COMPLETE PORTFOLIO
OF IT SOLUTIONS AND SERVICES
FOR TELECOMMUNICATIONS

OSS

IOT

BSS

WHY COMARCH

SUCCESS

BSS/OSS PORTFOLIO
We live in a world of constant connectivity. A world where interactions happen online in real-time, where massive streams of big data are sent through mobile networks every second, where traditional communication has become digital and devices intelligent, reshaping people’s lives globally.

For telecom companies like yours this world creates new challenges. Customers want their digital services to be available anytime and anywhere, and they demand the highest quality. At the same time you have to keep costs low, service delivery times short and operations agile. To face the challenges of the digital era you need to be flexible enough to adjust to the dynamically changing reality. And you need the right business partner who can help you launch new services quickly and cost-effectively, transform operations and increase business efficiency. A partner like Comarch.

Comarch is a European-based provider of complete BSS/OSS solutions for telecoms. Since 1993 we have expanded onto four continents and have been continuously developing our cooperation with both global and local customers. By partnering in telecom projects globally, and by actively contributing to the work of the industry standardization bodies, we have gathered valuable knowledge and best practices that we share with telecoms every day.

Together with our innovation potential, which has been proven by analyst companies such as Gartner, and thanks to the execution power of over 5000 highly skilled specialists we can successfully tackle even the most complex transformation project that may lie ahead of you.

We understand your business is unique. Our comprehensive BSS/OSS portfolio combines out of the box functionalities with high configurability. This enables you to shape Comarch’s solutions to tailor them to your company’s requirements, strategy and budget.

This product strategy, accompanied with a range of professional services that we can support with our own Data Centers, enables you to get the perfect solution for your business and achieve maximum efficiency while optimizing costs.

Today we work with over 50 satisfied telecom customers worldwide who have trusted us with key areas of their business, including billing and customer care, service fulfilment & assurance, network management & planning, optimizing the experience of VIP and enterprise customers, as well as managing new areas of business such as M2M, cloud and digital service enablement. The success of our customers translates to our success and enables Comarch to grow, develop and foster innovation together with telecoms companies worldwide.

Choose Comarch to be your partner in the digital era. Let’s shape the world of communications together.
As part of Telefónica’s strategy, our network and operation support systems play a crucial role as enablers of the services we provide to our clients. Implementing Comarch Next Generation Network Planning is a major step towards improving the efficiency of network planning and optimization processes in our subsidiaries in Latin America. Comarch was chosen as it has already proven to be a trusted partner of the Telefónica Group in Europe, and shown a great degree of flexibility in meeting our needs. The current implementation will provide an integration platform for a best of breed OSS solution, unified and reused across the group.

José González Díaz,
Director of Transformation & OSS, Global CTO at Telefónica S.A.
CHAPTER I

BSS/OSS PORTFOLIO
Comarch’s widely developed activity, both in Poland and abroad, is the strongest confirmation of the high quality of our products, which cover all strategic areas of the TMF Telecom Applications Map (TAM).

Comarch offers a comprehensive set of BSS/OSS tools that address the critical activities of fulfillment, assurance, billing and operational support, and enable communication service providers to create and secure new revenue streams and differentiate from their competitors.
We were very impressed by Comarch’s highly responsive and flexible attitude, as well as their coverage of our current and future needs. Telecom operators that want to stay competitive in today’s market need to deliver top-notch customer experience and provide personalized, data-driven services through all touch points. It is also crucial to manage all operational aspects by decreasing the number of incidents, improving response rates, and increasing efficiency through automation focused on added value activities. In partnership with Comarch, we aim to complete a very sizable project that will affect and transform all aspects of our BSS operations, ranging from prepaid charging and credit control to customer information management, mobile network provisioning, and trouble ticketing. Based on what we have seen so far, we are very hopeful and optimistic about the outcomes of the project.

**Werner De Laet,**
CEO at Orange Luxembourg
BSS ARCHITECTURE

- Market Sales
  - Mobile Sales
  - CRM for Telecoms
- Customer
  - Self Care
  - CRM for Telecoms
  - Customer Order Management
- Product
  - Product Catalog
- Service
  - Service Catalog
  - Service Order Management
  - Service Activation
- Resource
  - Field Service Management
  - Voucher Top-Up Management
  - BSS Mediation
- Partner
  - InterPartner Billing

NETWORK ENVIRONMENT
- 3rd party system
- NMS/EMS
- Physical devices
OSS ARCHITECTURE

- Service Catalog
- Service Inventory Management
- Service Activation
- Service Order Management
- Service Fulfillment
- SLA Monitoring
- Customer Experience Management
- Service Quality Management
- Service Monitoring
- Network Planning & Design
- Network Inventory Management
- Network Auto-Discovery & Reconciliation
- Network Configuration Management
- Field Service Management

Reusable Components
- Authentication Service
- System Repository & Configuration
- Reporting Service
- Notification & Escalation Service
- OSS Console
- WEB Console

Other Systems (BSS, Trouble Ticketing, etc.)

Other Systems (BSS, Trouble Ticketing, etc.)

/resource_management

Network Environment

3rd party system

NMS/EMS

Physical devices

OSS Mediation

Why Comarch BSS/OSS Portfolio

SUCCESS

WHY COMARCH
**IoT CONNECT**

**IoT Analytics Platform** module focuses on delivering measurable business value, using intelligent big data processing and real-time data analytics for M2M/IoT business purposes. It provides thorough information about the way in which customers are using your IoT products. Additionally, it handles some issues related to quality of service (QoS) within operations, by helping discover which device (or type of device) generates issues, revealing data patterns and trends, and providing reports and analyses of anomalies.

**Comarch IoT Connectivity Management** enables mobile operators to provide managed connectivity in multi-national, multi-level and multi-operator environments. The system is a M2M/IoT connectivity management platform that helps launch IoT offers for vertical industries such as automotive, consumer electronics, retail, energy & utilities, finance & banking, healthcare, manufacturing, public services, security, and transport & logistics.

**IoT Billing** is tailored to the needs of your IoT operations. It enables to charge not only for connectivity, but also for IoT devices, vertical applications and bundled services. IoT customers are looking for the well suited offer answering their businesses in the most appropriate way. System supports all kinds of multileveled business relations (B2B, B2B2C, B2B2B).
IOT CONNECTIVITY MANAGEMENT

- **Benefit From a “One Stop Shop” Solution for M2M/IoT Connectivity.** Execute end-to-end IoT strategies starting with selling, quoting and contracting processes, and manage all types of services and SIM cards easily using a single utility.

- **Scale the Solution to Fit Your Needs.** Upgrade the modular platform freely as your business evolves. Handle any type of service, transaction and pricing model efficiently with the built-in billing functionality and service activation module that can process vast amounts of data.

- **Increase Efficiency of Business Processes.** Activate a multilingual self-care portal for customers and partners, monitor your business and troubleshoot any issues easily, thanks to real-time notifications, browsing of data usage, reports and powerful diagnostics.

- **Monitor Costs.** Keep costs in check and ensure KPIs are met thanks to Comarch Managed Services. Integrate the platform easily with your existing environment, and process data automatically from multiple sources and systems.

- **Benefit From a New Billing Strategy.** Empower your IoT business partners and customers with new capabilities including SIM, app and device-based catalog and billing as well as billing on behalf of an application, device or service partner.

- **Shorten Time to Market for IoT services.** Perform bulk operations to deliver services quickly to your customers and improve time to market for both your company and your clients, thanks to automated provisioning and order management processes. Manage all services with a single tool. Create any kind of service or change the configuration of assets with intuitive wizards.

- **Gain Better Control Over IoT Equipment & Service.** Holistically analyze all network events in real time to trigger appropriate actions automatically and offer your customers bandwidth and QoS-controlled services (quality of service) through IoT-specific policy management and AAA.

- **Become a Real-time Service Provider.** Charge in real time to collect all billing and usage data instantly for all your partners and customers, and benefit from the built-in resource and SIM management functionality to manage M2M SIM cards in bulk mode.

- **Communicate More Efficiently with Customers & Business Partners.** Use the Customer & Partner Management module to manage relations and build personalized, flexible offers & tariffs combining service bundles in both prepaid and post-paid mode, and to add services or reconfigure assets.
Comarch IoT Connectivity Management – solution architecture
IOT ANALYTICS PLATFORM

- **Measure Business Value Using Intelligent Big Data Processing.** Gather and process data collected from a network, M2M/IoT devices, applications and other data sources in real time, and combine it all with historical data to see which services your customers are using, and how, in one consistent view. Use this knowledge to measure the value of your IoT business.

- **Learn More About Your IoT Services to Improve them.** Deliver valuable information from the analytics tool to your business, sales and operational departments. Combine the M2M analytics data with information from BSS/OSS and vertical applications, to build a complete view of the service and understand how to better tailor it to your customers’ needs.

- **Offer the Highest Quality of Service, Using Various-level SLAs.** Provide your customers with the highest quality of service (QoS), by offering and easily managing different SLA levels in your IoT operations. Discover which devices generate issues, reveal patterns and trends, report and analyze anomalies, drill down into the information within the user dashboards to see all details of a given service, raise alarms and notify customers to improve business and operational results, and enhance customer experience.

- **Analyze Data in Real Time for Immediate Action.** Switch from post-mortem, offline data mining and analysis to a real time report and analysis tool that can trigger actions as soon as an issue arises. This is mandatory in a world where everything needs to happen in real time.

- **Generate Revenues in New Vertical Markets.** Use IoT Analytics Platform for Device Movement Control in various use cases, such as asset tracking, fleet management, supporting cities in planning street and transport networks, improving the use of energy by providing data to smart utilities / monitoring systems, and more.

- **Reach Highest Operational Excellence.** Analyze how your services are being used by connected devices, track the performance of those devices, and visualize the movement of your equipment. Use those inputs to improve performance on your services, react to reduce inefficient use of devices, and propose service changes according to customer needs.
Comarch IoT Analytics Platform - solution architecture

**Reporting & UI**
- Business Intelligence for MNO
- Real Time Monitoring & Diagnostics for MNO
- Usage Analytics for Customer
- Device Movement Control

**Data Management**
- Action Triggering & Execution
- Data Governance
- Data Exposure

**Data Processing**
- Data Ingestion Streaming
- Data Transformation
- Data Aggregation
- Data Correlation & Enrichment

**Existing Systems**
- Vertical Apps
- Application Enablement Platform
- Customer Information
- Maps

**Network**
- Connectivity
- M2M/IoT Devices
IOT BILLING

- **Create Bundled IoT Services with a Variety of Pricing Models.** Using the IoT Billing module, you can cooperate with different IoT players (such as communications service providers (CSPs), providers of IoT services, application providers, device providers, third-parties (partners) or resellers) to create sophisticated bundled services. Offer your customers a variety of innovative pricing models, including value-based (pay per use), criteria-based (flat rate) or consumer device-based pricing.

- **Be Ready for Future with Real Time Processing.** The IoT Billing platform lets you gather and process data collected from your network, IoT devices, applications and other data sources in real time, and charge it in prepaid, post-paid or mixed models. Using these models you can deliver the real value to Customers’ businesses, whether this is retail, healthcare, automotive or energy & utilities.

- **Take Full Control of Your Money Flows.** Comarch IoT Billing let you control money flows between parties with up to date, automatically generated financial documents within multi-party IoT services. Control all phases of service delivery, down to payments, and browse financial reports, invoices and settlements between various involved parties.

- **Deliver real IoT Services to Vertical Markets.** Comarch IoT Billing helps to engage with vertical markets more dynamically by offering various capabilities to all customers. Thanks to the platform Customers can feel that the offering is suited to their needs, vertical specifics, process requirements. Customers buying a convergent service will be charged for the use of the IoT service and not only for data used or SMS sent. Each vertical is different and thus offering should also be composed of different elements. Using the IoT Billing platform, new offerings can be easily created as an exact answer to vertical.

- **Offer the Highest Quality of Billing for IoT Services.** Thanks to the IoT Billing module you can offer your customers the best user experience whatever the services are, ensure the highest invoicing speed and efficiency, provide support and help at any time with Managed Services to cover the full bill runs, and deliver improved performance, a multitude of reporting functions, automated alerts and notifications and detections of misuses.
Comarch IoT Billing – functionalities

- Product & Tariff Management
- Rating & Process Management
- On-line Charging
- Invoicing
- Payments
- Dunning

- AAA
- Service / Limit / Fraud Control

Existing Systems
- DWH
- Accounting
- Logistics

Network
- Connectivity
- M2M/IoT Devices

Operator - Billing Manager
Comarch / Operator - Operations

Comarch IoT Billing – functionalities
SALES & CUSTOMER MANAGEMENT

Customer Management helps communication service providers sell more services, get closer to their customers and significantly reduce customer churn. Pre-integrated with Comarch OSS/BSS suite, this flexible solution enables telecoms to benefit from a single, 360-degree customer view and gain deep understanding of the customer base.

Self Care is a web self-service tool helping to provide end customers with a convenient online self-management portal, where they can access and edit their profile data and service subscription information, without the help of a call center agent.

Sales Channel Management optimizes sales force efforts and helps service providers increase sales. It enables the optimization of your sales force compensation plans and automate field sales with Comarch Mobile Sales, to shorten and simplify the sales process. Comarch Logistics Management allows to verify, control and automatione of the replenishment of stock levels at selling points.
CUSTOMER MANAGEMENT

- **Benefit from always-in-context access to a comprehensive view of your subscribers.** Leverage a 360-degree customer view to deliver superior service across all contact channels, including call centers, retail, self-service and more.

- **Improve Efficiency While Reducing Costs.** Provide rapid and customized responses to incoming inquiries and reduce the cost of customer service thanks to empowering your clients with innovative and intuitive self-service tools.

- **Sell more services and build new ones according to client needs.** Follow the intuitive customer view application to effectively seize all sales opportunities and make sure to reach the right customer with the right offer at the right time.

- **Turn your customers into brand advocates.** Engage customers through social media channels, what will help you maintain high customer satisfaction levels and increase retention, sales and revenues.

- **Achieve more while simplifying the process.** Structure your marketing campaigns and introduce process-centric collaboration between front and back offices, sales and marketing, and business and technical departments to boost operational excellence and increase employee productivity.

- **Choose a future-proof solution.** Handle all data with ease by transmitting it in standardized form based on the TM Forum SID concept and benefit from Comarch pre-built processes to support any industry-specific operations.

Comarch CRM for Telecoms – user interface
SELF CARE

- **Introduce true omnichannel experience and increase your customers’ satisfaction** by letting them choose the most convenient, always on, engagement channel. Regardless of whether a customer uses a desktop or mobile device, the experience is always appropriate to their channel of choice – and to the task. With Comarch Omni-Experience suite, a customer can switch from Self Care to another channel, such as Call Center or Point of Sale, at any time and without needing to repeat information already provided.

- **Lower the cost of customer service** and reduce the workload of your customer service teams, by eliminating the number of customer service calls and moving bulk of customer management into the hands of your clients.

- **Boost your marketing and sales** – enhance your marketing efforts, thanks to a non-intrusive direct marketing platform for advertising new services and promotions. Increase the number of new sales orders, thanks to the ability to reach your customers with well targeted, personalized offers directly to their mobile device or desktop.

- **Turn your customers into your brand advocates** and connect with customers through social media channels (such as Facebook or Google) to let them share their experiences with your services, and motivate them using rewards. Let them use their social media identity when engaging with you.

- **Give customers better control over their finances** and let your customers browse invoices online, perform online top-ups and payments, review financial operations history, browse financial documents, and choose the language used by the system during a particular session.

- **Simplify selling and trouble ticketing** by empowering your clients to easily access information about new services and products available, activate or deactivate services, or report issues in a convenient and simple way. Let the telco service specific wizards guide your customers through sales or problem resolution processes.
SALES CHANNEL MANAGEMENT

COMMISSION & INCENTIVE

- **Constantly improve commission policies** to point agents in the right direction and **customize commissions for top agents** to motivate employees and improve sales results.

- **Immediately post sales, point & payment result data** for sales agents and managers to review.

- **Let business users calculate commissions directly** with a user-friendly algorithm configuration program.

- **Automate commission allocation calculations** with a reliable data repository.

- **Flexibly define sales goals and assign agent positions** in multidimensional distribution channel structures to set sales goals for individual agents or sales teams.

LOGISTICS MANAGEMENT

- **Comprehensively manage purchasing, storage and sales of physical and virtual products** (telephones, modems, SIM cards, charge codes, virtual coupons, gift cards, etc.).

- **Reduce return management costs and enjoy efficient anti-fraud protection**.

- **Automate the warehouse and delivery processes**.

- **Plan your purchases more efficiently based on analyses** generated by the system and react to irregularities on the fly, thanks to accurate reports available directly in your email inbox or on mobile devices.

COMARCH MOBILE SALES

- **Speed-up order processing** by enabling sales to register new contracts directly from their mobile device, in both online and offline modes.

- **Automate your order processing** to make it error-free.

- **Conveniently introduce new service orders** and service changes using mobile devices.

- **Easily check service availability**, based on your network infrastructure in a specific location, to instantly inform customers, which services they are able to order.

- **Integrate with CRM** to browse full customer data at any time and to automate order handling and service fulfilment.

- **Automatically send information** about necessary installation visits to **Field Service Management systems**.
The decision to select Comarch as the provider of the BSS platform was based on their ability to deliver a fully integrated, highly-scalable solution with catalog-driven processes and a centralized data model as part of an overall agile implementation.

**Dr. Marcus Hacke,**  
Managing Director at ngena
BILLING & CHARGING

Convergent Billing System is a high capacity, flexible and scalable service-agnostic management system which can be used by service providers to monetize services ranging from traditional telecommunications through MVNO and M2M to modern digital services. It allows real-time charging for any service type and facilitates the development of new business models in cooperation with partners – a key element in elevating business in the digital world.

InterPartner Billing facilitates managing relations with domestic and international business partners and supports various business models which include revenue sharing, wholesale or roaming services. It allows to easily exchange billing data and invoices and share revenue or cost information with third parties.
CONVERGENT BILLING SYSTEM

- Evolve your business with a proven tool trusted by over 20 communication service providers worldwide.

- Increase business efficiency by using one flexible and accurate tool for billing, charging, rating, invoicing and money collection, regardless of the customer, market or service type.

- Accelerate and simplify billing processes - the user-friendly interface supports flexible definition and flow of mass processes.

- Implement multi-sided business models including cooperation with content providers, OTTs, application providers, MVNOs or industry verticals and launch new services on behalf of partners.

- Easily charge for any service, based on multiple factors such as time, bytes and event content at any given time.

- Increase customer satisfaction with flexible invoice-level discounts, and automatic correction of your invoices (thanks to a powerful rerating tool).

- Control digital services in real-time and ensure better control over service usage for specific groups of subscribers thanks to a Service Controller Module.

- Facilitate pre-paid service management - define and generate vouchers and PIN codes using the flexible Comarch Voucher & Top-up management module.
Comarch Convergent Billing System – solution architecture
INTERPARTNER BILLING

- **Achieve multi-dimensional convergence** thanks to a single tool for handling voice, data, messaging, content services and others.

- **Manage any business models** (interconnect, roaming, revenue sharing, wholesale) and any contract type (bilateral, hubbing, revenue sharing, roaming, MVNO or content-based) with one platform.

- **Streamline billing management** thanks to a built-in reconciliation process, manageable from the Comarch InterPartner Billing interface, as well as the powerful rerating functionality (for correction) and automatic adjustment processing.

- **Take hold of the powerful Partner Management module** with its multiple core features: agreement management, workflow processing, regulated services support, dispute management, order handling, SLA auditing and managed communication channels.

- **Process limitless volumes of data**, by using a flexible and fully scalable system. Configure new services with ease using flexible customizable rating rules and aggregation levels.
BSS TAILORED TO YOUR NEEDS

**Smart BSS** is a complete, pre-integrated solution allowing the comprehensive management of processes such as Request-to-Answer, Order-to-Payment, Usage-to-Payment, Request-to-Change, Termination-to-Confirmation and Problem – / Complaint-to-Solution, via Customer Management and Self-Care applications. It’s the perfect choice for Tier-2 and Tier-3 telecoms, including internet, cable and satellite TV providers, and MVNOs thanks to fast deployment and low costs. Tier-1 operators can also use it for managing business activity (such as M2M) or services targeted at various industry verticals.

**B2B Solution** focuses on critical problems related to B2B relationships such as providing distinct selling strategies to companies of varied size (small, mid-size and multi-national corporations – MNCs), delivering and supporting large numbers of customized products and services, managing service level agreements (SLAs) and handling complex fulfillment processes. This solution supports multiple billing scenarios, such as split billing or billing-on-behalf.

**MVNO/MVNE Solutions** tailored to MVNO (Mobile Virtual Network Operators) and MVNE (Mobile Virtual Service Enablers) business models. They let MVNOs launch new brands quickly, and enjoy increased ARPU, while for MVNEs it provides enough flexibility to host multiple MVNOs on one platform and launch new ones for cooperation in as little as six weeks.
SMART BSS

- **Manage any type of payment for any kind of service.** Charge, invoice and bill using a real-time rating functionality, manage billing info and benefit from full support for AAA (Authentication, Authorization, Accounting) with a configurable authorization, service provisioning and optional real-time control of IP services.

- **Easily create product offers** using a built-in product catalog and shorten time-to-market for new services with simplified order management processes.

- **Speed up managing scratch cards and PIN codes** thanks to the voucher and top-up management functionality.

- **Enhance your customers’ experience** through web-based user interfaces (CRM, Self Care, web-shop) and create 360-degree customer view with the compact CRM module.

- **Give customers the option to take care of themselves.** Introduce a self-care portal, optionally extend it with a web-shop functionality and communicate with your customers through a built-in messaging functionality visible in the self-care portal.

- **Optimize your operations** to save time and money with batch loading of service usage data from external systems and use a platform that combines CRM, billing, charging, product catalog and service activation.

- **Boost employee productivity** thanks to mass processes automation ( invoicing, dunning, reporting and part of customer communication).

- **Simplify system maintenance** and configuration with a user-friendly administration console and run all kinds of required reports with easy-to-use, built-in reports and diagram templates.
Comarch Smart BSS - solution architecture
B2B SOLUTION

- **Implement flexible business customer organizational structure and introduce cost centers** with customer care tools designed for multi-national corporations and big enterprises.

- **Let customers manage their services** with a self-care portal focused on business customer processes, to reduce customer service workload and costs.

- **Define and monitor service-level agreements** (SLAs) in the context of actual products or business processes.

- **Proactively monitor and analyze the quality of your business services** and resolve service problems before they result in customer complaints.

- **Link all sales channels** to the same product catalog and order management tools.

- **Shorten time-to-market** by employing the product and service catalog which drives the fulfillment process and ensures that no complex reconfiguration is needed for each new service introduction.

- **Provide product variant offers and customized products** (standardized variants for Small & Medium Business clients and customized offers for Large Enterprises).
Comarch B2B Solution - solution architecture
MVNO/MVNE SOLUTIONS

MVNO SOLUTION

- **Launch an MVNO business within months** - pre-configured sets of processes and scenarios, specially adjusted to the MVNO’s needs, such as non-telecom integrators.

- **Increase ARPU thanks to better service availability** – enable rapid realization of competitive marketing strategies in terms of pre-paid and post-paid pricing.

- **Benefit from a range of sales / marketing tools** – easily build and maintain customer relations with dedicated CRM and SelfCare tools.

- **Create unique tariff plans** for selected customer segments.

- **Benefit from implementing in a Managed Services model** to shorten time-to-market and optimize infrastructure costs.

MVNE SOLUTION

- **Host multiple MVNOs** on a single MVNE platform.

- **Extend your business** by serving multiple MVNOs thanks to a user-friendly interface that enables you to benefit from a scale effect, without risking an error in configuration.

- **Launch a new MVNO in full, in as little as six weeks**, thanks to a **pre-configured set of processes and scenarios**, adjusted to the MVNE business reality.

- **Individualize pricing** and define competitive marketing strategies for each MVNO, thanks to convergent billing with a personalized product catalog.

- **Manage the database** of all your hosted MVNOs with a dedicated CRM module.

- **Integrate with MVNOs’ systems easily** – the system offers two independent ways of integrating with your MVNOs’ systems (API and web services using the B2B Gateway), providing immediate access to information about new customers and contracts with partners registered in the system, and the opportunity to service them immediately.

- **Increase control over SIM card orders** thanks to a resource management module that allows real-time tracking of order fulfillment, and even includes information about stolen SIM cards.

- **Manage your partners** (VAS / IPTV providers, MNOs)

- **Benefit from a Managed Services model**, which helps you shorten time-to-market and optimize infrastructure costs.
**FUTURE-PROOF OPERATIONS**

NFV/SDN enables telecom operators to introduce the new disruptive technology, while leveraging their existing OSS (and BSS) infrastructure.

**Self-Organizing Network** lets you achieve automation of your network management and align it with your business goals, by employing the OSS service layer together with ‘plug & play’, ‘self-optimization’ and ‘self-healing’ SON paradigms.

**SON Integration Box**, as a central hub for the exchange of various types of data, aggregates SON plans and dispatches them to different tools. It also provides physical network information to SON. Data is gathered from multiple external sources and pre-processed for SON usage.

**Customer-Centric OSS** facilitates switching a network management perspective from network resources to customer experience.
NFV/SDN

OSS FOR SDN NFV ORCHESTRATION – COMARCH SOLUTION BENEFITS

- Implement multi-domain, virtualized and non virtualized management and orchestration.
- Manage both the “legacy” network and the NFV/SDN one to avoid the problematic “transition” period.
- Implement customer service driven, end to end based automation.
- Benefit from the full end to end view provided by OSS (and BSS), and rapidly introduce services based on virtualized and physical network functions.
- Shorten the time to market for new services, managing all “abstraction” layers.
- Orchestrate your network thanks to the customer service order driven by the service catalog model, and align customer services.
- Achieve consistency of low level management with high level network and service management.
- Achieve full network visibility.

BUILT-IN MODULES:

- Comarch Network Inventory provides the physical topology of the network and chooses the best matches for virtual machine and network functions. Data plane topology is fed to the SDN controller, which is crucial for effective visualized and non-virtualized network function chaining.
- Comarch NGSF & Comarch Service Catalog and catalog driven orchestration are both essential for implementing service chaining and service delivery to customers, based on the virtualized and non-virtualized parts of the network.
- Comarch Next Generation Network Planning allows both virtual and non-virtual networks to be planned.

THE LONG-TERM VISION: TRANSFORMING A NETWORK INTO A DISTRIBUTED CLOUD

The idea behind NFV/SDN is that this new technology enables telecoms businesses to transform network nodes into micro data centers, which can host not only the software implemented network function (Virtualized Network Function), but also customer applications. This paves the way for Edge Computing, which is a function for low latency networks’ need for Internet of Things (IoT) applications.

REAL TIME OSS FOR NETWORK FUNCTION VIRTUALIZATION

The key to success is the high level of automation and “intelligent” algorithms in NFV MANO (NFV management and network orchestration) and in the SDN controller layer. This “intelligence” requires an end to end view of the virtualized and non-virtualized networks. The Comarch approach is to employ virtualized OSS Functions to implement NFV MANO and augment the functionality of the SDN controller.

- Comarch Next Generation Service Assurance helps an understanding of the impact of physical hardware failures on VMs, VNFs, service chains and, ultimately, the customer, and to automate the process of resolving problems.
- Comarch Performance Management (PM) and Service Quality Management (SQM) monitor virtualized and non-virtualized network function performance and enable SDN controllers to redefine network connectivity automatically, thus providing the best possible customer experience at peak load times.
- Comarch Service Inventory provides the service chaining view of the network.
SELF-ORGANIZING NETWORK

- **Providing a customer-centric network.** Customers expect to enjoy quality services independent of factors that might impact the network quality. In order to satisfy these expectations, MNOs can leverage SON algorithms to manage the complex dynamic behaviour of radio access networks. Self-healing modules can minimize the impact of network failures on services, while self-optimization algorithms can change the configuration automatically, to increase the service quality.

- **Increasing the return on infrastructure investments.** Provider networks are over-dimensional because they need to support both the peak and nominal network load. By providing self-optimization algorithms, the Comarch SON solution can automatically change the configuration of the network to optimize the resources for prevailing requirements. This will allow the MNO to better utilize their assets and achieve a corresponding return on investment.

- **Lowering the cost of managing the radio access network.** MNOs need to invest heavily in the people and operations connected with their radio access network, in order to offer a reliable and performant service to their customers. As the network expands daily, management becomes increasingly expensive. Automating these operational activities will allow MNOs to shift their experts from daily operations to strategic, high yield projects.

- **Reducing time to market for network projects.** Deploying new network resources or services in the mobile domain is a time-consuming and mostly manual process. By leveraging the algorithms provided by SON for self-configuration, many of these activities can be automated. This allows faster deployment and reduces provisioning errors.
SON INTEGRATION BOX

- **Manage data exchange between cSON, OSS and the network** thanks to the SON Integration Box that stores actions in its database and then processes, and distributes them to OSS applications. The Comarch solution can also be used to provision SON plans for specific RAN vendors or technologies, even those not supported by SON.

- **Save time thanks to process automation.** The console (GUI) is used only to control and configure adapter settings or reports, and is managed by admins or super-users. All other actions are automated.

- **Track and roll back SON-related changes** thanks to inventory database that stores the history of all SON plans and allows operators to identify problems and roll back SON-related changes if something goes wrong.

- **Perform periodical network audits that provide deep insight into default values** for the network parameters of all RAN managed objects, regardless of vendor. The Integration Box allows parameters to be modified and provisioned, even those not usually monitored and processed. The built-in scheduler can be used to trigger periodical network audits, aimed at correcting parameters or reporting discrepancies. All this is done in full synchronization with an SON tool.

- **Configure network elements from any supplier** by using automatic mediation to decompose SON plans and dispatch SON actions to network elements provided by any supplier. The process is automated and invisible for end users.

- **Optimize the transport layer by automatically** detecting mobile backhaul interface dependencies and applying corrections directly to network elements. Actions can also be triggered by SON requests to provision, correct or delete Iur or X2 interfaces.

- **Transform OSS easily to became really SON-oriented.** SON Integration Box, reusing Comarch Resource Management product capabilities, can transform into comprehensive rollout tool with tight integration with CSON tool.
Sample OSS Architecture with Comarch SON Integration Box

Inventory database

Repository of current and historical data for:

- Physical site configuration
- Radio parameters configuration
- Radio policies and validations
- SON Plans
- FM events/alarms
- Configuration Management (optional)

Console GUI

Mediation

Events/Alarms

- FM 1
- FM 2
- FM n

Planning Tool 1
Planning Tool 2
Inventory 1
Inventory 2

SON Plans

Phisical Data

SON Alarms
SON Actions
Whitelist / Blacklists
RAN vendor provisioning
RAN vendor reconciliation

Centralized SON

2G / 3G / 4G Network

Configuration Management & Reconciliation (optional)
CUSTOMER-CENTRIC OSS

CONGESTION MANAGEMENT / NETWORK UPGRADES

The ultimate goal of costly network upgrades lies in providing a better service for end customers. When solving network congestion problems, beside pure technical parameters, customer perception of network performance is a critical factor that should be measured and taken into account. The process requires a high level of network management automation, which is needed to implement a strategy of agile network development based on customer demand, and to limit the costs of infrastructure transformations.

SERVICE QUALITY MANAGEMENT / ASSURANCE

Service quality cannot be based solely on technical KPIs, as the customers’ view of the network must also be taken into account. Therefore it is essential that service providers can easily correlate various technical parameters with their influence on customer experience. In this way, CSPs will be able to introduce pro-active network management and limit the number of customer complaints. The essence of this approach is in switching from network-centric fault management and performance management systems towards customer-centric service assurance and service quality management systems.

SERVICE FULFILLMENT

Customers expect their services to be introduced quickly, and to be innovative and exciting. The OSS system should be a platform that boosts service innovation, through leveraging product and service catalog-driven fulfillment processes. The strategy of service innovation also requires redefining a CSP’s positioning against OTT companies. This requires modifying the OSS into a platform that enables telecom operators to compete / collaborate with these significant market players.
INTEGRATED ASSURANCE

Customer Experience Management provides insight into customer aspects of service management, playing the overarching role for service monitoring, SQM and fulfilment metrics.

Service Quality Management enables monitoring of service quality by leveraging the translation of resource centric KPIs into customer service centric KQI based on service inventory and service catalog data and TMF: CFS-RFS-R model.

Next Generation Service Assurance transforms traditional network-centric fault management into a customer-centric assurance solution. The system enhances customer service pro-activeness, by allowing early detection of network problems and enabling the calculation of customer service impact based on the service models from service catalog and inventory systems.

OSS/BSS Data Analytics processes data gathered from the telecommunications network (the key customer touchpoint) in real time, combines it with information from other OSS/BSS systems and aggregates it. By correlating data from all these sources, you get a comprehensive, real-time analysis. The system effectively helps you improve the overall Net Promoter Score (NPS) or Customer Satisfaction (CSAT), as it takes into account the real customer experience when using a given service provided by the network.
CUSTOMER EXPERIENCE MANAGEMENT

- **Validate and steer your marketing decisions** regarding service packaging and marketing campaigns, and increase your revenues thanks to information about customer preferences.

- **Improve customer satisfaction and decrease churn** by being able to personalize your offers, understand customer behavior and become proactive in fulfilling the needs of your clients.

- **Optimize your network investments** and eliminate over-investment in lower priority areas. Based on the information about customer behavior and customer-related issues, you can plan your network investments efficiently and avoid outages in the highest revenue areas (hotspots).

- **Become pro-active in managing customer relations** – monitor potential customer experience issues in the network and enable your customer service representatives to contact your customers proactively upon detection of incidents, even before a complaint is made.
SERVICE QUALITY MANAGEMENT

- **Monitor services implemented on heterogeneous multi-vendor, multi-domain networks** and delivery platforms serviced by partners. The system also lets you easily monitor and manage the quality of digital services delivered through complex value chains.

- **Get an insight into customer perception of service quality** by transforming network-centric KPIs into customer service-centric KPIs/KQIs that take into account how different services are being implemented on the network, and what their requirements are regarding network performance.

- **Prevent customer service degradation pro-actively** and protect customers from experiencing service quality deterioration. This kind of pro-activity is enabled through trend analysis and prediction capabilities. Thanks to pre-integration with NG Service Assurance you can also benefit from a quality of service (QoS) threshold alarm mechanism, which allows alerts to be raised early enough to prevent customer incidents.

- **Optimize your network investments** by pinning down customer QoS issues to an underlying network KPI and identifying network bottlenecks. By pre-integrating the solution with NG Network Planning you can create a closed-loop system, which detects network congestion, identifies the network areas that should be optimized, and can monitor the results of such optimization.

![Comarch Service Quality Management - solution architecture](image-url)
**NEXT GENERATION SERVICE ASSURANCE**

- **Reduce CAPEX/OPEX.** Thanks to the highest level of integration and applying an ‘all in one’ concept, as well as the high level of automation in both customer service impact calculation and root cause analysis, Comarch NGSA allows you to decrease both capital and operational costs.

- **See your network through your customers’ eyes.** Comarch NGSA helps you shift towards a business-oriented view of your network and service quality, focusing on customer service.

- **Reduce churn by quickly resolving problems.** Deliver the highest quality of service and make your customers feel special, thanks to the ability to managing service information comprehensively, and to resolving service quality problems and incidents quickly and efficiently.

- **Improve SLA management for business customers.** Because network events can be translated, automatically and directly, into customer impact, SLA Management becomes quick and efficient and allows you to offer even more demanding SLA conditions.
OSS/BSS DATA ANALYTICS

- **Win internal user support for customer-focused transformation.** Comarch OSS/BSS Data Analytics can support use cases addressing the needs of a broad audience, ranging from business-focused departments (such as marketing or customer care) to network engineering departments (for example, network operations or network planning).

- **Visualize results of the analysis** in the manner best suited to the needs of your data consumers. Results of the analysis can be presented using built-in web dashboards, focused on specific use cases (e.g., Roaming Monitoring and VIP monitoring), or generic, easily configurable BI-like web dashboards.

- **The analysis results can be used to trigger specific actions that relate to various customer touchpoints.** These include marketing, setting up priorities for network planning, and automated solving of device or network problems. In this way **telecoms companies can improve customer experience pro-actively**, meaning that they are able to address a potential customer experience issue before the customer contacts one of the other touchpoints to complain.

- **As the network is the main touchpoint for a telecom operator’s customer,** the correlation of network performance with customer related data can positively influence **NPS and CSAT scores.**
RESOURCES MANAGEMENT

Next Generation Network Planning enables telecom operators to manage telecom network planning, design and optimization processes, comprehensively and efficiently. Enabling process-orchestrated planning, the system paves way for optimizing network investments, so that they provide real business value.

Network Inventory Management stores complete information about network resources and presents you with a view of the current, historical and future state of your network. The system facilitates network resource management for multi-vendor, multi-domain fixed and mobile networks, supporting RAN, copper, fiber, and cable-based access networks.

Network Auto-Discovery & Reconciliation provides a complete, comprehensive and up-to-date insight into multi-vendor, multi-domain networks, enabling effective network management.

Network Configuration Management enables the automation of network configuration management and can be implemented as part of a broader solution for network planning and upgrading (Comarch NG Network Planning).

Network Consolidation for M&A helps telecoms organize and streamline network planning and consolidation processes efficiently in merger and acquisition (M&A) projects. The solution is built of various components from Comarch’s next generation OSS portfolio.
NETWORK INVENTORY MANAGEMENT

- Get an end-to-end view of multi-vendor, multi-technology networks – the system represents the same equipment and connections in several layers, with technology-specific information included in the dedicated-generic layer providing a consistent view of the network without an information overflow.

- Reduce network operating cost – thanks to a single consistent view of the network you can increase business efficiency and decrease operational costs.

- Improve utilization of existing resources – use your up-to-date, cross-domain network inventory as a basis for network investments, allowing the efficient utilization of existing resources and planning of new ones which are profitable from the business perspective.

- Increase the efficiency of service assurance – the system supports network assurance tools in topological correlations and allows recognition and troubleshooting of the root cause of failures in the most efficient way.

- Benefit from an ‘Umbrella OSS’ model with Network Inventory as the “heart” of the Comarch OSS Suite, providing the information for all other modules (Planning & Design, Configuration Management, Fault Management, Service Quality Management, Customer Experience Management, and Business Process Management)

- Reduce operational costs thanks to a single database and interface – all Comarch OSS modules utilize the same inventory database, which leads to efficient data processing and reduction of operational costs due to the elimination of lots of dedicated interfaces.

- Combine NFV/SDN and technologies in a single ‘Umbrella’ interface thanks to the future-proof architecture of Comarch OSS, which is already integrated with the NFV/SDN framework in the inventory, planning, configuration and assurance areas.

Integrated network & service Inventory
**NEXT GENERATION NETWORK PLANNING**

- **Become more agile thanks to the process driven inventory.** Implement business process management and automated distribution of tasks according to process flows, technological, business and customer related rules and responsibility matrix, to become more agile and responsive.

- **Lower your OPEX.** Integrate industry standard tools into one ecosystem featuring automated synchronization mechanisms to realize OPEX savings.

- **Lower your CAPEX.** Improve the coordination of co-dependent network-related processes for CAPEX optimization to lower all CAPEX costs.

- **Decrease time to market smoothly.** Monitor the efficiency of network engineering teams using unified project procedures and configurable reports, and reduce time to market.

- **Stay integrated with assurance domain.** Synchronize data and alarms with SQM/CEM systems to enable SON integration, and easily implement quality-driven triggering of optimization processes.

- **Enjoy an end to end network view.** Plan and configure the network efficiently, thanks to the accurate and detailed network view assured by Network Reconciliation mechanisms. Comarch framework allows you to visualize and plan the network from different perspectives, in both the strategic, long term, and the integrational, short term.

- **Implement the umbrella OSS to stay ahead of your competitors.** Comarch OSS fulfills the role of umbrella OSS over new virtualized and legacy worlds. Thanks to its innovative and future proof architecture, Comarch OSS is integrated with NFV/SDN framework in inventory, planning, configuration and assurance areas.

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**Comarch Next Generation Service Planning – solution architecture**
NETWORK AUTO-DISCOVERY AND RECONCILIATION

- **Comprehensive, up-to-date network view in one system** – provides up-to-date insight into the multi-vendor, multi-domain network leveraging Comarch Mediation Layer.

- **Automation** – automates discovery and resolution of discrepancies between the inventory data and the real network. Enables definition of rules for discrepancy resolution, thus supporting complex scenarios when a simple network update action is not sufficient.

- **Reduced time-to-market** – shortens network upgrades and optimization cycles by providing almost immediate feedback from the network regarding configuration updates. Flexible network modelling mechanism and configuration templates assure extendibility for future network technologies.

- **Provisioning process simplification** – pre-integration with Comarch OSS Process Management enables triggering a process which can include manual steps when the reconciliation process requires human decisions.

- **Improved Customer Experience** – when pre-integrated with Comarch NGNP, it implements the closed-loop process: plan, upgrade, verify, re-plan, thus shortening the time needed to provide good customer experience for network-based services.

- **Umbrella Configuration Management** – integrated with SON. Smart Plans Management plays a role of Policy Management between manual and automatic plans coming from SON. System automatically recognize conflicts between the plans and resolves them which leads to elimination of errors within network provisioning process.

- **Reduced costs** thanks to future proof system architecture and integration within Comarch OSS Suite it is just another module in Umbrella OSS concept which leads to cost reduction due to decommission of several legacy systems and migrating them into One OSS.
**NETWORK CONFIGURATION MANAGEMENT**

- **One multi-vendor and multi-domain configuration platform.** Enables the configuration of a multi-vendor, multi-domain network to be managed, thanks to integration with Comarch OSS Mediation. Supports both mobile and fixed network configuration management in one system, enabling efficient fixed mobile convergence and eliminating technological silos in the architecture.

- **Simplification of the provisioning process.** Hides the complexity of NE vendor specific network configuration management, leveraging pre-integration with Comarch Network Inventory Management. Automates translation of high level network planning to vendor specific reconfiguration, thus shortening the end to end planning in the configuration management process.

- **Improved customer experience.** When pre-integrated with Comarch NCNP, it implements the closed-loop process: plan, upgrade, verify, re-plan, thus shortening the time needed to provide good customer experience for network-based services.

- **Shorter time to market.** Flexible network modeling mechanism and configuration templates assure extendibility for future network technologies.

- **Umbrella configuration management** - integrated with SON. Smart Plans Management plays a Policy Management role between manual and automated plans coming from SON. The system automatically recognizes conflicts between the plans and resolves them, which leads to the elimination of errors within the network provisioning process. The Reconciliation mechanism allows smart plans acceptance of manual and automated SON related changes in the network.

- **Reduced costs.** Thanks to future-proof system, architecture and integration within Comarch OSS Suite, it is one more module in the Umbrella OSS concept, which leads to cost reductions due to the decommissioning of several legacy systems and their migration into One OSS.
NETWORK CONSOLIDATION FOR M&A

- **Plan your target network before gaining M&A approval** – thanks to the built-in data access rights management functionality, it is possible for Comarch to migrate and operate on data from both sides of the M&A process, while isolating the sensitive data until receiving approval from the authorities.

- **Speed-up M&A-related operational activities** – as you select sites and plan the target network in advance, you can begin operational activities right after the M&A is officially approved. A further consolidated rollout process can be provided in a unified, controlled manner.

- **Customize your network planning workflows** thanks to easily configurable, built-in business processes, used to orchestrate the target network planning workflow. The management can easily track and report process milestones, which allows a constant and clear overview of consolidation process.

- **Get a consistent view of your network planning processes** and browse radio and transport planners’ decisions with their results in the form of convenient reports or views. Take a look at your network using the geographical view.

- **Measure the results** of your network consolidation and its progress with configurable KPIs.

- **Synchronize all M&A activities with legacy OSS tools** thanks to a built-in mediation module.

- **Plan any network in any technology**—including radio technologies (2G/3G/4G) and market-used logical and physical transport layers.

- **Easily extend to other Comarch OSS modules as your needs change** – e.g. with Comarch Configuration Management to provision changes directly on network resources.
SERVICE DESIGN & FULFILLMENT

Product Catalog simplifies IT architecture and accelerates launching new products by providing a single platform for managing product catalogs and life cycles. The system allows businesses to digitally process product offers and specifications and define product relationships for stand-alone and bundle offers.

Omnichannel Order Management is a fully automated, end-to-end fulfillment solution operating from customer order capture through service, network provisioning and activation to customer billing. This fully catalog-driven and highly configurable tool allows introducing new offers or bundles in a matter of days instead of months.

Next Generation Service Fulfillment supports the complete telecom service fulfillment process: creating the customer service, modeling it, and then orchestrating network operations. It helps CSPs automate telecom service fulfillment and delivery, and reduce time to market, thanks to employing the catalog-driven fulfillment concept.

Service Inventory enables managing the network from the service perspective. When integrated with Product Inventory (through the north-bound interface) and with Network Inventory (through the south-bound interface), it provides an end-to-end view of the network, services and products.

Field Service Management schedules, staffs, manages, and supports the field workforce. It automates tasks-resource matching based on technician calendar availability, skills, location and configurable scheduling criteria.
**PRODUCT CATALOG**

- **Design & manage all product offers and specifications** through one user-friendly platform built on easy to use web user interfaces that will improve efficiency, save time and reduce costs.

- **Use the central rules repository & evaluation**, and the unified interface for order capture in all sales channels to improve offer quality and consistency.

- **Create new product specifications**, based on similar content through the unique inheritance mechanism to streamline your product catalog.

- **Control your products’ and offerings’ lifecycles**, and manage the design, definition, publication and retirement of products, offers and other related processes.

- **Effortlessly update versions** of product or offer specifications with the configuration repository.

- **Optimize your project management** through the integrated project function providing users with a holistic overview of changes performed to publishing processes, ongoing activities and environments used for decision-making processes.

- **Customize the interface** and freely use perspectives, customize the Comarch Product Catalog display to each user’s role and let the user further personalize their widgets.

![Comarch Product Catalog - solution architecture](image-url)
OMNICHANNEL ORDER MANAGEMENT

- **Let your customers choose the most convenient channel** and switch seamlessly between them at any time during their shopping journey, with a truly omnichannel, centrally defined ordering process.

- **Shorten time to market** by employing a central product and service catalog, which drives the order management process and assure that no complex reconfiguration is needed for each new product introduced.

- **Benefit from seamless integration** of business & technical process elements based on the TMF SID model to reduce costs of integration and support both fully automated and manual sub-processes within one end to end process.

- **Boost your creativity** with optimized BSS/OSS architecture, and transform your ideas into market services: focus on innovation instead of administration and be first to launch breakthrough innovations onto the market.

---

**Channels**
- CRM
- Partner Store
- Mobile App
- eShop
- Self Service
- REST API
- ...

**Omnichannel Order Management**
- Product Catalog
- Customer Order Management
- Service Catalog
- Service Order Management
- Product Inventory
- Service Inventory

Comarch Order Management - solution architecture
**SERVICE INVENTORY**

- **Bridge the gap between the network and the services**, thanks to the system’s pre-integration with Product Inventory and Network Inventory.

- **Correlate services with matching network resources** thanks to a top-down and bottom-up view of your network and services.

- **Improve customer experience** by easily calculating the impact of network-related problems on customer services and propagating alarms, as well as facilitated service monitoring and service quality management processes.

- **Gain better control over the costs** of network development and maintenance.

- **Improve the execution of service orders** regarding updates and/or termination thanks to the information about existing services.

- **Shorten time-to-market and lower costs** of delivering new services to the customer by pre-integrating with Service Catalog (service fulfillment automation).

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Comarch Service Inventory – solution overview
**NEXT GENERATION SERVICE FULFILLMENT**

- **Deliver new services based on hybrid networks** (NFV/SDN and legacy networks). New network functions can be easily on-boarded into the service catalog, and new services for customers can be created using the service and resource catalog to avoid coding and scripting. Pre-integration with BSS Product Catalog enable new products to be offered, and the “fail fast”, “beta service” concept of the OTT world to be embraced.

- **Increase the creativity of product/service managers and let them easily assemble new services**, thanks to reusing pre-defined service components – the solution is based on the TMF SID:CFS-RFS-R model, so system operators can easily define new services directly in the service catalog, without having to understand the technical aspects of the employed SOA technology. Easily incorporate partners’ services into your portfolio to pave the way for becoming a service aggregator.

- **Improve time to market for convergent offerings** (including digital and content-augmented services) regardless of the underlying technology, thanks to the ability to build services from pre-defined components managed in the service catalog.

- **Align service offerings with network capabilities** thanks to centering the service fulfillment process around integrated product & service catalogs. Achieve true customer centricity - the solution inspires a shift of the core competence from network operations to customer service innovation.

- **Increase business efficiency and cut costs**. Lower the TCO, as a result of automating the service fulfillment process. Decrease service launch and delivery costs thanks to service fulfillment automation. Quickly and easily integrate third party service components, existing legacy systems and the service infrastructure thanks to using Service Inventory as an integration hub.

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**Comarch Next Generation Service Fulfillment – solution architecture**

![Diagram of service fulfillment process]

- **Service Fulfillment**
  - CRM
  - Capture customer needs
  - Identify what technical services are required
  - Allocate resources

- **Service Assurance**
  - CRM
  - Calculate customer service impact
  - Identify impacted technical services
  - Identify faulty resources
FIELD SERVICE MANAGEMENT

- **Reduce field service costs through automation** - optimize field service costs thanks to automated task assigning and route planning.

- **Improve the quality of your field service** - specific task types and properly allocated resources allow for more efficient and standardized performance.

- **Maximize revenues and boost sales** - increase your company’s revenues by achieving a higher number of installations per day, and gaining the ability to complete the service activation process in real time. Boost sales by presenting new up-sell and cross-sell offers to customers through your field service.

- **Decrease workloads and increase productivity** - decrease dispatcher workloads with an Automated Dispatching module, and order completion reporting performed directly by service technicians. Maximize your field workforce productivity thanks to improved time and resource management.

- **Automate and improve task scheduling** - Comarch Field Service Management creates initial estimates of task duration, and records the actual time taken. The estimate is based on automatic system suggestions, depending on the task type and employee skills, availability, and location.

- **Let field technicians access the system remotely** - provide your field technicians in remote locations with the ability to log in to the system via Comarch FSM Mobile.

- **Easily execute field tasks in large territories** - simplify task execution in large territories thanks to a built-in Geographical Information System (GIS), which processes information regarding employee location, presenting both employee and task location.

- **Easily report the state of your field workforce** - create various reports related to your field services thanks to an advanced reporting module that lets you analyze employee data and tasks, through scheduled and ad hoc reporting.
Comarch FSM

Orders and Tasks
Resources
Time Management
FSM Inventory
Reporting
Automatic Dispatcher

Comarch Field Service Management - solution architecture
PROFESSIONAL SERVICES

Business Consulting - we work with your experts to optimize and automate business processes in your company and increase effectiveness in OSS and BSS areas, by eliminating redundancies and rethinking IT architectures.

BSS/OSS Transformations - end-to-end handling of even the most complex, multi-country transformations ensures simplification and standardization of processes and systems according to TMF Frameworx.

Managed Services - help you improve business process efficiency and decrease costs without compromising on process quality.

End-to-end Project Delivery - covers requirement analysis and solution design, system implementation and integration, migrating data, delivering comprehensive maintenance and support, as well as thorough training for system administrators and users.
BUSINESS CONSULTING

- **Supporting telecommunication business transformations** by optimizing processes and improving the efficiency of your overall business and IT environment specializing in: Network Planning & Design, RAN Optimization, Umbrella Configuration Management, Service Fulfillment Automation, Consolidation of Product Management and BSS/CRM.

- **Breaking down operational barriers** - increasing enterprise performance and agility, process integrity, TCO optimization and simplifying integration within IT and business domains.

- **Maximizing the business benefits of implementing Comarch software**
BSS/OSS TRANSFORMATIONS

- **Consolidate your BSS/OSS to save time and money** – benefit from an “umbrella” approach to BSS and OSS to consolidate your BSS/OSS environments and multi-country operations, optimizing network / resource management and business processes related to new technology rollouts and current market needs.

- **Optimize product and customer management** – switch towards a unified, optimized and cost-effective way of managing product portfolios and customer-related processes / data, across multiple geographical locations within your company. Simplify your product management, billing, ordering and customer service processes so that you can react fast to changing market conditions.

- **Generate new revenues from existing assets** – launch new business lines and business models, while securing your company’s independence in the value chain and ensuring monetization of existing assets such as connectivity, security, network and customer data.

- **Pave the way for the technologies of tomorrow** – leverage the capabilities of your existing BSS/OSS infrastructure to support the latest technologies, such as introducing SDN/NFV or offering M2M/IoT services.

- **Consolidate service fulfillment and operations** – shorten time to market and boost service innovation, by centralizing your order management and service fulfillment processes around a product and service catalog.

- **Benefit from a Managed Services model** – move part of the responsibility for your transformation’s success to Comarch, resulting in time and cost savings. Optimize the total cost of ownership (TCO), ensure the highest quality of your services with a set of defined KPIs, and enjoy the boost that your business receives as result.
MANAGED SERVICES

- **End to end system delivery and maintenance** – high standards of project responsibility: business KPIs/KQIs included in the contract, a single point of contact/responsibility.

- **BSS/OSS transformations** – including legacy IT environment transformations to increase business and operational agility.

- **Infrastructure outsourcing and hosting** – Comarch’s Data Center locations allows us to offer full IaaS (infrastructure as a service) solution models.

- **Seamless migration** from black box outsourcing towards fully managed processes – process logic and third party systems and solutions to support the efficient execution of defined procedures.
END-TO-END PROJECT DELIVERY

- **Initial analysis and consulting**: defining business requirements and project goals, analyzing systems and processes already in place, defining a system replacement / modification plan, designing the final picture of architecture and interfacing.

- **Proposing organizational changes**: specifying the organizational structure and enforcing it efficiently within the project, including third parties, preparing risk management procedures, designing and proofing test procedures and switch-over procedures.

- **Solution design, implementation and integration**: identification and verification of business needs, translating business needs into IT requirements, solution design, proof of concept, solution configuration, integration, first instance tests, user acceptance test, solution rollout, knowledge transfer.

- **Maintenance**: incident & problem resolution, setup and configuration of upgrades and updates, proactive monitoring of system parameters.

- **Operational support**: helpdesk service, consultancy services.

- **Technical support**: software updates and upgrades, change request design, development and delivery, benchmarking.

- **Professional training and best practice exchange**: operational courses delivered to system users, advanced configuration courses for administrators and local supervisors, courses and materials (including multimedia) for trainers.
With a modern and innovative OSS portfolio, Comarch has repeatedly demonstrated strong and reliable business partnering with Vodafone. Comarch has provided high quality COTS products, coupled with their impeccable services to implement solutions on time and within budget, adapting swiftly to new business requirements arising during and after implementation. Considering dimensions such as: time to market, quality to market; customer obsession, agility, value, innovation, Comarch is a partner that invariably ticks all of the boxes.

**Shane Gaffney,**
Director of OSS, Central Europe at Vodafone
CHAPTER II
SUCCESS
## COMARCH TELECOM CUSTOMERS

### GLOBAL TELECOM GROUPS

<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>IMPLEMENTATION SCOPE</th>
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<tbody>
<tr>
<td><strong>BASE COMPANY</strong>&lt;br&gt;BASE Company (KPN Group, Belgium)&lt;br&gt;www.basecompany.be&lt;br&gt;Business type: Mobile</td>
<td>Managed Services (OSS)</td>
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<td><strong>E-PLUS GRUPPE</strong>&lt;br&gt;E-Plus Gruppe (Now owned by Telefonica Germany)&lt;br&gt;www.eplus.de&lt;br&gt;Business type: Mobile</td>
<td>Next Generation Network Planning, Managed Services</td>
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<td><strong>Hrvatski Telekom (Croatia)</strong>&lt;br&gt;www.t.ht.hr/en/&lt;br&gt;Business type: Mobile and Fixed</td>
<td>Next Generation Service Fulfillment, Field Service Management, Network &amp; Service Inventory</td>
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<td><strong>KPN (the Netherlands)</strong>&lt;br&gt;www.kpn.com&lt;br&gt;Business type: Mobile</td>
<td>Convergent Billing, Customer Management, Corporate Self Care, Billing Mediation, Reporting Tool, Enterprise Service Bus</td>
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<tr>
<td><strong>Mobile Telesystems OJSC – MTS (Russia)</strong>&lt;br&gt;www.mts.ru&lt;br&gt;Business type: Mobile</td>
<td>Next Generation Service Assurance, Service Inventory, SLA Monitoring</td>
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<tr>
<td><strong>ngena (the Next Generation Enterprise Network Alliance)</strong>&lt;br&gt;www.ngena.net&lt;br&gt;Business type: Telecom Operator Alliance</td>
<td>CRM for Telecoms, Self-service Portals, Customer Order Management, Convergent Billing, ITSM Service Desk, Performance Management, Service Fulfillment, Service Assurance</td>
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Telefónica (Argentina, Brazil, Chile, Colombia, Peru)
www.telefonica.com
Business type: Mobile and Fixed

Telefónica Deutschland (Germany)
www.o2.de
Business type: Mobile and Fixed

Telefónica (Global)
www.telefonica.com
Business type: Mobile

Telekom Austria Group (Austria)
www.telekomautria.com/en/m2m
Business type: Mobile and M2M service provider

Telekom Deutschland, (Germany)
www.t-mobile.de
Business type: Mobile

Thales Alenia Space (France)
www.thalesaleniaspace.com
Business type: Satellite Provider

T-Mobile (Austria)
www.t-mobile.at
Business type: Mobile

T-Mobile (Poland)
www.t-mobile.pl
Business type: Mobile

T-Mobile (formerly GTS, Poland)
www.biznes.t-mobile.pl/pl
Business type: Mobile

Vodafone (Germany)
www.vodafone.de
Business type: Mobile and Fixed

Next Generation Network Planning, Network Inventory Management, Network Configuration Management, Network Auto-discovery & Reconciliation

Configuration Management, Fault Management, Performance Management, OSS Mediation, OSS Framework

Next Generation Network Planning, Next Generation Service Fulfillment

M2M Platform

Network Inventory, Service Inventory

Smart BSS

Network Inventory, Service Inventory

Self Care, Fault Management, Cloud Marketplace, Fault Management, Service Quality Management, Performance Management

Convergent Billing for Business Customers

Next Generation Service Assurance
<table>
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<tr>
<th>CUSTOMER</th>
<th>IMPLEMENTATION SCOPE</th>
</tr>
</thead>
</table>
| Belize Telemedia Limited (Belize)  
www.btl.net  
Business type: Mobile, Fixed and ISP | Convergent Billing, Customer Management, Business Process Management, Billing Mediation, Service Activation |
| DTMS - Mainz (Germany)  
www.dtms.de  
Business type: Mobile, Fixed and ISP | Convergent Billing, InterPartner Billing, Customer Management, Business Process Management, Offline Billing, Credit Control, Billing Mediation |
| Kyivstar (Ukraine)  
www.kyivstar.ua  
Business type: Mobile, Fixed, ISP | Convergent Billing, Billing Mediation, Service Activation |
| MDC – Velcom GSM (Belarus)  
www.velcom.by  
Business type: Mobile | InterPartner Billing, Billing Mediation, Service Activation |
| Netia (Poland)  
www.netia.pl  
Business type: Fixed and ISP | InterPartner Billing, Field Service Management |
| NextGenTel (Norway)  
www.nextgentel.no  
Business type: Fixed and ISP | Product Catalog, CRM, SelfCare, Next Generation Service Fulfillment, Convergent Billing, Billing Mediation |
SUCCESS

**Plus Communications (Albania)**
www.plus.al
Business type: Mobile

**Polkomtel SA (Poland)**
www.polkomtel.com.pl
Business type: Mobile

**SIA Bite (Latvia)**
www.bite.lv
Business type: Mobile

**Síminn (Iceland)**
www.siminn.is
Business type: Fixed and ISP

**UAB Bite (Lithuania)**
www.bite.lt
Business type: Mobile and ISP

**Unleashed (Medialaan Company)**
unleashed.be
Business type: Mobile

**Convergent Billing, Customer Management, Billing Mediation**

**InterPartner Billing**

**Convergent Billing, InterPartner Billing, Customer Management, Business Process Management, Billing Mediation, Self Care, Service Activation**

**Convergent Billing, Managed Services**

**Convergent Billing, InterPartner Billing, Customer Management, Business Process Management, Billing Mediation, Self Care, Service Activation**

**Smart BSS, InterPartner Billing**
<table>
<thead>
<tr>
<th>MVNE/MVNO</th>
<th>CUSTOMER</th>
<th>IMPLEMENTATION SCOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auchan Telecom (France)</td>
<td><a href="http://www.auchantelecom.fr">www.auchantelecom.fr</a></td>
<td>Convergent Billing, Customer Management, Business Process Management, Smart BSS, Dealer Care, Self Care</td>
</tr>
<tr>
<td>Turkcell Europe (Germany)</td>
<td><a href="http://www.turkcell.de/de/">www.turkcell.de/de/</a></td>
<td>Convergent Billing, Customer Management, Self Care, Billing Mediation, Application Integration Framework, Service Activation</td>
</tr>
<tr>
<td>CABLE/SATELLITE TV</td>
<td>Cable Onda (Panama)</td>
<td>Convergent Billing, InterPartner Billing, Customer Management, Business Process Management, Data Processing Server, Fraud Detection</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.cableonda.com">www.cableonda.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business type: Multiplay</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CableCom (Mexico)</td>
<td>Convergent Billing, InterPartner Billing, Billing Mediation, Fraud Detection</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.cablecom.com.mx">www.cablecom.com.mx</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business type: Multiplay</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grupo TVCable (Ecuador)</td>
<td>Convergent Billing, Customer Management, Business Process Management, InterPartner Billing, Self Care, Billing Mediation, Fraud Detection, Network Inventory, Service Activation</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.grupotvcable.com">www.grupotvcable.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business type: Multiplay</td>
<td></td>
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</table>
## Convergent Communications

### Customer

<table>
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<tr>
<th>Business Type</th>
<th>Implementation Scope</th>
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<tbody>
<tr>
<td>Voiceworks (Germany)</td>
<td>Convergent Billing, Interconnect Billing, Billing Mediation, Service Activation, CRM for Telecoms, Corporate Self Care, Network Inventory</td>
</tr>
<tr>
<td>Multimedia (Poland)</td>
<td>Convergent Billing, Customer Management, Business Process Management, Cash Desk</td>
</tr>
<tr>
<td>ORS/simpli services (Austria)</td>
<td>Convergent Billing, CRM, Self Care, Web Shop, Product Catalog, APIs, Service Activation, Trouble Ticketing</td>
</tr>
<tr>
<td>Vectra (Poland)</td>
<td>Convergent Billing, Customer Management, Product Catalog, Billing Mediation</td>
</tr>
<tr>
<td>ViaSat (USA)</td>
<td>Field Service Management</td>
</tr>
</tbody>
</table>

---

**Media Broadcast**

www.media-broadcast.com  
Business type: Multiplay

**Multimedia (Poland)**

www.multimedia.pl  
Business type: Multiplay

**ORS/simpli services (Austria)**

www.simplitv.at  
Business type: Digital Terrestrial TV

**Vectra (Poland)**

www.vectra.pl  
Business type: Multiplay

**ViaSat (USA)**

www.viasat.com  
Business type: Satellite ISP

---

### Why Comarch

- **BSS/OSS Portfolio**
  - Smart BSS
  - Convergent Billing, CRM, Self Care, Web Shop, Product Catalog, APIs, Service Activation, Trouble Ticketing
  - Convergent Billing, Customer Management, Product Catalog, Billing Mediation
  - Field Service Management

<table>
<thead>
<tr>
<th>VOIP</th>
<th>CUSTOMER</th>
<th>IMPLEMENTATION SCOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fring (Israel)</td>
<td>Smart BSS</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.fring.com">www.fring.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business type: Mobile, VoIP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TELEGROSIK – Galena (Poland)</td>
<td>Smart BSS</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.telegrosik.pl">www.telegrosik.pl</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business type: VoIP</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>ISP</th>
<th>CUSTOMER</th>
<th>IMPLEMENTATION SCOPE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>NASK (Poland)</td>
<td>Convergent Billing, Self Care</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.nask.pl">www.nask.pl</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business type: ISP</td>
<td></td>
</tr>
</tbody>
</table>
We have been working together with Comarch for many months in order to finalize the new partnership. What we really appreciate is the company’s flexibility in meeting our needs, and strong ability to execute projects professionally. The implementation of Managed Services will enable us to achieve a major OPEX reduction and, as a consequence, will impact positively on our financial results. While focusing on increasing the effectiveness of the company, we decided to transfer out the time-consuming and routine activities related to the area of IT.

**Eric Figueras,**  
Vice President and CTO at Síminn
CHAPTER III

WHY COMARCH
**COMARCH IN NUMBERS**

<table>
<thead>
<tr>
<th>Founding year</th>
<th>1993</th>
<th><strong>OVER</strong></th>
<th>5500</th>
<th><strong>employees</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Comarch onset</td>
<td>1991</td>
<td><strong>thousands</strong></td>
<td>of successfully completed projects on</td>
<td></td>
</tr>
<tr>
<td><strong>recognized by</strong></td>
<td>Gartner, Forrester Research, IDC and more</td>
<td><strong>6</strong> Continents in about <strong>60</strong> Countries</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>publicly traded</strong></td>
<td>on WARSAW STOCK EXCHANGE since 1999</td>
<td><strong>500 mln USD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>added value 82%</strong></td>
<td>Comarch is a software house which sells own software products to large corporations along with implementation and managed services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>subsidiaries</strong></td>
<td>54</td>
<td><strong>headquarters</strong></td>
<td>KRAKÓW, POLAND</td>
<td></td>
</tr>
</tbody>
</table>
ORGANIZATIONAL STRUCTURE

DIVISIONS

prof. Janusz Filipiak
Founder and CEO of Comarch SA
Strategy, HR, Marketing

Konrad Tarański
Finance, Administration and Internal IT Systems, CFO, Vice-President of the Management Board

Marcin Dąbrowski
Vice-President of the Management Board, Director of TELECOMMUNICATIONS DIVISION

Paweł Prokop
Vice-President of the Management Board, Director of PUBLIC SECTOR DIVISION

Andrzej Przewięźlikowski
Vice-President of the Management Board, Director of FINANCIAL SERVICES DIVISION

Zbigniew Rymarczyk
Vice-President of the Management Board, Director of ERP DIVISION

Marcin Warwas
Vice-President of the Management Board, Director of SERVICES DIVISION

Piotr Piątosa
Director of COMARCH HEALTHCARE DIVISION
CUSTOMERS & OFFICES WORLDWIDE

**EUROPE**
- **Poland**
- **Albania**
- **Austria**
  - Innsbruck, Vienna
- **Belgium**
  - Brussels
- **Finland**
  - Espoo
- **France**
  - Montbonnot Saint Martin, Lille
- **Germany**
  - Berlin, Bremen, Dresden, Düsseldorf, Hamburg, Hannover, Munich, Münster
- **Italy**
  - Milan
- **Luxembourg**
  - Strassen
- **Russia**
  - Moscow
- **Spain**
  - Madrid, Malaga
- **Sweden**
  - Stockholm
- **Switzerland**
  - Arbon, Lucerne
- **UK**
  - London
- **Ukraine**
  - Kiev, Lviv

**MIDDLE EAST**
- **Saudi Arabia**
  - Riyadh
- **United Arab Emirates**
  - Dubai

**NORTH AMERICA**
- **Mexico**
  - Mexico City
- **Canada**
  - Saint John, Montreal, Toronto
- **USA**
  - Atlanta, New York, Rosemont, Chicago, Columbus, Tyrone

**SOUTH AMERICA**
- **Argentina**
  - Buenos Aires
- **Brazil**
  - São Paulo
- **Chile**
  - Santiago
- **Colombia**
  - Bogota
- **Panama**
  - Panama City
- **Peru**
  - Lima

**ASIA**
- **China**
  - Shanghai
- **Japan**
  - Tokyo
- **Malaysia**
  - Kuala Lumpur
- **Singapore**
  - Singapore
- **Thailand**
  - Bangkok

**SUBSIDIARIES**
- **54**

**CITIES**
- **62**

**COUNTRIES**
- **91**

**CONTINENTS**
- **6**
### CUSTOMERS IN ALL MAJOR INDUSTRIES

#### SERVING GLOBAL BRANDS IN ALL MAJOR INDUSTRIES

<table>
<thead>
<tr>
<th>TELECOMMUNICATION</th>
<th>FINANCIAL SERVICES</th>
<th>FMCG</th>
<th>RETAIL</th>
<th>TRAVEL</th>
<th>OIL &amp; GAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>vodafone</td>
<td>ING</td>
<td>HEINEKEN</td>
<td>TESCO</td>
<td>jetBlue</td>
<td>OMV</td>
</tr>
<tr>
<td>Telefonica</td>
<td>UniCredit</td>
<td>DANONE</td>
<td>Carrefour</td>
<td>Heathrow</td>
<td>OMV</td>
</tr>
<tr>
<td>T</td>
<td>LINK4</td>
<td>Carlsberg</td>
<td>METRO</td>
<td>enterprise</td>
<td>OKKO</td>
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<tr>
<td>orange</td>
<td>Allianz</td>
<td>Red Bull</td>
<td>Auchan</td>
<td>Azul</td>
<td>STATOIL</td>
</tr>
<tr>
<td>kpn</td>
<td>UNIQA</td>
<td>Coca-Cola</td>
<td>JERÓNIMO MARTINS</td>
<td>ST AIRLINES</td>
<td>MAPCO</td>
</tr>
</tbody>
</table>

WHY COMARCH

SUCCESS

BSS/OSS PORTFOLIO

WHY COMARCH
VALUE PROPOSITION

FLEXIBLE, CONFIGURABLE SOLUTIONS

Complete BSS/OSS portfolio with feature-rich, out-of-the-box functionalities, templates and models – manage all crucial processes in your company from network resources to the customer.

Flexibility of IT solutions – easily customize and configure your system according to your company’s needs.

CUSTOMER-CENTRIC APPROACH

Customer centricity – enjoy a tailored approach throughout the project and shape the solution together with our architects.

Standards-based products with common architectural constructs, easy integration with legacy systems – build future-proof IT architectures for your company.

COST-EFFICIENT BSS/OSS TRANSFORMATIONS

Managed B/OSS Service and SaaS/PaaS options (own Data Center)

Agile organization – easily access the relevant experts from each domain and benefit from short decision-making paths.

Unified experience for managing new multi-tenant online services – benefit from the opportunities of the digital era.
Comarch’s products have been recognized and positively evaluated in the following reports by analyst companies:

<table>
<thead>
<tr>
<th>ANALYST</th>
<th>REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gartner</td>
<td>Critical Capabilities for Field Service Management, 2018</td>
</tr>
<tr>
<td>Gartner</td>
<td>Magic Quadrant for Operations Support Systems, 2017</td>
</tr>
<tr>
<td>Gartner</td>
<td>Magic Quadrant for Integrated Revenue and Customer Management (IRCM), 2017</td>
</tr>
<tr>
<td>Gartner</td>
<td>Magic Quadrant for Integrated Revenue and Customer Management (IRCM), 2016</td>
</tr>
<tr>
<td>Gartner</td>
<td>Global BSS, OSS, Enhanced and Enterprise Initiatives, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>Update Hype Cycle for Communications Service Provider Operations, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>Hype Cycle for Communications Service Provider Digital Services Enablement, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>Assuring Services in the Virtual Network, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>Global CSP Billing Part 4b: Rating &amp; Charging and Other Core Billing Market Share Analysis, Forecast, and Global Supplier Assessment, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>European M2M Outlook, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>Competitive Landscape: Cross-Channel, Centralized, Catalog-Driven CRM, Order Management and Service Fulfillment for CSPs, Worldwide, 2014</td>
</tr>
<tr>
<td>Gartner</td>
<td>Magic Quadrant for Integrated Revenue and Customer Management (IRCM), 2013</td>
</tr>
</tbody>
</table>
**Gartner**

- [www.gartner.com](http://www.gartner.com)
- A Roundup of Future-Focused Research Into CSPs’ Customer Experience, 2012
- Hype Cycle for Communications Service Provider Operations, 2012
- Competitive Landscape report: M2M Platform and Software Providers for CSPs, 2012

**Frost & Sullivan**

- [www.frost.com](http://www.frost.com)
- Latin American Telecommunications Network Solutions and Services, 2016
- Re-inventing Network Inventory for the Virtual Age, 2015
- Assuring Services in the Virtual Network, 2014
- Assuring Services in the Virtual Network, 2014
- Global CSP Billing Part 4b: Rating & Charging and Other Core Billing Market Share Analysis, Forecast, and Global Supplier Assessment, 2014
- European M2M Outlook, 2014
- Western European Mobile Communications Outlook 2011, 2012
- Analysis of the Global Customer Experience Monitoring Market, 2012
Analysys Mason
www.analysysmason.com

- SCN vendor tracker, 2016 (a list of vendors of NFV and SDN solutions)
- Service fulfilment systems: worldwide market shares, 2014
- Service fulfilment systems: worldwide market shares 2012, 2013
- M2M management software: supplier and product review, 2012
- Customer care systems: worldwide market shares 2011, 2012
- Revenue management systems: worldwide market shares 2011, 2012
ABOUT COMARCH

Since 1993, Comarch’s specialist telco solutions business unit has worked with some of the biggest telecoms companies in the world to transform their business operations. Our industry-recognised telco OSS and BSS solutions help telecoms companies streamline their business processes and simplify their systems to increase business efficiency and revenue, as well as to improve the customer experience and help telcos bring innovative services to market. Comarch’s telco solutions customers include Telefónica, Deutsche Telekom, Vodafone, KPN and Orange.

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telco-enquiries@comarch.com | telecoms.comarch.com