

True BSS Convergence – A Technically Advanced Approach

White Paper

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Siloed Ecosystems Not Up to the Challenges of a Real-Time World

The telecom landscape continues to evolve with enhanced 3G and 4G and other network technologies enabling advanced and converged services with expanded connectivity coverage. As a result, service providers are poised to profit from new growth opportunities, including mobile data, cloud computing and machine-to-machine communications (M2M). However there are well-defined challenges to overcome.

Today's communication service providers (CSPs) must deliver an exceptional customer experience, provide individualized service through any touchpoint, offer innovative pricing and promotions across converged services, solve problems instantly, keep pace with changing technology and consumer devices, and (oh, yes) achieve revenues and profits through better network management. This is all crucial to staying competitive in today's "real-time world."

Providers need to know in real time who the customer is, what service(s) they are trying to access, if they are authorized to use the service(s), subscriber type, device type, relevant promotions, and so on. Providers then need to be able to respond immediately with the appropriate actions.

The ability to take appropriate actions calls for a policy management and enforcement approach that takes into account customers' profile information and both historic and current usage information – for efficient network management that keeps the customer experience at the center.

And, it goes without saying that all of this must be achieved in the most efficient manner possible.

For those CSPs that are limping along with existing complex ecosystems (consisting of disparate legacy systems, data silos, or other underperforming systems), this is a daunting or near-impossible task. In such environments, even small change requests can take months to implement, and involve significant IT resources. Additionally, they do not easily support the crucial move towards effective policy management and enforcement. According to a recent Heavy Reading survey, CSPs point to "problems integrating with charging and billing systems" as the highest scored obstacle for deploying policy solutions.

Siloed environments do not adequately support the needs of true convergence. Silos result in utilizing the least common denominator of functionalities per system, while leading to capability deficits driven by systems that have their own way of defining and managing customer data. All this becomes a deterrent to customer management consistency, charging and pricing flexibility, and business and marketing agility.

These outmoded ecosystems simply must be torn down to make way for a far more superior approach to BSS – one that unlocks value.

The Importance of a Unified Approach to BSS Convergence

A high-performing, highly-scalable converged BSS system – with deep-rooted in-network capabilities that span policy management and enforcement – would allow CSPs to become more powerful, flexible, customer-focused and change-oriented. Such a real-time ecosystem would need to be able to:

- Provide a single source for complete, current and consistent customer, product and prospect information available at every interaction
- Support multi-dimensional charging, policy management and enforcement that blends network intelligence with comprehensive BSS information at every moment of opportunity
- Support flexible product and account management across all lines of business for effective lifecycle management
- Consolidate and virtualize workloads into fewer servers for maximum resource utilization, deterministic performance and availability SLA
- Provide out-of-the-box business processes resulting in an optimized delivery methodology

Creation of such a system requires unification across the ecosystem: from marketing, to customer management, financials and into the network. This approach is best able to streamline and automate end-to-end business processes across sales, marketing, ordering, customer management (including self-service), real-time rating, charging, policy, billing, and traffic management and optimization. To achieve such automation requires unification of all functionality around a single data model,

service-agnostic product catalog and single operations approach.

To ensure effective implementation, such a solution needs to employ a standards-driven implementation methodology such as the TM Forum's (TMF) Business Process Framework, which provides logical grouping of processes for building management systems. The TMF asserts that standardization is a key business practice, and that the industry is wise to "invest in OSS/BSS systems that create true value by developing end-to-end solutions that are reusable, flexible and extendable."¹

While this approach forms the baseline for efficient deployment, the system must also employ a dynamic computing infrastructure, built on modern technologies and platforms, to allow for efficient operations and uncompromised availability, while being highly flexible and adaptable to meet future evolving business needs and market dynamics through configuration.

Is it possible to combine all of these features to create an advanced, highly adaptable, solution that allows CSPs to optimize and streamline their business operations? Does such a converged solution exist in the marketplace today?

Yes it is possible, and yes, a solution does exist – the only one, in fact: Comverse® ONE™ Billing & Active Customer Management.

A Look at Comverse ONE Billing & Active Customer Management Solution

As an industry-leader with an unparalleled record of both in-network and IT expertise and success, Comverse understands the evolving needs of CSPs. Through innovation and a strategic vision, Comverse has ensured continued success for CSPs in today's dynamic telecom market.

Comverse's flagship BSS offering, Comverse ONE Billing & Active Customer Management solution, is capable of handling any dimension of convergence. Comverse ONE aligns and unifies sales, marketing, ordering, customer management, real-time rating, charging, and billing around the same open architecture that leverages one data model, one product catalog, one security and operations approach, and open APIs. It is the first convergent BSS in the market to unify critical business functions in such a manner.

Recognizing that operators will have unique paths to convergence, Comverse ONE was built to be able to be deployed in a modular nature, with common deployment modes being able to support prepaid subscribers only, postpaid subscribers only and also to support hybrid (converged prepaid/postpaid accounts). CRM is an integral part of the solution, with self-service and mediation options also available. Any deployment mode can be evolved over time towards full convergence (service, network, payment).

The solution's modular and highly-adaptable architecture leverages industry standards and offers a dynamic computing infrastructure, through server virtualization and consolidation to reduce TCO and maximize ROI.

Recently Comverse added the ability to capture and charge based on in-network information to Comverse ONE's already extensive charging variables. With integral policy management and enforcement (including DPI), CSPs are now able to use Comverse ONE to charge based on any combination of service, application, content, website, and network condition or device type, while also taking into account quality of service, subscriber profile and history.

With this enhancement, Comverse ONE ties all aspects of the customer relationship together with network resource management and monetization when defining and enforcing policies and pricing plans. Its multi-dimensional approach to policy management goes beyond network considerations to include variables such as the subscriber, device, specific operator business rules, traffic type (including third-party content), and enterprise contract (where applicable).

Comverse ONE offers a robust set of unified capabilities that sets it apart from other systems on the market and makes it particularly valuable to a CSP. The proven solution brings unique technical value from four distinct design areas which will be explored in this paper:

- Single-system approach to convergence
- Low touch/high efficiency
- High adaptability
- Standards-driven implementation methodology

¹ "Solution Frameworks (NGOSS)," <http://www.TMForum.org>

Single-System Convergence: The Fast Track to Maximized Revenues and Optimized Customer Management

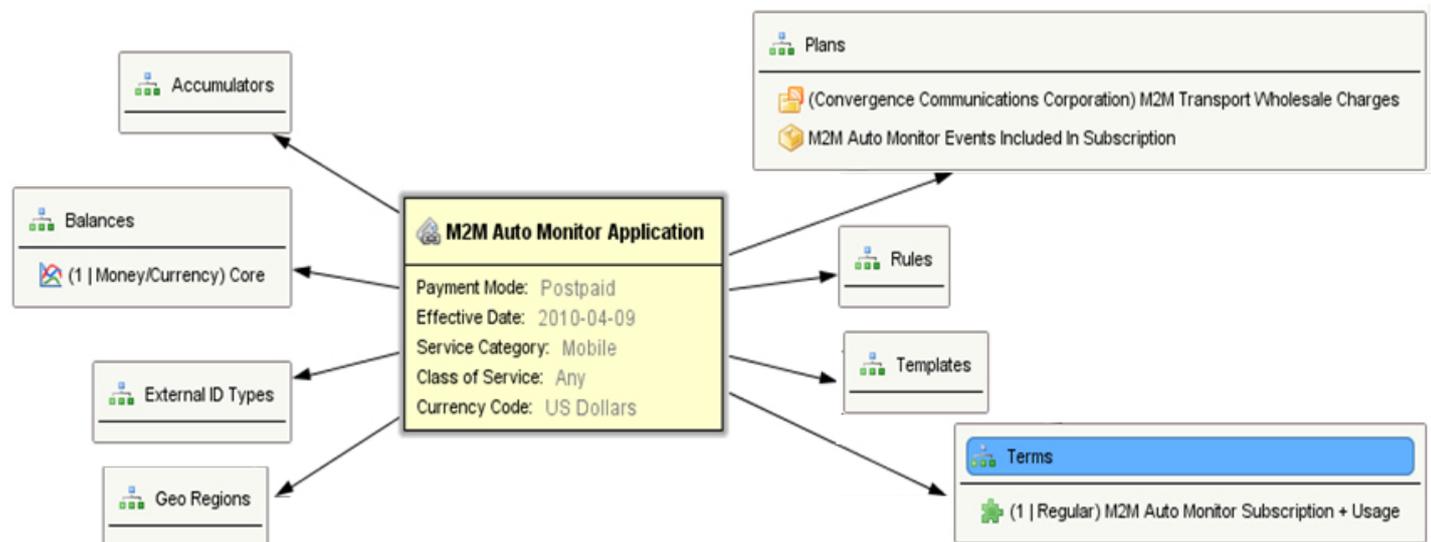
CSPs have historically taken a piece-part approach towards convergence (service, payment, line of business), which creates disparate ecosystems made up of discrete, service-specific systems, each with its own way of looking at customers and services. These complex environments hinder the fundamental goals of convergence: increasing competitiveness and revenues, and customer retention.

Single-system convergence removes complexity, creating an environment ready to maximize profitability and deliver a superior customer experience. Comverse ONE, the market's only single-system converged BSS, was purpose-built to support every dimension of convergence (any network, service, content, device and payment type) with all relevant components – from sales and marketing, to customer management, to call and session control, charging, billing and financial management – built around a single data model and supported by a single product catalog and unified approach to operations and administration.

Comverse ONE's single-system approach to BSS convergence eliminates multiple representations of the same data. Its single data model is the foundation for a single source of truth for the unified business functions across the system. Every function from sales to policy to charging to billing has access to the same comprehensive real-time prospect, customer and product data. This allows for both consistent customer management and offer presentment, regardless of how the customer decides to interact (CSR, IVR, Web, device) or pay for the provider's service(s).

Additionally, as the global market is linked through IP-based networks that provide near-seamless connectivity, new revenue growth strategies such as Machine-to-Machine (M2M), cloud computing and data-centric business models have emerged. However, these trends create network congestion and monetization challenges, "... increasing demand for integrated policy/charging solutions that enable operators to offer more flexible pricing models..."²

Integrating policy management solutions within already fragmented ecosystems impedes the creation of effective links between BSS and the network required to drive multi-dimensional policy management and smart charging of data-centric services.



Enhanced Marketing Agility with a Single Product Catalog

The Comverse ONE solution's inherent dual in-network and IT-based capabilities position it to lead the convergent charging market. Converged billing is an essential capability to optimize the customer experience while increasing profitability associated with new growth strategies such as M2M, cloud computing and convergent data-centric business models – all of which have an impact on network capacity, hence require real-time control.

Furthermore, extension to include policy management and policy enforcement powers the solution to allow CSPs to manage all policy and charging dimensions holistically and seamlessly. The solution blends real-time customer information with network knowledge to drive intelligent policies. This ensures that connectivity is managed effectively, for example supporting

² Infonetics, Convergent Charging Software and Services, May 2010

priority based on class of account, SLAs and QoS commitments, which are essential factors to consider with cloud computing and M2M models in particular. This ability also allows for the effective monetization of mobile broadband while also enhancing the customer experience.

And finally, experts determined that customer transparency is essential with 3G and specifically 4G networks. According to Yankee Group, "Tomorrow's 4G world is one of shared control between CSPs and customers. Customers will determine how, where and when they consume CSPs' offers, features and content. Customers will add and delete their own account members and determine which members receive online charging (for prepaid) and which receive offline charging (for postpaid) in hybrid accounts."³ Comverse ONE allows CSPs to meet those customer demands today.

Through unified self-service, Comverse ONE allows CSPs to provide their customers access to holistic, up-to-date, account and product information with the ability to extend subscriber account control options. In this way, customers are able to access the latest relevant services and promotions while having the ability to modify and control account expenditures by setting their own spending/credit policies.

Central to this ability is not only the self-service capabilities within Comverse ONE, but also Comverse ONE's service-agnostic product catalog, which acts as the single creation point for all products, their inter-relationship, their charging rules and other underlying policies. A user-friendly graphical interface (shown above) enables the quick definition of offers, rules, terms, balances, usage plans, supplementary and up-sell offers, and so on, leveraging re-usable building blocks and drag-and-drop functionality.

CSPs can utilize this marketing-driven product catalog to quickly define, test and launch new offers, cross-product bundles, promotions, and campaigns across all or any relevant customer touchpoint: Web, IVR, Call Center, and device. The data model underlying the product catalog is rich and highly flexible, enabling the modeling of any voice, messaging, video or data service and associated pricing and promotion plan.

Taking a focus on marketing agility further, Comverse ONE allows CSPs to bring the consistent customer experience up front to the sale process while allowing them to become more agile, insightful and effective in their marketing through integrated sales force automation and campaign management capabilities. CSPs can analyze and understand customer behavior throughout the lifecycle to prevent churn and proactively roll out targeted offerings that differentiate the customer experience and maximize revenues.

As detailed in the chart below, Comverse ONE's rich features and capabilities empower CSPs to maximize revenue streams and extend the same services and customer management channels to the entire subscriber base.

Maximized Revenues	Optimized Customer Management
<ul style="list-style-type: none"> • Charge accurately any combination of service, application & content based on subscriber status (premium subscriber, early adapter), usage levels, financial status (sufficient funds), etc. • Control revenue leakage with online event processing • Apply real-time triggers (quotas and thresholds), maximizing usage transparency to capture critical moments of opportunity for effective up-sell across all services through real-time marketing • Leverage complete customer information, both historic and real-time, to launch effective marketing campaigns 	<ul style="list-style-type: none"> • Consistent product and customer lifecycle management (from prospect to cash), achieved across convergent services and all customer touchpoints (Web, IVR, call center, device) • Flexible real-time balance management for CSPs and their end users to support hybrid accounts and services across single account users and across users within account hierarchies • Grant and enforce network priority based on class of account, SLAs and QoS • Offer unified self service so customers have access to holistic and current account information and the latest relevant services and promotions with the ability to set, modify and control account expenditures

3 "4G B/OSS: Oxymoron or Mandate?" Yankee Group Research, Oct 2010

Low-Touch/ High Efficiencies: Decreasing TCO and Increasing ROI

Comverse ONE is designed as an easy-to-manage low-touch solution, optimized for minimal TCO and maximum ROI through server consolidation and virtualization. And given that Comverse ONE was built on a foundation that includes years of in-network expertise, it is engineered for deterministic performance characteristics and is typically sized for daily busy hour workloads with headroom to support scale within, fail-over events and capacity on demand for seasonal traffic or future growth -- meeting the availability needs essential in a real-time environment.

Comverse ONE offers completely isolated hardware and software domains among network-centric and IT-centric components to match varying SLA needs. By separating database and application workloads, the solution allows these to scale free of each other - optimizing 3rd party software licenses and resources utilization. Additionally Comverse ONE consolidates these workloads onto fewer servers while taking advantage of virtualization, allowing them to both scale-up on a vertically scalable platform and scale-out within a virtualized, consolidated, energy-efficient infrastructure.

To allow workloads to scale-up, multiple workloads are deployed as logical partitions. These partitions can easily expand and contract their specific resource pool to accommodate heavier or lighter loads and can be easily and remotely re-sized and created in response to new business events. And to allow workloads to scale-out, multiple instances are deployed across multiple servers ensuring deterministic performance, scalability and availability SLA.

Comverse ONE's dynamic computing infrastructure based on server consolidation and virtualization, allows effective sharing of processing resources through intelligent virtualization which enables high utilization which in turn, reduces total cost of ownership (TCO) of the system.

To ensure operational efficiency across both IT and in-network components of the solution, Comverse ONE provides a unified infrastructure that allows for a single set of operations, administration, and maintenance (OA&M) functionality across both the domains. This:

- Eliminates redundant applications
- Increases business process automation
- Improves workflow

These should increase a CSP's overall efficiency. In fact, this streamlined operations approach has enabled a convergent CSP in Poland to support more than two million subscribers with a billing operations staff of just 10 people (usually junior engineers).

The unified platform provides a single Manager/Agent infrastructure that is adaptable to include disparate platforms within CSP environments and provides a single uniform interface for managing and administering all components of the Comverse ONE system.

The common infrastructure includes the following components and functionalities:

- **Administration Component:** Handles operations that are performed, such as life-cycle operations and maintenance mode state changes.
- **Client Management Component:** Provides a single entry point for all client interface operations, such as performing security tasks of client authentication, policy enforcement, and auditing of user activities.
- **Scheduler Component:** Provides a flexible scheduling architecture used for scheduling jobs, alarm monitors, workflows and processes, and internal scheduling of timers, such as timers to resume jobs after they have been paused for a given duration.
- **Session Management Component:** Provides functionality for processing the registration, un-registration, and heart-beat messages sent by the manager/agent infrastructure.
- **Reporting Component:** Provides textual report generation functions that are used to generate historical reports for events generated, job execution, monitoring execution, workflow execution and process execution.

The solution's common infrastructure is based on Service-Oriented Architecture (SOA) and includes services that provide the following: event and alarm management, process management, job and workflow management, system inventory management, and log and file management. These services provide functionality across the entire solution and are extensible

to allow CSPs to easily implement operator-specific operational business processes.

The event and alarm management service detects hardware failures and configuration issues in real-time and reports them appropriately. While this is assumed as part of an in-network application, this capability is obviously also beneficial to the IT-based aspects of a converged system. This is also extensible to support customized monitoring of Comverse ONE and even third-party components – another example of removing complexity for an operator.

Additionally, the unified platform controls instrumental processes, such as batch processes and certain continuously running processes. Through Comverse ONE's process management, CSPs can view running processes, determine status and statistics, control the process lifecycle (start, stop, pause, resume), retrieve results of process execution history, send alarms and track the health of a long-running process.

Comverse ONE further increases efficiencies by leveraging workflow-based process orchestration, reducing the amount of interaction required to run the system. Through the solution's job and workflow management, CSPs can schedule, view and determine the status of all jobs and workflows, view historical reports for all scheduled execution of jobs and workflows and control the life cycle.

Additionally, the solution's workflow technology provides process expansion flexibility and enables providers to easily implement operator-specific operational business processes, for example running a bill cycle. As a result, only basic programming skills are needed to create custom processes and integrate them to the platform. This crucial feature allowed one Tier-1 CSP to reduce manual order processing costs by more than 50 percent.

High Adaptability: Preparing for the Needs of Tomorrow

Telecommunications is a rapidly changing industry, with new business models emerging that demand market attention. A modular BSS solution that is converged (with an ability to provide end-to-end processing for a variety of "billable unit types"), highly adaptable, highly scalable – and open is essential.

The Comverse ONE turnkey solution can be adapted and extended, as appropriate, as a result of the following design features:

- Modular deployment modes
- Open framework
- Performance at scale

A continuum of deployment modes is supported, allowing operators to phase transformation to convergence. Comverse ONE offers deployment modes to support prepaid customers, postpaid customers – even with real-time credit control – and to support converged/hybrid accounts and offers. These deployment modes can be enhanced with policy management or taken further into the network with policy enforcement. Options including sales and marketing automation, self-service and mediation allow the solution to be tailored to each operator's unique needs.

The solution's modularity delivers the transformation flexibility necessary to quickly adapt, as any deployment mode can also be evolved over time by adding functionality/components to move to convergence in a manner consistent with the provider's business goals and business transformation timeframes.

Additionally, Comverse ONE's open framework exposes all external integrations and 3rd party solutions to the power of Comverse ONE's single data model and product catalog, while allowing tight integration with new network connections to maximize time to market (TTM) and ROI. CSPs can add new lines of business through product catalog configuration, as was done by a leading CSP in Montenegro who was able to easily add a new line of business – fixed line over WiMax – via in-house configuration of Comverse ONE. Other Comverse customers have rolled out services 'in the cloud' and easily monetized them with Comverse.

With a complete set of services-based APIs, Comverse ONE's full capabilities are exposed. These APIs ensure that the solution can be quickly integrated in an overall ecosystem – SOA or otherwise. They also enable efficient integrations with third-party systems and custom applications, regardless of the deployment approach by delivering a public, documented, services-based interface that lets developers rapidly build custom applications and integrate them into the system.

This versatile architecture provides unparalleled scalability, enabling cost-effective growth through the incremental addition of new functionality without extensive infrastructure changes. And given that the solution separates application layers from database layers, it allows flexible scalability of applications and data with cost-effective third-party software licensing. Comverse's scale-out architecture approach allows incremental investments for capacity growth and non-disruptive capacity expansions.

Moreover, given that the system is open to external systems, it can import billing events to and from other systems and perform network activity analysis – key considerations for M2M models.

The solution's extendable design and productized technology is proven to support massive subscriber and product growth, as evidenced by a leading CSP in Russia that grew from fewer than 100,000 subscriber instances to tens of millions through the addition of additional processing units.

Comverse ONE also provides advanced end-to-end processing for both online and offline rating events to support discount plans, invoicing, bill per event/per type of service and so on. This is essential for new and emerging growth strategies like cloud computing and M2M.

Standards-Driven Implementation Methodology: Working Well Together

Comverse ONE leverages a standards-driven implementation methodology that emphasizes the company's experience, expertise, and understanding of converged BSS deployments and associated business processes. This allows the company to best position each CSP for success today and into tomorrow – while helping optimize and streamline ongoing business operations.

More than 250 business processes supported by the system have been documented to detail the internal operational flows as well as the external activities required to achieve those flows, whether that be a Comverse ONE component, an external system, or a manual interaction. As a result of this work, Comverse is able to reduce deployment time and risk.

Comverse has documented these business processes according to the standards put forth by TM Forum's Business Process Framework (eTOM). This industry standard provides a framework to assist CSPs in ensuring they have a comprehensive operational infrastructure.

TM Forum is the world's leading industry association focused on enabling best-in-class IT for service providers in the communications market. The Forum's Business Process Framework (eTOM) is a key element of the TM Forum Framework Integrated Business Architecture. It is the industry's common process architecture for both business and functional processes and has been implemented by hundreds of service providers around the world. TMF offers its members the ability to certify against the Business Process Framework. Comverse ONE received conformance certification in December 2010.

Comverse ONE functions (market sales management, product management, service management) align with the core processes of the eTOM, supporting the deployment of a BSS infrastructure that also addresses all aspects of convergence. The eTOM business processes are mapped into the Comverse ONE system and associated deployment methodology, and are already mapped into the software. These purposeful efforts have helped Comverse earn the highest conformance level to date.

The combination of these TMF Framework-certified processes, plus a deployment approach that has been refined through many convergent deployments, will help operators streamline business transformation projects and realize ongoing cost savings. By conforming to eTOM business processes, Comverse has enabled and established an optimized delivery process to significantly reduce delivery cost and time to market.

By following implementation standards, Comverse is able to become a major, proactive partner to any CSP (new or veteran) looking to evolve their BSS to be more dynamic. Comverse provides a robust system to help CSPs better position themselves towards meeting new business challenges.

The Right Solution Is at Hand

Complex BSS environments truly are becoming a thing of the past. CSPs have too many real-world, real-time demands from marketplace pressures and customers to waste time (and money) with outdated, inefficient systems that are not agile or responsive.

CSPs need to be forward thinking – looking for solutions that grow with them. They cannot be constantly rebuilding or reinventing their BSS; they simply need to be able to expand and adapt in meaningful ways.

These realities led Comverse to create and enhance its leading Comverse ONE solution to achieve true convergence for any CSP. Built from a superior design, Comverse ONE surpasses outdated silos, legacy systems and other disparate and cumbersome BSS ecosystems.

Simply stated, low-touch, highly-efficient Comverse ONE, delivered within the framework of leading industry standards, helps operators increase business agility. With Comverse ONE, CSPs can reduce TCO and optimize ROI through server virtualization and consolidation, while securing tight prospect-to-cash cycles through coupling of sales, marketing, customer management, order management and charging. They can also position themselves to monetize mobile broadband and take advantage of emerging business models and capture the associated revenue potential.

CSPs all around the world are embracing the power and value of true convergence. Comverse ONE makes the transition to true BSS convergence achievable with a solution that is designed to support efficient operations and future-proof evolution to capture the opportunities of today and tomorrow.

About Comverse

Comverse is the world's leading provider of software and systems enabling converged billing and active customer management, mobile Internet, and value-added services. Comverse's extensive customer base spans more than 125 countries and covers over 450 communication service providers serving more than two billion subscribers. The company's innovative product portfolio enables communication service providers to unleash the value of the network for their customers by making their networks smarter.

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