COMPLETE PORTFOLIO OF IT SOLUTIONS AND SERVICES FOR TELECOMMUNICATIONS
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 6000 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 numerous satisfied telecom customers worldwide, both long-established and new, 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, and managing, as well as managing new areas of business such as M2M, AI, 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 telecom companies worldwide.

Choose Comarch to be your partner in the digital era. Let’s shape the world of communications together.
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SUCCESS

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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.
BSS/OSS PORTFOLIO

CHAPTER I
IOT CONNECT

IOT SOLUTION MANAGEMENT
Comarch IoT Solution Management helps businesses function in today’s IT world. It includes comprehensive support for selling, storing and managing IoT connectivity services, devices and applications.

IOT CONNECTIVITY MANAGEMENT
Comarch IoT Connectivity Management enables mobile operators and IoT service providers to provide managed connectivity in multi-national, multi-level and multi-operator environments.

IOT ANALYTICS PLATFORM
The 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.

IOT BILLING
Comarch’s IoT Billing solution is tailored to the needs of your IoT operations, letting you charge for connectivity, devices, vertical applications and bundled services. Supports B2B, B2B2C and B2B2B.
IOT SOLUTION MANAGEMENT

- **Manage comprehensive sales catalog**
  Create IoT solutions to connect devices and applications, import models and device types, and create offers to meet the needs of businesses and their customers.

- **Store inventory of various types of IoT devices**
  Manage, deliver and monitor all physical devices, from simple nodes and complex sensors to multimode intelligent IoT gateways, using this Comarch solution.

- **Use device and vertical-specific pricing**
  Adapt your pricing model to any vertical, charge for device counters, define device lending/selling models, and set connectivity pricing in the background.

- **Control contract management**
  Complete the quote lifecycle with a contract that can be sent to customers and stored in the system. Amend the contract if required, and generate and manage voucher codes.

- **Open your ecosystem to the IoT**
  Use IoT Portal and IoT Marketplace to expose IoT Services to your customers and partners, sell IoT solutions and enable vertical applications with single sign-on feature.

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**IoT Solution Management Architecture**

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**Existing Systems**

- Sales CRM
- Device Management
- Inventory
- Billing
- Financial Systems
IOT CONNECTIVITY MANAGEMENT

- **Ensure M2M/IoT connectivity**
  Handle selling, quoting and contracting, and manage all service types and SIMs.

- **Get a scalable solution**
  Upgrade as your business grows. Handle any service, transaction and pricing model.

- **Increase efficiency**
  Receive live notifications on data-use browsing, reports, diagnostics and bulk operations via multi-language self-care.

- **Monitor costs**
  Integrate with your existing environment to facilitate automatic KPI/cost data processing.

- **Implement new billing strategy**
  Enable SIM, app and device-based catalog and billing, and billing on behalf.

- **Shorten time to market**
  Use bulk operations to deliver services with automated provisioning and order management.

- **Control IoT equipment and service**
  Trigger actions automatically and deliver bandwidth and QoS-controlled services.

- **Be a real-time provider**
  Collect all billing and usage data instantly, and bulk-manage M2M SIMs.

- **Communicate more efficiently**
  Build personalized, flexible offers and tariffs combining bundles in pre and post-paid mode.

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IoT Connectivity Management Architecture
IOT ANALYTICS PLATFORM

- **Measure business value with intelligent big data processing**
  Gather, process and combine real-time and historical data to see the services your customers use, so you can measure the value of your IoT business.

- **Improve your IoT services through analytics**
  Combine M2M analytics data with information from BSS/OSS and vertical applications to build a complete view of the service and understand how to tailor it to your customers’ needs.

- **Achieve operational excellence**
  Analyze how services are being used, track device performance and visualize equipment movement, to improve services, reduce inefficient usage and propose service changes to meet customer needs.

- **Offer highest quality of service with various-level SLAs**
  Manage different SLA levels in your IoT operations to deliver on QoS. Discover patterns and trends, see device issues, and report and analyze anomalies with user dashboards.

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**IoT Analytics Platform Architecture**

![Diagram showing the architecture of the IoT Analytics Platform](image-url)
IOT BILLING

- **Bundle IoT services with different pricing models**
  Create bundled services with CSPs, device providers, third parties and resellers, using value-based, criteria-based and device-based models.

- **Offer high-quality IoT service billing**
  Enhance user experience with swift and efficient invoicing, and 24-hour support across entire bill runs. Implement reporting, automated alerts and notifications.

- **Deliver IoT services to verticals**
  Create and tailor services for specific verticals and organizations, charging intelligently for the use of the IoT service and not only for data/SMS volume.

- **Control money flows**
  Use up to date, automatically generated financial documents within multi-party IoT services. Control full service delivery and browse financial reports, invoices and settlements.

- **Be future-proof with real-time processing**
  Gather and process data from a network, IoT devices, applications and other sources in real time. Charge mixed, pre or post-paid to deliver value to any vertical.
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 touchpoints. 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 sizeable 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
5G NETWORK OPERATIONS

ZERO-TOUCH NETWORK PROVISIONING
A solution to IoT and 5G demands for rapid, automatic implementation of telecom network elements. Comarch Zero-touch Network Provisioning allows devices to be connected, updated, pre-configured and updated.

REAL-TIME OSS – SDN/NFV ORCHESTRATION
The Comarch solution is a platform for provisioning and managing services over VNFs, PNFs and SDN-controlled networks, facilitating comprehensive orchestration of complex multi-domain topologies.

SELF-ORGANIZING NETWORK
Integrating easily with the existing OSS environment, this solution enables network automation for RAN optimization, reducing OPEX, shortening time to market, and improving customer experience.

SERVICE & RESOURCE ORCHESTRATION
Helps CSPs transform service and network management using automation. Assures orchestration of a domain-specific orchestrator, so each domain provides sub-services needed to deliver customer service.
ZERO-TOUCH NETWORK PROVISIONING

- **Reduce cost of device implementation**
  Configure devices without intervention by a technician. This can reduce costs of device implementation, after which initial configuration, software updates and script execution can be done automatically.

- **Deliver services rapidly**
  Install, then let devices connect to the network, self-configure and activate necessary services, reducing the time needed for service implementation.

- **Fully automate processes**
  Automate the “plan, build, run” process thanks to API integration with resource and process management. Devices can also establish secure connections with other systems using NETCONF and/or RESTCONT.

- **Take a catalog-driven approach**
  Create a library of configuration scripts which can be retrieved and implemented easily per use case, vendor and machine language to achieve significant cost reductions.
REAL-TIME OSS – SDN/NFV ORCHESTRATION

- **Make your network context-aware**
  Customize your network by varying the level of performance across services, locations, applications or users.

- **Deploy services rapidly**
  Be the first one to the market by using NFV to make your applications available faster, and then take advantage of SDN to adjust traffic flow and bandwidth to best suit your service.

- **Virtualize for security**
  Introduce virtual networks to your company and provide the basis for micro segmentation as a security strategy in your data centers.

- **Introduce flexible service pricing**
  Attract more clients by offering pricing models based on software and license usage.
SELF-ORGANIZING NETWORK

- **Provide a customer-centric network**
  Leverage SON algorithms to manage RANs. Self-healing modules minimize the impact of network failures, and self-optimization algorithms change configuration automatically to raise service quality.

- **Increase return on infrastructure investments**
  Use self-optimization algorithms to let the solution automatically change network configuration to optimize resources. This will allow the MNO to better utilize assets and increase return on investment.

- **Lower the cost of RAN management**
  Automate operational activities to keep down management costs as the RAN network expands, by shifting expert focus from daily operations to strategic, high yield projects.

- **Reduce time to market for network projects**
  Leverage the algorithms provided by SON for self-configuration to automate deployment of new network resources and automate services. This allows faster deployment and reduces provisioning errors.

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**SON SOLUTION**

- **Presentation Layer**
  - Tasks & Actions
  - CM Views
  - Network Views
  - SON Configuration
  - KPI View
  - SON Status

- **SON**
  - CM Module
  - CM Adapter
  - Generic & VS Datamodel
  - Actions
  - Algorithms
  - Tasks
  - Filter
  - OSS Data
  - OSS API

- **Mediation Platform**
  - Configuration Management
  - Performance Management
  - Call Trace

---

Self-organizing Network
SERVICE & RESOURCE ORCHESTRATION

- **Shorten time from idea to execution**
  Implement plans rapidly, thanks to service and network rollout and upgrades, and orchestrated assurance.

- **Achieve customer focus**
  Go customer-centric thanks to service and resource orchestration and alignment.

- **Transition smoothly**
  Separate design and execution for smoother transition to automated orchestration.

- **Assure customer experience**
  Benefit from comprehensive network/service view delivering proactive automation, self-healing and auto-scaling.

- **Avoid silos**
  Coordinate VNF and SDN controller orchestration for intelligent customer services, to avoid silos.

- **Automate virtual and legacy networks**
  Unlock the potential of orchestration across a hybrid network, with orders delegated to legacy and virtual domains.

- **Achieve full multi-domain orchestration**
  Orchestrate domain-specific controllers and management systems to achieve customer value.

- **Take a microservices approach**
  Get holistic network view thanks to comprehensive modular approach. Integrates with third-party products.
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 and innovation, Comarch is a partner that invariably ticks all of the boxes.

Shane Gaffney
DIRECTOR OF OSS, CENTRAL EUROPE AT VODAFONE
INTELLIGENT ASSURANCE & ANALYTICS

CUSTOMER EXPERIENCE MANAGEMENT
Links service monitoring and quality management, providing an insight into customers' perceptions of services to help network providers switch from network-centric operations to customer-focused ones.

OSS SERVICE DESK
A comprehensive solution supporting engineers working in operations centers and handling situations with the potential to impact subscribers and, subsequently, the company’s revenue stream.

INTEGRATED ASSURANCE
With embedded support for full assurance processes, this solution manages digital services based on complex value chains, and aggregates information from partner systems and converged networks.

BSS/OSS DATA ANALYTICS
With its big data analytics for telecom operators, the solution processes data from the network in real time, combines this information with that from external systems, and aggregates it.
CUSTOMER EXPERIENCE MANAGEMENT

- **Improve efficiency and protect revenues**
  Obtain the information and drill-down capabilities to speed up troubleshooting and decrease mean time to repair. Use built-in self-healing capabilities, prioritize your incidents and solve problems quickly.

- **Personalize your offers**
  Understand telecom customer behavior and be proactive in providing your clients with offers that are tailored to their needs. Personalization improves customer satisfaction, increases loyalty and decreases churn rate.

- **Improve customer satisfaction**
  Measure your customers’ quality of experience and optimize service performance in line with what they expect. Identify and eliminate problems perceived by your customers increase satisfaction and reduce churn.

- **Develop your business**
  Use the solution to identify new potential revenue streams and leverage big data capabilities to launch new products, build partnerships or provide new services, helping your business expand in size and value.

CEM Use Cases

<table>
<thead>
<tr>
<th>&quot;CORE&quot; CEM Use Cases</th>
<th>SQM Use Case</th>
<th>Analytical Use Cases</th>
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<td>Affected Clients Service Monitoring</td>
<td>Non Real-Time Analytics</td>
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<td>Mobile &amp; Fixed Service Performance</td>
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<td>Device Performance</td>
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<td>Corporate Monitoring</td>
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<tr>
<td>Roaming Monitoring</td>
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- Annoyed customers hot-spots
- User location profiling
- CEI
- 4-Play experience
- Silent calls & call drops
- Indoor problems
- Mobile traffic detection
- Traffic routes
- Transport analytics
- Browsing performance

Examples:
- Annoyed customers hot-spots
- User location profiling
- CEI
- 4-Play experience
- Silent calls & call drops
- Indoor problems
- Mobile traffic detection
- Traffic routes
- Transport analytics
- Browsing performance

Examples:
- Annoyed customers hot-spots
- Annoyed customers hot-spots
OSS SERVICE DESK

- **Automate your assurance processes**
  Perform a centralized and unified set of actions triggered by correlation rules using information from a comprehensive set of sources, and reduce by up to 90% the number of tickets that need to be processed manually.

- **Improve your operational efficiency**
  Reap the rewards of implementing a solution that provides ultimate automation of root-cause and impact analysis via a flexible correlation engine and the implementation of robust unique checklist mechanisms.

- **Integrate your trouble tickets with intelligent event processing**
  Embed network or customer trouble tickets into the comprehensive procedure of processing events arising from different sources, giving you an overview of all ticket information.

- **Accumulate your organizational knowledge**
  Embed your operational team’s knowledge into the system, in a formalized manner which can be shared and used by machine learning algorithms to increase operational efficiency.
INTEGRATED ASSURANCE

● Take the first step towards zero-touch management
Utilize the comprehensive end to end assurance data that you gather to automate root-cause and impact analysis using information from different domains.

● Decrease costs of maintenance
Automate your business processes with efficient and comprehensive event processing that takes into account all aspects of the resource, service and customer perspectives.

● Introduce the BizDevOps paradigm to your organization
Gather and use the experience, knowledge and expertise of your engineers in the most effective manner to grow your telecommunications business.

● Break silos and go cloud-native with open APIs
Implement network and service convergence, and integrate the solution with your environment via open API, or enhance it with other Comarch products.
BSS/OSS DATA ANALYTICS

- **Make your data work for you**
  Integrate and manage all external, heterogeneous systems and new services through the ESB-based platform. Doing this has no negative impact on those which are already running.

- **Generate new revenue streams**
  Personalize parameters and communicate with business partners through a secure channel, sort your data (usage, billing etc.), and define service and data access for each business partner.

- **Improve your operational efficiency**
  Set the data update frequency and define the file formats and other parameters to adapt your operations to business requirements in a manner that will improve your efficiency.

- **Raise the level of customer satisfaction**
  Use the automated B2B Gateway to facilitate fast, efficient and reliable web service access to all of the specific functionalities built in to the underlying BSS platform.

Comarch Data Analytics – Selected Use Cases
I am confident that Comarch solutions will enable MTS to accomplish the transition from a network-centric towards a customer-centric OSS ecosystem, with the ultimate goal of creating the best customer experience.

Andrey Ushatsky
VICE-PRESIDENT AND CHIEF TECHNOLOGY OFFICER, MTS
RESOURCE MANAGEMENT

NETWORK PLANNING & DESIGN
Enables CSPs to manage telecom network planning, design and optimization processes comprehensively and efficiently, and to future-proof operations to ensure ongoing customer satisfaction.

NETWORK AUTO-DISCOVERY & RECONCILIATION
Provides live, comprehensive insight into a multi-vendor, multi-domain network, enabling effective network management and supporting reconciliation of RAN, transport, core, access and IT domains.

NETWORK CONFIGURATION MANAGEMENT
Comarch Network Configuration Management enables service providers to automate network provisioning in the radio access network, transmission, core and access domains.

NETWORK CONSOLIDATION FOR M&A
Comarch Network Consolidation for M&A helps telecoms companies organize and streamline network planning and consolidation processes efficiently in merger and acquisition (M&A) projects.

REAL-TIME NETWORK INVENTORY MANAGEMENT
Stores information about physical, logical and virtual network resources in a shared, central inventory facilitating network resource catalog management for multi-vendor, multi-domain networks.
NETWORK PLANNING & DESIGN

- **Increase agility**
  Implement business process management and automated task distribution using process flows and rules to increase agility.

- **Get end to end network view**
  Get accurate and detailed network view showing logical, virtual and physical resources at a glance.

- **Implement umbrella OSS**
  Benefit from pre-integration with SDN/NFV framework for inventory, planning, configuration and assurance.

- **Innovate and evolve**
  Let new and legacy architectures operate together, giving technicians advanced network management tools.

- **Ensure integrated assurance**
  Synchronize data and alarms with SQM/CEM to enable SON integration and quality-driven optimization.

- **Lower OPEX**
  Integrate tools into one ecosystem featuring automated synchronization mechanisms.

- **Lower CAPEX**
  Improve coordination of co-dependent network-related processes for CAPEX optimization.

- **Decrease time to market**
  Monitor efficiency using unified project procedures and configurable reports, and reduce time to market.
NETWORK AUTO-DISCOVERY & RECONCILIATION

- **Comprehensive, live network view**
  Provides up to date insight into the multi-vendor, multi-domain network leveraging Comarch Mediation Layer.

- **Automation**
  Automates the discovery and resolution of discrepancies between inventory data and the real network, with rule definition for complex scenarios.

- **Reduced time to market**
  Shortens upgrade and optimization cycles by providing almost immediate configuration update feedback from the network.

- **Simple provisioning process**
  Pre-integration with Comarch OSS Process Management allowing manual intervention when required.

- **Improved customer experience**
  Can be pre-integrated with Comarch NGNP to implement the plan, upgrade, verify, re-plan process to shorten the time needed to provide good customer experience.

- **Umbrella configuration management integrated with SON**
  Automatically recognizes and resolves conflicts between plans, eliminating network provisioning errors.

- **Reduced costs**
  Allows legacy systems to be decommissioned and migrated into Comarch OSS Suite.
NETWORK CONFIGURATION MANAGEMENT

- **Facilitate multi-vendor and multi-domain configuration**
  Enable multi-vendor, multi-domain network configuration with mobile and fixed network support.

- **Simplify provisioning**
  Hide the complexity of vendor-specific network configuration management and automate network planning to vendor-specific reconfiguration.

- **Improve customer experience**
  Choose pre-integration with Comarch Network Planning & Design to implement the plan, upgrade, verify, re-plan process to shorten the time needed to provide good customer experience.

- **Make yourself future-proof**
  Ensure extendibility for future network technologies thanks to flexible and template-based design.

- **Facilitate umbrella configuration management – integrated with SON**
  Eliminate network provisioning errors, with automatic recognition and resolution of conflicts between plans.

- **Reduce costs**
  Decommission and migrate legacy systems into Comarch OSS Suite, to make cost savings.

- **Integrate configuration management with SDN**
  Get support for configuration of a standard IP network and integration with SDN controller.
REAL-TIME NETWORK INVENTORY MANAGEMENT

- **Get a comprehensive network view**
  See equipment and connections in several layers, both technology-specific and generic, for a consistent view of the network.

- **Reduce network operating cost**
  Increase business efficiency and decrease operational costs with a single, consistent view of the network.

- **Improve resource utilization**
  Use existing resources efficiently, and plan new ones which are profitable from the business perspective.

- **Assure efficiency**
  Get network assurance system support with topological correlations for recognizing and troubleshooting the root cause of failures.

- **Integrate in umbrella OSS**
  Reduce operational costs and raise processing efficiency, with a solution that provides data for all other modules.

- **Innovate**
  Create umbrella OSS for new virtual and legacy architectures, thanks to integration with the SDN/NFV framework for inventory, planning, configuration and assurance.
NETWORK CONSOLIDATION FOR M&A

- **Plan network before gaining M&A approval**
  Let Comarch migrate and operate on data from both sides of the M&A process, isolating sensitive data until the merger is approved.

- **Customize network planning workflows**
  Easily configure business processes for orchestrating the target network planning workflow.

- **Get consistent view of network planning processes**
  Browse radio and transport activity, see the network from a geographic perspective and measure progress and consolidation outcomes with configurable KPIs.

- **Synchronize with other OSS tools**
  Synchronize all M&A activities managed within the solution with legacy OSS tools, thanks to a built-in mediation module.

- **Plan any network in any technology**
  Get support for all radio technologies (2G/3G/4G) together with market-used logical and physical transport layers.

- **Easily extend to other Comarch OSS modules**
  Add capabilities from Comarch OSS Suite as your requirements change.

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Comarch Acting as a Trusted Third Party in a Network Consolidation Process
SERVICE DESIGN & FULFILLMENT

SERVICE FULFILLMENT & ORCHESTRATION
A catalog-driven solution designed to reduce time to market and automate service fulfillment for customer service delivery on top of a hybrid network. Enables seamless orchestration of virtual and physical network functions and services.

FIELD SERVICE MANAGEMENT
A solution supporting service order placement, scheduling, technician assignment, route optimization, equipment allocation and management of service level agreements and reports, to reduce operating costs and improve customer experience.

SERVICE INVENTORY
End to end management of network and related products from the service perspective. Integrates with other Comarch modules to facilitate a comprehensive network, service and product view, simplifying management of all these aspects.
SERVICE FULFILLMENT & ORCHESTRATION

- **Deliver services based on hybrid networks**
  Benefit from SDN/NFV technology combined with a legacy network to deliver new services and embrace the ‘fail fast’ concept.

- **Use VNFs as components for service creation**
  Automate on-boarding and adaptation of VNFs and network services, then use them to model customer services via the service catalog module.

- **Increase creativity**
  Define new services without needing in-depth technical or scripting knowledge. Accelerate service creation and flexibility, and incorporate partners’ services.

- **Improve time to market**
  Launch and deliver offers by building services from pre-defined components managed in the service catalog.

- **Align service offers with network capabilities**
  Focus on integrated product & service catalogs to deliver a true customer-centric offer.

- **Increase efficiency and cut costs**
  Cut the costs of service launch, delivery and provisioning, and unlock the capability to integrate third-party services.
FIELD SERVICE MANAGEMENT

- **Optimize costs**
  Benefit from well-informed task assigning and route planning.

- **Cut level of paper and phone usage**
  Ensure mobile access for technicians in remote locations.

- **Reduce dispatcher workload**
  Free up resources with Automatic Dispatcher module and order completion reporting performed directly by service technicians.

- **Maximize workforce productivity**
  See the benefits of improved time and resource management.

- **Limit number of unsuccessful truck rolls**
  Ensure technicians have access to all required data in the FSM Mobile.

- **Increase revenue**
  Carry out a higher number of installations per day, and complete the service activation process in real time.

- **Boost sales**
  Let field service operatives implement up-sell and cross-sell offers to customers.

- **Raise level of customer satisfaction**
  Keep clients happy with greater service efficiency.

**FIELD SERVICE MANAGEMENT FEATURES**

- Effective Planning and Scheduling
- Field Service Empowerment
- Third-party Workforce Management
- Site Access Management
- Mobile Workforce Management
- Corrective, Preventive and Predictive Maintenance
- Data Integration, Reporting and Forecasting
- Customer Service
SERVICE INVENTORY

- Get comprehensive network view
  See resources required for services, and identify the services supported by a given network element.

- Connect networks and services
  Eliminate the gap between business/customer-centric views and technical infrastructure to control development and maintenance costs.

- Save time, cut costs
  Ensure faster, less expensive new service delivery and service fulfillment automation.

- Improve customer experience
  Improve service monitoring and quality management to raise the level of customer experience.

- Drive automation
  Store information about new services, and view details of existing ones to enable the execution of service orders.

- Enhance quality management
  Calculate the impact of network-related problems on customer services, and enable alarm propagation and KPI/KQI monitoring for quality management processes.

- Optimize network planning
  Get information about network resource service utilization for network planning and upgrading processes.
ENHANCING DIGITAL CUSTOMER JOURNEYS

DIGITAL SALES AND CUSTOMER CARE
Manage comprehensive traditional telco and digital service offers, letting customers browse and compare services, check availability, manage carts and check out. Provide full, actionable overview of accounts and access to self-care or direct support.

REAL-TIME DATA CONTROL & PRESENTATION
Calculate service charges, improving customer experience with clear, real-time views of bundle consumption, data use, balances and limits. Facilitates reporting with 360-degree customer views, analytical actions, recommendations and personalization.
DIGITAL SALES AND CUSTOMER CARE

- **Get 360-degree customer view**
  Use current and past cost control, digital invoicing and integration with payment providers.

- **Go omnichannel**
  Pick processes most beneficial to your business and place them in your preferred channels, to create customized customer journeys via omnichannel process management.

- **Take advantage of contextualized help**
  Benefit from help engine with chat, chatbots, call center, and spectator mode.

- **Adopt intuitive digital services and a mobile first approach**
  Manage your catalog services, including advanced marketing tools, in few simple steps.
REAL-TIME DATA CONTROL & PRESENTATION

- **Simplify real-time usage and cost control view**
  Get full view of current usage, consumption, and financial data across all channels. Converged charging with unified rating and balance management.

- **Ensure 3GPP compliance**
  Ensure all your networks and devices are in line with the standards of the top seven standard development organizations, covering cellular telecommunications, radio access, transport network and service capabilities.

- **Be 5G ready**
  Benefit from support for all fixed and mobile networks, and all communication protocols.

- **Enhance scalability and openness**
  Scale up smoothly as your business grows, and take advantage of smooth integration with other Comarch and third-party systems.
Considering the comprehensiveness of the solution and its complexity, as well as our ambitious timeframes, we were looking for an experienced and reliable BSS/OSS provider. Comarch has cooperated with various large telco operators, including the Deutsche Telekom group, on various projects over the past 10 years, and the trust established there was an important factor behind choosing them to be a partner in this strategically important project. Comarch has demonstrated an understanding of our demands and we engaged in truly collaborative solution development. Their dynamic approach and their ability to listen to our technical and business needs, as well as to adjust the development to best support our goals, convinces us we made the right decision.

Dr. Marcus Hacke
FOUNDER & MANAGING DIRECTOR, ngena GmbH
DIGITIZING ENTERPRISE CUSTOMERS

ENTEPRISE BILLING, CHARGING & REVENUE MANAGEMENT
Aids even complex corporate billing management, with real-time cost control based on customizable rules, and single invoice creation for all mobile, fixed, hosting and IoT services with multi-branch, multi-department and third-party support.

B2B SELF-ENABLEMENT PLATFORM
Provide mobile and fixed voice, data and VPN services that can be bundled with other solutions. Shows all relevant data, making even complex hierarchies manageable. Full omnichannel support ensures consistent customer experience.

B2B SALES & ORDERING
This proven solution provides a full lead to cash experience within a single package. It ensures accurate, automatic and near-instant quotes which, thanks to the product catalog-driven mechanism, become agreements seamlessly upon approval.
Unify invoicing and hub billing
Aggregate data from numerous billing solutions to generate a single invoice.

Get support for complex company hierarchy
Implement multi-branch and multi-department support functionalities.

Introduce trial invoicing
Take advantage of opportunity to review invoices prior to approval.

Benefit from digital invoicing with online data access
Get online access to invoices with drill-down analysis possibilities to a single event.

Implement split billing
Split charges between numerous third parties.
B2B SELF-ENABLEMENT PLATFORM

- **Support customer-manageable complex hierarchies and multiple roles**
  Carry out split billing (for instance, sharing costs between employees and employers). Combine with flexible rules and dashboards for real-time cost control of subscriptions.

- **Implement advanced reporting**
  Guarantee accurate information for business needs with advanced business intelligence solution, numerous pre-configured dashboards and ad hoc reports.

- **Take a model-driven approach**
  Make it easier to introduce new products and services, re-use and bundle, experiment and navigate business to where the market requires.

- **Go omnichannel**
  Ensure unified, 360-degree view and management possibilities for subscriptions, orders, cases and financial information in traditional and modern digital channels.
B2B SALES & ORDERING

- **Unify sales processes**
  Let a single solution handle entire lead to cash process, using the same entities, continuously enriched as the customer and order capture process progresses.

- **Drive quoting and ordering with product catalog**
  Guarantee bid prices, with quoting and ordering that use the same offers in a model-driven approach enabling re-usability and innovation, and simplifying multi-tenant quotes and orders.

- **Personalize offers and customize pricing**
  Address the needs of VIP customers, especially those in the public sector, who demand offer conditions cut precisely to their requirements. The system also provides tools preventing fraud, including approval processes and customization rules.

- **Manage enterprise frame agreements**
  Take advantage of full support for frame agreements, so negotiated offer terms can be used by a company, its employees and even related firms.
PROVIDING ENTERPRISE SERVICES GLOBALLY

ENTERPRISE PRODUCT CATALOG

Enables simple and flexible storage of the entire CSP product portfolio in one place, via slave catalogs used for sales, charging and billing. Multi-tenancy, multi-currency and multi-taxation support.

DIGITAL BILLING AND REVENUE MANAGEMENT

Multi-currency and multi-taxation functions, allowing the creation of financial documents for customers and partners. Flexible rating rules apply to enterprise customers.

PARTNER MANAGEMENT

Get automation and flexibility in liaising with partners and third parties by modeling of any type of service. Secure and easy to deploy, with multi-currency, multi-tenancy and multi-national support.

WHOLESALE BILLING

Allows service and content providers to exchange billing data and invoices, and share revenue/cost information with partners. Easily scalable for all agreement types.
ENTERPRISE PRODUCT CATALOG

- Implement a product catalog ready for any roles and multiple partnerships
  Benefit from easily configurable solution for multiple tenant and multiple role environment, so even the most complex organizations and partnerships fit perfectly.

- Centralize all products and offers
  Bring a unified approach to product specifications, offers, details and relations using a product catalog solution designed in line with market standards.

- Integrate with other product catalogs
  Take advantage of Comarch Product Catalog’s unified interfaces and APIs to set this solution to work as a master enterprise product catalog or as a slave one.

- Simplify lifecycle management
  Make it easy to create, copy, test, approve or retire services. A single entity or larger configuration element can be managed easily throughout the entire lifecycle.
DIGITAL BILLING AND REVENUE MANAGEMENT

- **Ensure flexibility in price and cost management**
  Effortlessly and precisely model even the most complex offers and wholesale agreements.

- **Be ready for global expansion**
  Ensure support for multi-currency, multi-taxation and multi-language functionalities.

- **Deploy single solution for all players in the ecosystem**
  Take unification to new level, as a CSP, its partners and customers can all use the same solution.
PARTNER MANAGEMENT

- **Manage your digital ecosystem holistically**
  Simplify day to day business processes by taking a single, unified approach within a multi-tenant and multi-currency environment.

- **Adopt a model-driven approach**
  Use the easy to modify configuration stored in Centralized Product Catalog and Party Information Management modules to define how the system and processes work.

- **Prepare for global expansion**
  Take advantage of full global capabilities including multi-currency, multi-taxation and multi-language support.
WHOLESALE BILLING

- **Ensure support for various types of partner settlements**
  Build in support for interconnect, roaming (TAP/RAP/NRTRDE/HUR), content with revenue share, MVNO, M2M settlement, signaling and OTT partners.

- **Implement partner management functionalities**
  Manage relations with partners and suppliers, and automate most tasks required for cooperation within the field of telecom interconnect billing.
At LG U+ we currently use an in-house developed OSS stack. As the current IT architecture is silo-based, we experience a number of challenges regarding the introduction of new technologies such as 5G and network virtualization. The successful implementation of Comarch’s comprehensive platform will enable us to achieve a competitive advantage and increase business process efficiency.

Hokyung Kwon
NMS DEVELOPMENT TEAM LEADER AT LGU+
PROFESSIONAL SERVICES

BUSINESS CONSULTING
Comarch helps CSPs and technology vendors to optimize and automate business processes and increase efficiency by eliminating redundancy and rethinking IT architectures and configurations.

MANAGED SERVICES
Comarch Managed Services can help your company achieve an OPEX reduction of up to 50%, and improve the time to market for new services, technology rollouts, device and infrastructure integration.

END TO END PROJECT DELIVERY
Helps CSPs transform service and network management using automation. Assures orchestration of a domain-specific orchestrator, so each domain provides sub-services needed to deliver customer service.

CLOUD TRANSFORMATION
Comarch’s IT solutions for telecoms benefit from agile, microservice-based architecture that ensures full automation of platform integration and delivery, rapid deployment, and cloud-readiness.

BSS/OSS TRANSFORMATIONS
Comarch offers a comprehensive portfolio of products and services designed to support local and multi-country transformations for businesses of all sizes in both the BSS and OSS domains.
BUSINESS CONSULTING

- **Benefit from the know-how of BSS/OSS experts**
  Let Comarch support your transformation in the areas of: Sales & Customer Management, Convergent Charging & Billing, Service Design & Fulfillment, Network & Service Assurance, Resource Planning & Inventory, as well as new business areas such as SDN/NFV, IoT, M2M and Data Analytics.

- **Break down operational barriers**
  Personalize the parameters and communicate with your business partners through a secure channel. Sort your data (usage, billing etc.) and define all service and data accesses for each business partner.

- **Achieve maximum business results**
  Set the data update frequency, define the file formats and other parameters to adapt to business requirements.
MANAGED SERVICES

- **Get measurable results**
  Define KPIs and KQIs that will help you achieve your project goals.

- **Offer highest level of service**
  Benefit from monitoring, measuring, reporting and reviewing of SLAs against SLTs.

- **Manage incidents efficiently**
  Get services restored as soon as possible after any incident, minimizing the impact on business operations.

- **Outsource infrastructure and hosting**
  Comarch Data Centers offer SaaS and IaaS implementation models.

- **Outsource business processes**
  Comarch can take responsibility for business processes and implement operational tasks.

- **Migrate to new BSS/OSS seamlessly**
  Benefit from seamless migration, from black box outsourcing to fully managed processes.

- **Get specialist support**
  Enjoy Comarch’s SaaS and BPO services guarantee of quality, in the knowledge that all personnel are ITIL v3 certified.

- **Get single point of contact with 24/7 support**
  Take advantage of 24/7 access to a dedicated service desk that handles all incidents and requests.
END TO END PROJECT DELIVERY

- **Get full post-sales support**
  Get help from our experts with any system maintenance issues, and benefit from full support in person or over the phone.

- **Outsource third-party management**
  Take advantage of Comarch’s experience with third-party companies as integration and technology partners, or select your own.

- **Get a tailored solution**
  Let us examine systems, business processes and organizational issues to establish the best way to reach the desired outcome.

- **Share responsibility for managing project risks**
  Let Comarch shoulder some of the risk of a project via its own tools and risk management methodologies or those of its partners.

- **Don’t tackle issues alone**
  If you need advice, ask. We are always there to help you get the most out of your new solution, even after the go-live phase.

- **Get professional training**
  Benefit from Comarch training services, addressed to those engaged in system implementation, project managers, end users as well as system administrators and trainers.
CLOUD TRANSFORMATION

- **Don’t move your data**
  Retain pre-existing SaaS and PaaS models while still benefitting from the convenience of the cloud-ready solution.

- **Deploy new services quickly**
  Re-use network configuration to make the addition of new value-added services a matter of simply defining pricing models and content.

- **Integrate easily**
  Integrate smoothly with third-party software including social media, IP-based messengers, analytics and BI tools, IN and IoT platforms, and OTT services.

- **Find new revenue streams**
  Use telco cloud platform openness to allow operators to access new revenue sources and manage content with OTT providers in revenue-sharing models.

- **Raise capacity intelligently**
  Speed up deployment, simplify automated testing, and facilitate a swift response to temporary network utilization peaks.

- **Lower OPEX**
  Improve automation and reuse configuration patterns and operations teams by allowing them to work from the same cloud platform.
BSS/OSS TRANSFORMATIONS

- **Consolidate BSS/OSS to save time and money**
  Optimize network/resource management and business processes related to technology rollouts and current market needs.

- **Optimize product and customer management**
  Manage product portfolio and customer-related processes across multiple locations in a unified, optimal and cost-effective manner.

- **Generate new revenues from existing assets**
  Implement new models, while securing your company’s independence in the value chain and ensuring monetization of assets.

- **Pave the way for tomorrow’s technologies**
  Leverage the capabilities of your BSS/OSS infrastructure to support the latest technologies.

- **Consolidate**
  Shorten time to market and boost service innovation with a central product and service catalog. React to customers in real time and create new services rapidly.

- **Benefit from managed services**
  Move part of the responsibility for your transformation’s success to Comarch, saving time and money.
## COMARCH TELECOM CUSTOMERS

### GLOBAL TELECOM GROUPS

<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>IMPLEMENTATION SCOPE</th>
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<tbody>
<tr>
<td>E-Plus Gruppe</td>
<td>Next Generation Network Planning, Managed Services</td>
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<td>KPN</td>
<td>Convergent Billing, Customer Management, Corporate Self Care, Billing Mediation, Reporting Tool, Enterprise Service Bus</td>
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<tr>
<td>LG U+</td>
<td>Complete network resource and service management solution including 20 Comarch products, e.g.: Fault Management, Service Monitoring, NFV Inventory/Planning, Network Discovery</td>
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<tr>
<td>Mobile Telesystems</td>
<td>Next Generation Service Assurance, Service Inventory, SLA Monitoring</td>
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<td>MTC</td>
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<td>ngena</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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<td>T-Mobile</td>
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<td>T-Mobile (formerly GTS Poland)</td>
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### FIXED AND MOBILE

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<td>dtms.de GERMANY</td>
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<td><strong>Kyivstar</strong></td>
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<td>kyivstar.ua UKRAINE</td>
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<td><strong>MDC – Velcom GSM</strong></td>
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<td><strong>Netia</strong></td>
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<td><strong>NextGenTel</strong></td>
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<tr>
<td>nextgentel.no NORWAY</td>
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<td><strong>Plus Communications</strong></td>
<td>Convergent Billing, Customer Management, Billing Mediation</td>
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<td>plus.al ALBANIA</td>
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<tr>
<td><strong>Polkomtel SA</strong></td>
<td>InterPartner Billing</td>
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<td>bite.lv LATVIA</td>
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<tr>
<td>MVNE/MVNO</td>
<td>CUSTOMER</td>
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<tr>
<td><strong>Auchan Telecom</strong></td>
<td>auchantelecom.fr FRANCE</td>
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<tr>
<td><strong>Turkcell Europe</strong></td>
<td>turcell.de/de GERMANY</td>
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<tr>
<td>CUSTOMER</td>
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<td><strong>CableCom</strong></td>
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<td>grupotvcable.com</td>
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<td><strong>Multimedia</strong></td>
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<td><a href="http://www.multimedia.pl">www.multimedia.pl</a></td>
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<td>Convergent Billing, CRM, Self Care, Web Shop, Product Catalog, APIs, Service Activation, Trouble Ticketing</td>
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<td>simplitv.at</td>
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<td><strong>Vectra</strong></td>
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### CONVERGENT COMMUNICATIONS

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### VOIP

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<td>Smart BSS</td>
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### ISP

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<td><strong>NASK</strong>&lt;br&gt;nask.pl&lt;br&gt;POLAND</td>
<td>Convergent Billing, Self Care</td>
</tr>
</tbody>
</table>
We’re delighted to have extended the partnership that we have had since 2013 in order to deliver excellent infrastructure to enable smart metering to be a reality for every home and business in the UK.

Richard Channell
PLATFORM DEVELOPMENT DIRECTOR, ARQIVA
WHY COMARCH

CHAPTER III
## COMARCH IN NUMBERS

<table>
<thead>
<tr>
<th><strong>1991</strong></th>
<th><strong>1999</strong></th>
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<tr>
<td><strong>Founding year</strong></td>
<td><strong>Comarch onset</strong></td>
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<td></td>
<td><strong>1993</strong></td>
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<tr>
<td></td>
<td>Publicly traded on Warsaw Stock Exchange since</td>
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### RECOGNIZED BY

Gartner, Forrester Research, IDC and more

### THOUSANDS OF SUCCESSFULLY COMPLETED PROJECTS ON

- **6 Continents in about 60 Countries**

### OVER **6000 EMPLOYEES**

### 93% of revenues sale of own software and solutions

### SUBSIDIARIES

- **54**

### HEADQUARTERS

- **KRAKÓW, POLAND**

### ADDED VALUE

Comarch is a software house which sells own software products to large corporations along with implementation and managed services

### GLOBAL PRESENCE

- **North America**
- **Europe**
- **Asia**
- **Middle East**
- **Latin America**
- **Africa**
- **Australia**

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ORGANIZATIONAL STRUCTURE

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

DIVISIONS

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

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

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

Piotr Piątosa  
Director of COMARCH HEALTHCARE DIVISION
CUSTOMERS & OFFICES WORLDWIDE

54 SUBSIDIARIES
91 OFFICES
61 CITIES
32 COUNTRIES
6 CONTINENTS

EUROPE
1 POLAND | Białystok, Bielsko-Biała, Częstochowa, Gdańsk, Gliwice, Katowice, Kielce, Kraków HQ, Lublin, Łódź, Poznań, Rzeszów, Tarnów, Toruń, Warsaw, Włocławek, Wrocław
2 ALBANIA | Tirana
3 AUSTRIA | Innsbruck, Wenen
4 BELGIUM | Brussels
5 FINLAND | Espoo
6 FRANCE | Montbonnot Saint Martin, Lille
7 GERMANY | Berlin, Bremen, Dresden, Düsseldorf, Hamburg, Hannover, Munich, Münster
8 ITALY | Milan
9 LUXEMBOURG | Strassen
10 RUSSIA | Moscow
11 SPAIN | Madrid
12 SWEDEN | Stockholm
13 SWITZERLAND | Arbon
14 UK | London
15 UKRAINE | Kyiv, Lviv
16 CHINA | Beijing, Shanghai
17 JAPAN | Tokyo
18 MALAYSIA | Kuala Lumpur
19 SINGAPORE | Singapore
20 SOUTH KOREA | Seoul
21 THAILAND | Bangkok
22 SAUDI ARABIA | Riyadh
23 UNITED ARAB EMIRATES | Dubai
24 MEXICO | Mexico City
25 CANADA | Saint John, Montreal, Toronto
26 USA | Atlanta, New York, Rosemont, Chicago, Columbus, Tyrone
27 ARGENTINA | Buenos Aires
28 BRAZIL | Sao Paulo
29 CHILE | Santiago
30 COLOMBIA | Bogota
31 PANAMA CITY | Panamá City
32 PERU | Lima

ASIA

MIDDLE EAST

NORTH AMERICA

WORLDWIDE SUBSIDIARIES, CUSTOMERS, PROJECTS
CUSTOMERS AND PROJECTS

DATA CENTER
DATA CENTER ONLY

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CUSTOMERS IN ALL MAJOR INDUSTRIES

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<th>TELECOMS</th>
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<td>OKKO</td>
<td>STATOIL</td>
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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.

Flexible 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.
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-recognized 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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