as well as application behavior analysis.
- **Awareness**: Alerts are delivered to the IT staff via email and/or SMS. Multi-user notification escalation capabilities ensure alerts reach the attention of the right people.
- **Problem Remediation**: Event handlers allow you to automatically restart failed applications, services, servers, and devices when problems are detected.
- **Trending and Capacity Planning**: Allows organizations to plan for infrastructure upgrades before outdated systems catch them by surprise.
- **Reports**: Ensure SLAs are being met, provides historical records of outages, notifications, and alert response for later analysis.
- **Health**: Provides periodical (daily/weekly/monthly/yearly) health reports that provides managerial review of the system in a centralized place.

Hardware Technology

Platform Independence

MINDBill is available for deployment on cloud as well as on premise. The MINDBill is HW agnostic and supports multiple OS.

Scalability and High Availability

MINDBill's modular and scalable architecture allows the system to grow with the service provider. Scalability is achieved either by Horizontal or Vertical growth (adding more servers vs. adding more computing resources to existing servers).

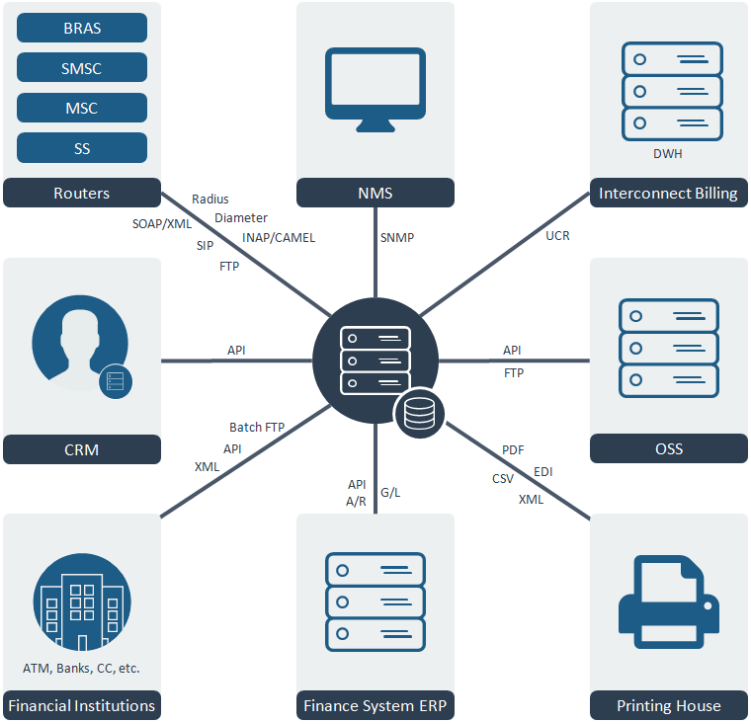
MINDBill provides a solution with built-in redundancy and high-availability (HA) architecture. It is reliable with no single point of failure, guaranteeing undisrupted service for mission-critical systems. All servers are data-less, hence load sharing and HA are obtained using the N+1 architecture. MINDBill Data Servers HA are based on Oracle's RAC Architecture.

Audit Trail

The system audit (SA) records all system level operations. The list of SA entry types covers the auditing areas required: application start/stop, user logon/logoff, Processes start/stop, and configuration changes. It includes audit-trail of all MINDBill applications, system and billing administrators' actions that are not account-specific. An SA entry may contain additional process-specific information – e.g. the automatic account creation will provide the number of accounts that were created. Supported configuration operations include all Manager and Administrator menus: Tariffs (tariff definition only), Products, Services, Gateways, Sites, Agents, Security groups, Providers, Currencies, Tax settings and rules, G/L settings and rules, Billing Cycles, Invoice configuration, Banks, Credit cards.

MINDBill APIs

The MINDBill system features a comprehensive set of APIs that cover all CRM needs, business rules and reference data. It uses HTTPS requests in a standard SOAP protocol (using a WSDL file) in order to enforce security access based on predefined user names and passwords. The MINDBill API environment is session-based, and supports importing and exporting utilities that enable mass updates toward external systems. Using the API, any external application, irrespective of platform, can create, update or query accounts, account services or payment details. In case errors occur, unique error codes and error descriptions are returned for easier identification and resolution. The MINDBill APIs are accompanied by detailed documentation, which helps back-end staff in better understanding and interacting with the APIs.



MINDBill APIs

About MIND CTI

MIND is a leading provider of convergent end-to-end billing, PoS, customer care, self -care, inventory, provisioning, mediation and OCS product based solutions for telecommunication service providers. MIND supports all deployment models including on premise and cloud managed service for Wireless, Wireline, Cable, IP Services and Quad-play carriers worldwide. Our product approach enables operators to implement seamlessly & quickly a robust billing solution. A global & publicly traded company on the NASDAQ (MNDO), with over twenty years of experience in providing solutions to carriers and enterprises, MIND operates from offices in the United States, Romania and Israel.

To learn more about MIND CTI, please visit www.mindcti.com.