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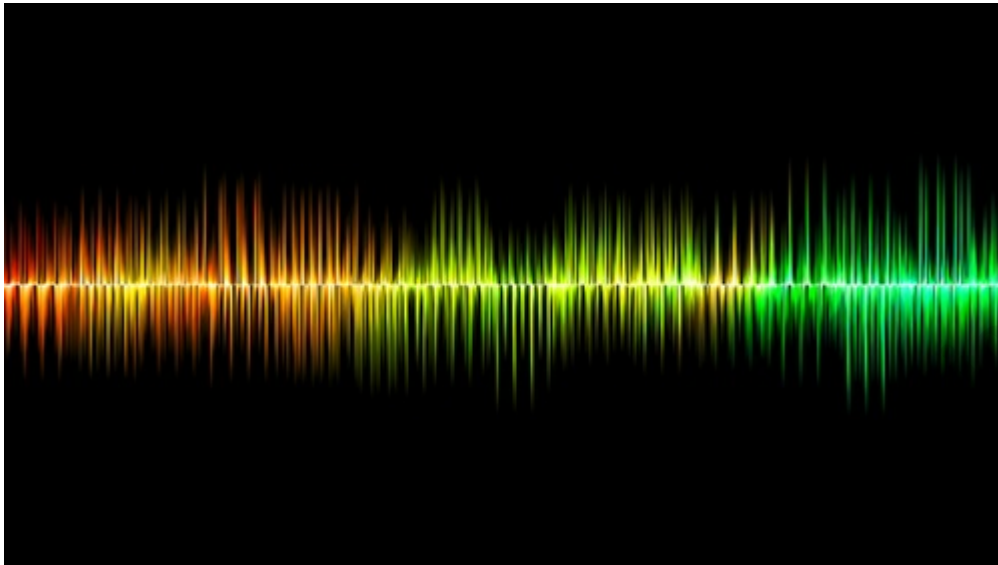
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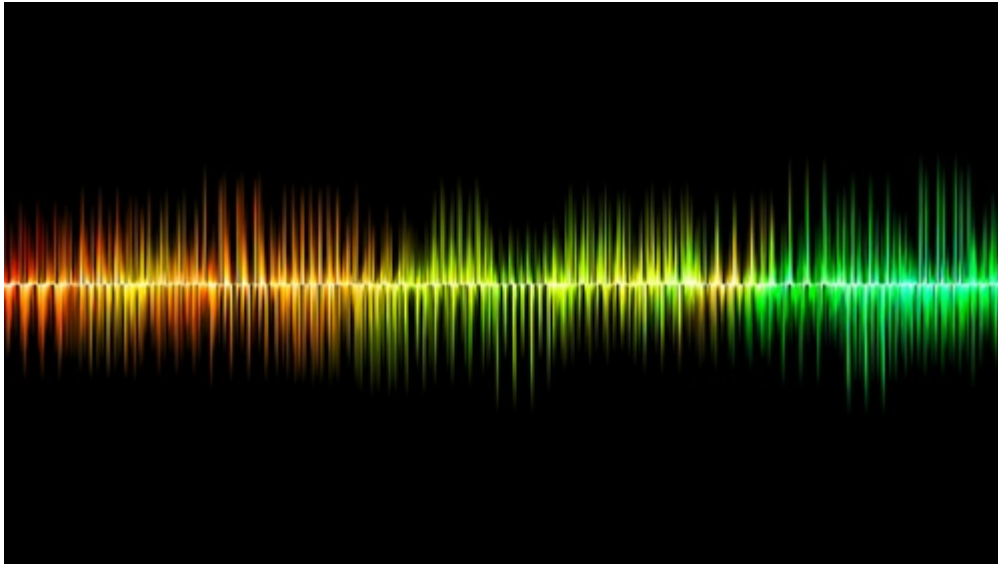
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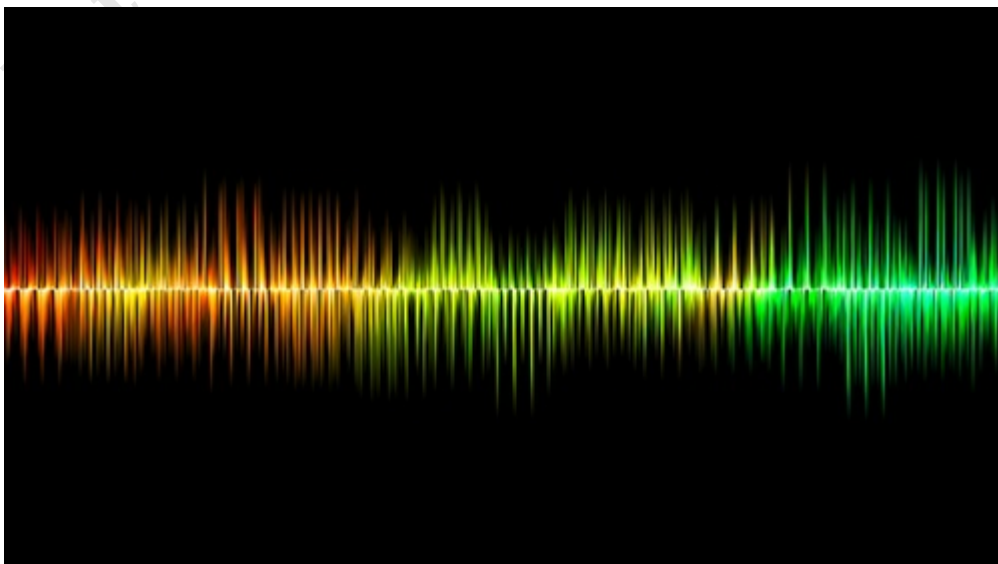
Predicting Colonial Pipeline: Mitigating Risk and Compliance

Mitigating risk and compliance for lawful intercept using lawful intelligence is explored in this Pipeline article feature SS8. Learn how CSPs can comply with lawful intercept regulation, while empowering law information with critical, real-time data.



Podcast: The Evolution to 6G

The world's eyes are already looking forward to the potential of 6G. Demands resulting from innovative use cases, for instance specific requirements from different industries and other user groups, as well as overarching goals like sustainability, are driving the standardization and development of mobile technologies.





The Network Transformation Imperative

*A Dynamic Panel Discussion Featuring
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Agile Architecture for Digital Innovation

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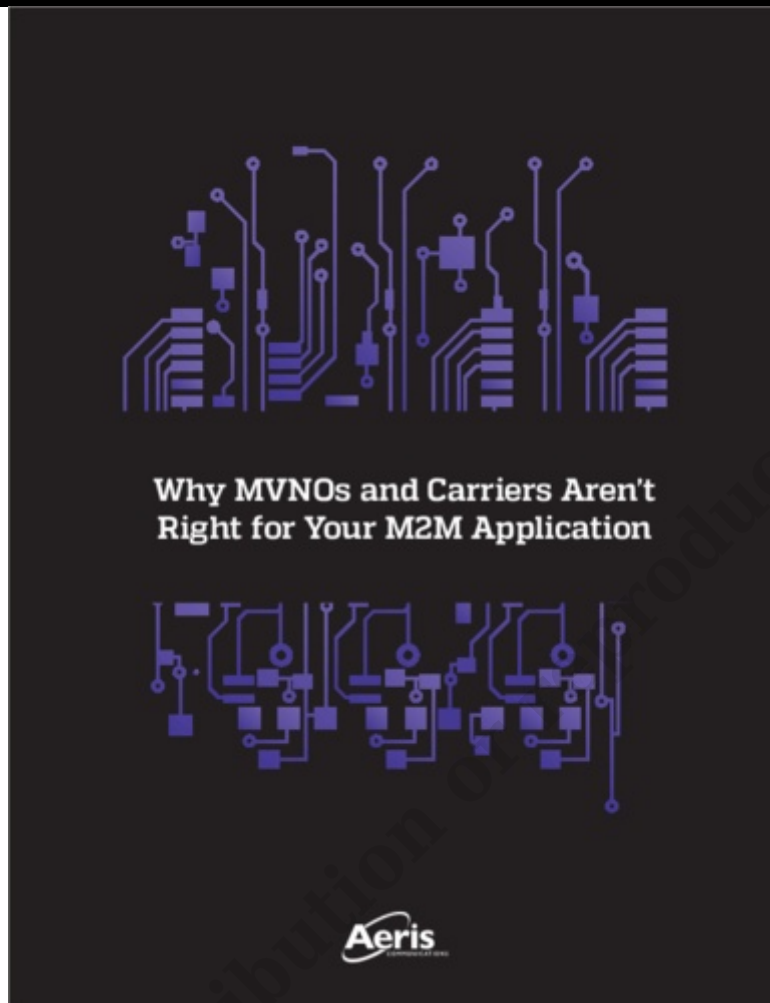


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product bulletin

Next Generation Billing and CRM

Omnia360 transcends traditional billing and relationship management with a complete 'out-of-the-box', pre-integrated customer relationship management and billing solution. Available as a fully-hosted cloud-based solution, managed service or on-site license subscription, this next generation solution empowers communications service providers (CSPs) with a client-centric model for service differentiation and rapid deployment of new services, especially within the Enterprise space.

Leveraging Microsoft Dynamics® CRM, Omnia360 best-of-breed software platform delivers a comprehensive, turn-key back office solution for CSPs to monetize the largely untapped revenue opportunities.

Centralized Customer Management

Omnia360 provides a holistic view of your customers. Within a single screen, service providers can view all billing, accounts receivable, orders and service details. The solution helps drive operational efficiency by empowering you to create custom fields, enforce business-specific rules, and even integrate third-party applications with simple point and click customization.

Dynamic Product Catalog

Omnia360 delivers a dynamic, centralized product catalog enabling the selling and fulfillment of next generation products and services such as cloud services, productivity solutions, unified communications and Voice over IP products—all while enabling traditional voice, video and data products. This unlimited product hierarchy capability helps optimize sales accuracy while reducing the time it takes to complete the entire lead-to-cash cycle.

Powerful Business Analytics

It is critical for management to be able to monitor business performance. With Omnia360, management maintains a single scorecard that covers sales, marketing, and customer service. This up-to-the-minute information provides inline charts with drill-down intelligence to visually navigate data, identify trends, and uncover new insights.

Market Leading CRM

Combine the familiar Microsoft® Office fluent user interface with powerful CRM software to maximize marketing effectiveness, win more sales, and enrich customer service interactions. Leveraging the power of Microsoft Dynamics® CRM, marketing and sales professionals are equipped with flexible segmentation tools, simplified campaign management capabilities, lead-to-cash visibility, real-time sales forecasts, and much, much more. Customer service specialists are empowered with tools that simplify case management, streamline escalations, improve knowledge sharing, and enable more effective account management, all while helping to contain service costs.

- **Improve Monetization Opportunities**
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- **Simplify Business Systems**
with a complete, pre-integrated back office solution
- **Elevate Customer Experience**
with consistent customer interactions

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Living on the (Network) Edge:

A TELECOMMUNICATION PROVIDER'S GUIDE TO MAKING THE MOVE

The Internet of Things (IoT) is not new. Neither is the rapid rise of connected devices or customers' demands for instantaneous service. These are realities of digitalization. While they have become normalized, they are by no means the final destination on the journey to digital transformation. They are merely the first wave of the transformation process. In their wake, the next round of changes is brewing. These changes will require providers turn their focus to the periphery of their networks and get closer to their customers. This next frontier for providers to conquer? The Edge.

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How to Improve
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CASE STUDY
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MATRIX CONVERGENT CHARGING

As communications business models evolve and mature, marketing organizations are constantly creating new services, payment models are evolving, and devices are becoming increasingly sophisticated. Customer segments are becoming more defined and granular, and what once was either a prepaid or a postpaid relationship has grown into a multi-faceted array of payment options. These mix and match payment methods also provide options to charge physical goods to a mobile account or access personal funds as a customer would at a bank.

Devices and access methods are also multiplying making the picture yet more complex for service providers. Their subscribers have a choice of Smartphones, set top boxes, tablets, PCs, laptops, gaming consoles, and mp3 players to access services via cable, DSL, FTTH, 3G, Wi-Fi, Wi-Max and new LTE networks. However, competition is fierce and network access charges are becoming commoditized.

Communications service providers are challenged with rising above these complex operational and service delivery environments to focus on the customer. Regardless of device, access method or

payment option, customers should be presented with compelling, integrated service bundles that are intuitive and customizable to fit their personal needs. Convergent charging applications play a key role in delivering a differentiated and consistent customer experience as they provide the central link between services, payment methods, and devices.

MATRIX Convergent Charging provides a highly flexible, hyper-efficient application that runs on low cost, commoditized hardware and which easily integrates with existing billing systems. It helps the marketing department and the business implement initiatives to strengthen the brand and increase customer value while providing dramatic scale and driving cost out of operations.

Increase Customer Value

MATRIX Convergent Charging enables service providers to better monetize their portfolio of services and content and increase customer lifetime value. It provides a flexible and configurable set of pricing, charging and balance management features so that service providers can quickly and cost-effectively implement a convergent charging layer without disrupting existing IT and network assets.

Functional Highlights

- ▶ Bundle products and services together regardless of access network
- ▶ Quickly deploy new pricing models, promotions or discounts
- ▶ Manage balances and payment relationships
- ▶ Develop and implement loyalty programs and preferred pricing
- ▶ Track and enforce usage quotas, allowances and credit limits
- ▶ Bundle services together to provide cross-product discounts
- ▶ Roll out the same offers across prepaid and postpaid subscribers
- ▶ Share balances across devices, such as sharing a data allowance across a laptop, tablet and Smartphone
- ▶ Create prepaid/postpaid hybrid offerings

MATRIX Software

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W²CM Smart Replay

Near Senak, Product Manager, EXFO

INTRODUCTION

Along with the phenomenal growth in volume of data on the mobile Internet, there has been an increase in the different types of data flowing through wireless networks. In addition to traditional types of data, such as file transfer protocol (FTP), hypertext transfer protocol (HTTP), voice-over-Internet protocol (VoIP), e-mail and video streaming, there has been a constantly increasing list of over-the-top (OTT) smartphone applications generating new types of data, including peer-to-peer (P2P) data from applications such as BitTorrent and Kazaa. In an effort to differentiate themselves, operators have also been offering their subscribers their own unique applications, which in turn contribute to the variety of data on wireless networks.

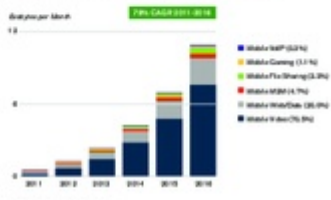


Figure 1. The explosive growth in mobile data.

This vast amount and variety of data has created a need for it to be managed effectively. There are several motivating factors to do so, chief among them being:

- ▶ Honoring service-level agreements (SLAs) and delivering committed quality of service (QoS) to customers
- ▶ Efficiently managing network resources
- ▶ Generating revenue as opposed to being just a "dumb pipe" for data
- ▶ Securing the network

Let's look at each one of these aspects in a little more detail.

HONORING SLAs

Operators have SLAs with their customers to guarantee a certain minimum performance from their networks. To be able to meet these commitments, the network elements have to be able to ensure that the required amount of resources is made available when needed. A recent study has shown that 5% of users consume 60% of bandwidth. This type of usage pattern can endanger an operator's ability to meet its SLA commitments to the rest of its subscribers. Operators have a strong incentive to manage the data usage of such heavy data users (e.g., by throttling the throughput rates available to such users).



Figure 2. Mobile network operators (MNOs) need to proactively manage network usage.

Honoring SLAs may also mean being able to identify data associated with key customers and giving it preferential treatment in the network. There are strict guidelines in the LTE specifications about the handling of data with different levels of QoS. Gateways in the network have to correctly implement these techniques to ensure that committed QoS is delivered.

EFFICIENT MANAGEMENT OF NETWORK RESOURCES

Another motivation for operators is to manage their CAPEX. Operators are making huge investments in building out their networks to keep up with the growth in data consumption. Unmanaged data usage coupled with the need to deliver on SLAs would result in operators having to deploy more equipment to handle the load. A better alternative is to manage the data usage. The LTE 3GPP specifications introduced the concept of maximum bit rates (MBR). The idea is to limit the maximum throughput used by a subscriber. This is a very critical technique for operators in order to prevent abuse of network resources by a few "bad" subscribers.

REVENUE GENERATION

With an explosion in over-the-top (OTT) applications on the Internet, operators risk becoming mere "dumb" pipes carrying user data back and forth. This is not an enviable situation for operators, considering the enormous investments in infrastructure required to keep up with growth in data usage. Operators want to find ways to generate revenue from the data flowing through their pipes. They can do this by providing the same services as the OTT players, for instance voice-over LTE (VoLTE), but with significantly better and more predictable quality. Operators may want data associated with their own applications to be given preferential treatment as compared to equivalent OTT applications. Additionally, they can add value to the data already flowing through their network (e.g., by signing retransmission deals with service providers in exchange for prioritizing their data, or through targeted advertising based on the content of user data, similar to what Google does with Gmail).



Testing the Cloud

Mark Sytko, New Technologies EXFO Service Assurance

INTRODUCTION

Broadband, backbone and mobile wireless service providers see the cloud as an opportunity for growth. New applications running in the cloud drive new traffic to their network. The cloud also offers new revenues from new services that can be sold to customers. The business models for carriers and how they relate to the cloud are evolving quickly, but one fact is becoming clear: to achieve success in the cloud market, carriers must actively ensure that they offer a high quality of service to cloud consumers. The best way to assess cloud quality is to test the cloud.

A cloud is a shared computing platform available over the network used to run a variety of business or personal applications. The concept is hardly new; it has roots in service bureaus, outsourced data centers and utility computing. What makes the cloud work today is the rise of the web browser as a thin client that allows individual users to run any application, the wide availability of high-bandwidth networks, and virtualization technologies for computers, storage and networking. The cost savings, expanded reach, and improved quality gained by running an application in the cloud is proving to be a business success, as shown by the growth of cloud services into a market worth billions.



Figure 1. Cloud players: cloud users, cloud consumers, cloud providers and cloud centers

Cloud services are sold to cloud consumers who have a business need. To meet that need, the cloud consumer deploys an application to be run in the cloud for a user community. The cloud itself is driven by cloud data centers that provide an environment for running the application. The data centers provide servers, storage and

networking. User access to the cloud data centers is provided by cloud carriers. The cloud provider manages the cloud data centers and their servers, storage and networking. The carrier manages the interconnection between the user and the cloud data centers. The application may be owned and managed by the cloud consumer or the cloud provider.

The quality of the user's experience depends on both the carrier and the cloud provider. Together, they determine how well the application serves its users. The carrier manages bandwidth, latency, reachability, loss and other network key performance indicators (KPIs) that affect quality. The cloud provider manages processor utilization, storage, switch utilization and other resource KPIs that affect quality. But the KPIs that describe the quality of the service (QoS) provided to the consumer and the user are web download times, service availability, data delivery times, and other KPIs that are tied more directly to the service sold to cloud consumers. These service-oriented KPIs cannot be measured by any one actor; together, they either is determined by the business relationship between them, if they are independent, cloud carriers offer SLA guarantees to cloud providers. Cloud providers in turn offer SLAs to cloud consumers. If the carrier owns the cloud provider, then the single organization can offer the service-level agreements (SLA). These SLAs are one factor driving carriers and providers to test the cloud.

Actor	Definition
Cloud User	A person or organization that uses and benefits from the cloud.
Cloud Consumer	An organization or person that buys services from the cloud provider to use or run an application.
Cloud Provider	A person or organization that provides a cloud service.
Cloud Center	A communications service provider that provides connectivity and transport between users and the cloud or within the cloud.

Table 1. Cloud actors

In this complex business environment, carriers have strengths. First, they own the network that connects users to the application running in the cloud. Second, they provide the circuits that connect cloud data centers to the Internet and each other. Third, they can provide the security and privacy customers want through dedicated circuits or virtual private networks that isolate one customer's traffic from another's. Finally, they know how to offer a high-quality service backed by the guarantees of an SLA.



Whitepapers



Secure Access and Single Sign-on

Keep your distributed network ship-shape by ensuring that globally dispersed access points don't represent security leaks. Our Secure Access and Single Sign-on Solution gives you a crow's-nest view of who is accessing network elements, and the potential impact.

Know your crew

Securing large, multi-vendor, multi-technology networks can be a daunting task. With thousands of geosites accessing thousands of network elements, the problem is clear. But a consistent set of security procedures can help — as long as you know they are being followed. Still, how can you manage security in an environment where different element management systems all handle user accounts and auditing differently? Secure Access and Single Sign-on from Nakina Systems solves these complex issues by assigning security privileges by user in a central location and tracking activity in easy-to-access reports.

Watching the horizon

When something goes wrong, the ability to quickly audit who accessed network elements, if they made any changes, and from what network entry point they accessed them, can make the difference in meeting service level agreements. Nakina Systems' Secure Access solution allows security administrators to implement a single user interface to consolidate, manage all access

to network elements and element management systems in the network. A broad range of security policies can be created and enforced network-wide, and administrators can audit activity at anytime.

Set sail safely

Nakina's multi-vendor security management solution offers the ability to:

- Centralize security policy administration via a single tool that integrates into existing corporate identity management systems
- Substantially reduce the effort and cost to administer security credentials for thousands of users across large networks
- Standardize the implementation of security policies across multi-vendor environments
- Enforce robust and consistent security policies with automated network-wide security measures like password aging and minimum alphanumeric password requirements
- Customize security privileges at the individual user level and define and assign privileges to user or groups of users based on job responsibilities.

Key Functions

The Nakina Secure Access and Single Sign-on solution addresses four key problem areas:

Network Element Security

- This feature enables the security administrator to automate and centrally manage user password management across all network elements and element management systems.

User Security Proxy

- This allows users a single point with his or her own unique account credentials and a list of authorized applications or elements, significantly simplifying and improving the end-user experience.

User Privileges

- This enables the security administrator to assign user access privileges by network element or element management system.

Auditing

- This enables the Security Administrator to centrally log, review the activity of and terminate select individual user sessions.



Whitepapers



Know Your Customers, Keep Your Customers: Five Key Benefits of Using Automated Surveys to Gauge Customer Satisfaction

CSG International | September 2011

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Use Semantics to Deliver Flexible Service Management and Avoid the Risks of OSS/BSS Transformation



by Arindam Banerjee | April 2009

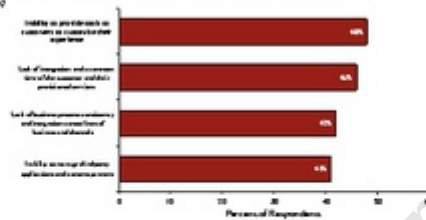
Executive Summary

The customization and convergence of services across application silos and disparate networks are critical to communications service providers (CSPs) aiming to provide innovative services, reduce customer churn and drive average profitability per user. CSPs realize that providing innovative services is not enough; it is critical to offer end users customized services with consistent and flawless quality of service (QoS), which is impossible without an end-to-end unified customer- and service-level view. This is where most service providers falter. Our research clearly points out the glaring problems that exist with most service providers' back-office OSS/BSS systems, which are typically complex, disjointed and lack the agility necessary to present a coordinated 360-degree customer-centric view. In a recent global CSP survey conducted by Yankee Group, more than 60 percent of surveyed global CSPs agreed that improved customer experience is directly linked to improved ARPU.

Most service providers take a top-down approach to express customer and service views. However, they often adopt a service model that in most cases does not capture the complexity of misaligned as well as heterogeneous underlying infrastructure. Only when the relationships among underlying systems, services and customers are mapped out of the infrastructure is it possible to achieve the goal of traditional service modeling. Therefore, what is needed today is a bottom-up approach that looks at how existing systems map to existing customers instead of a more traditional top-down approach.

CSPs have invested billions to streamline and modernize their OSS/BSS infrastructure to achieve the agility required to see all of their assets in one view, which in most cases has failed to deliver the desired service-level transparency. Exhibit 1 illustrates the critical factors inhibiting CSPs from being competitive and delivering innovative services to customers. Not surprisingly, the inability to have a common view of customers, lack of customized service delivery and business process inconsistency are the top factors that hamper service providers from rolling out innovative services.

Exhibit 1.
Critical Factors Inhibiting CSPs from Being Competitive and Delivering Innovative Services
Source: Yankee Group, 2009



In light of current economic challenges, it is clear that telecom service providers are squeezing their capex budgets to align with lower revenue growth expectations. Hence, although a unified end-to-end service model remains on top of their priorities list, instead of full-scale and expensive transformation exercises, CSPs and managed service providers are looking for an alternative low-risk, incremental path toward a unified service model. In this report, we look at CSPs' current operational issues, take a deep dive on a unique, alternative semantics-based approach toward achieving a unified virtual service model, and investigate how such an approach can enable customer consistency by solving the problem of siloed infrastructure data.

This custom publication has been sponsored by **Drinking Systems**.

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Whitepapers

MDS BillAnalyzer

Deliver clear e-bills to business customers, provide the management information and customized reporting they need to effectively manage their accounts and services, simplify integration with existing infrastructure, improve ROI and reduce risk.

Consolidated e-billing and Analytics for Business Customers

Communication Service Providers (CSPs) are faced with the challenge of how to increase revenues and drive up profitability despite intense competition and slow growth in core markets. One revenue growth strategy being pursued is to expand into new business areas and increase the range of products offered. However, this expansion can increase billing complexity and have a negative impact on customer experience. As business customers represent a significant source of revenues for CSPs, it is imperative to deliver increasing levels of value to customers while reducing complexity and minimizing the cost to serve.

Businesses are demanding access to tools that enable them to view their consolidated bills, analyze usage, leverage business intelligence reports and control the cost of the services they use across their organization. CSPs need to satisfy this need to differentiate from the competition, attract and retain key customers, and efficiently deliver a superior customer experience.

MDS BillAnalyzer

MDS BillAnalyzer is a sophisticated e-billing and analytics application that allows you to present an integrated view of products and services to business customers. It provides a seamless customer experience from disparate billing systems and allows business customers to manage their consolidated bills in a convenient manner that eliminates the need for paper bills. Powered by the Lavastorm Analytics Engine, MDS BillAnalyzer provides light-touch integration capabilities to deliver rapid go to market and low-risk deployment that capitalizes on existing infrastructure.

MDS BillAnalyzer



MDS BillAnalyzer Analytics Dashboard

Advantages for CSPs

Single View of Products and Services

MDS BillAnalyzer has been designed to be billing-system agnostic. It streamlines the task of bringing together information from multiple billing systems, presenting the customer with a single, converged view of their services. Its non-intrusive ETL functionality and standard APIs simplify the capture of data from multiple sources, provide data synchronization and assurance, support data enrichment for presentation, and offer rapid system integration with low project risks and costs.

Single View of Customer

With MDS BillAnalyzer, CSP care staff and relationship managers can view bill and usage data in the same way as customers. It provides them with a holistic view of the customer and their services, enhancing first-time call resolution and helping staff to have a better understanding of the true value of the customer.





Network Automation Blueprint

A best practice reference architecture for achieving secure & reliable digital services



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Case Study: MVNO Integration

PROJECT
MVNO integration

SITUATION
A converged provider, desiring to offer wireless services to its customers, acquired the regional subscribers of a national provider. This effort required the conversion of approximately 35,000 subscribers as well as the MVNO integration to this national provider to support these customers as well as add new customers.

CHALLENGE
Provide a business-to-business MVNO integration from the first provider's system to other provider's system, with a complex, in-store conversion procedure for handset swaps.

RESULTS

- Cycle30 designed and integrated a complete order-to-cash business integration to support the MVNO offering
- Solution included direct order-entry integration, provisioning and LNP integration as well as end customer and wholesale billing integration and reconciliation
- Conversion process involved a challenging, in-store manual conversion and phone swap with an average customer handling time of 35 minutes
- Project finished in six months with a complete system for ordering, provisioning and billing
- 35,000 subscribers converted within six-month timeline with less than two percent attrition

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Cloud Connectivity Management Made Simple: Your Cloud Services Are As Good As Your Network

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INTRODUCTION

Cloud services are the Holy Grail for service providers. As enterprise customers look to reduce IT expenses, cloud services are looking more promising than ever in terms of achieving these savings. Although multiple stakeholders are increasingly involved in the delivery of cloud services, none have as much impact as cloud carriers.

But first, let's start with a simple question: "What exactly is cloud computing?" According to the definition recently published by the National Institute of Standards and Technology (NIST), "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." The document further elaborates on its definition by providing a list of essential characteristics, in addition to service and deployment models. The essential characteristics are: on-demand self service, broad network access, resource pooling, rapid elasticity and measured service. A definition for each characteristic is provided in the following **NIST publication**. By applying a network view of these characteristics, it becomes immediately clear that a static and classic network is not able to deliver on these promises. An intelligent and dynamic network is mandatory to delivering on these essential characteristics.

Cloud transport connectivity can be described as the connectivity between cloud consumers and cloud content. This connectivity makes delivery of cloud computing services to the cloud consumer possible. In order to deliver this type of connectivity, cloud carriers need high-performance services with multiple classes of service and high availability.

Cloud application connectivity can be described as the connectivity between cloud content. This connectivity provides the ability to move data between the computing resources via different data centers. For cloud application connectivity, services must be high performance and be available at all times.

This application note discusses the technologies being used to deliver the different type of connectivity, and the management steps (e.g., activation, performance monitoring and troubleshooting) required to successfully deploy cloud computing services.

GOT CONNECTIVITY?

To deliver cloud computing services, cloud providers must possess the computing infrastructure necessary to process and store very large amounts of data, and rely on cloud carriers to connect all the pieces together. This section covers the different types of connectivity used to deliver cloud computing services in more detail, and also covers the technology used to achieve this connectivity.

Cloud Transport Connectivity

The original connectivity strategy for cloud computing was the Internet. What better a solution than the most ubiquitous WAN technology to access data centers? Although the Internet is great for consumer applications, it lacks the attributes mandatory for enterprises: security, network performance, data governance and regulatory compliance [IMEF, CSI].



Figure 1. Cloud connectivity.

Figure 1 shows the data flow for delivering cloud computing services and the two types of connectivity required, as follows:

1. Cloud transport connectivity
2. Cloud application connectivity



Figure 2. Current challenges in Web-based service delivery. (Source: Matrix Elements Forum)



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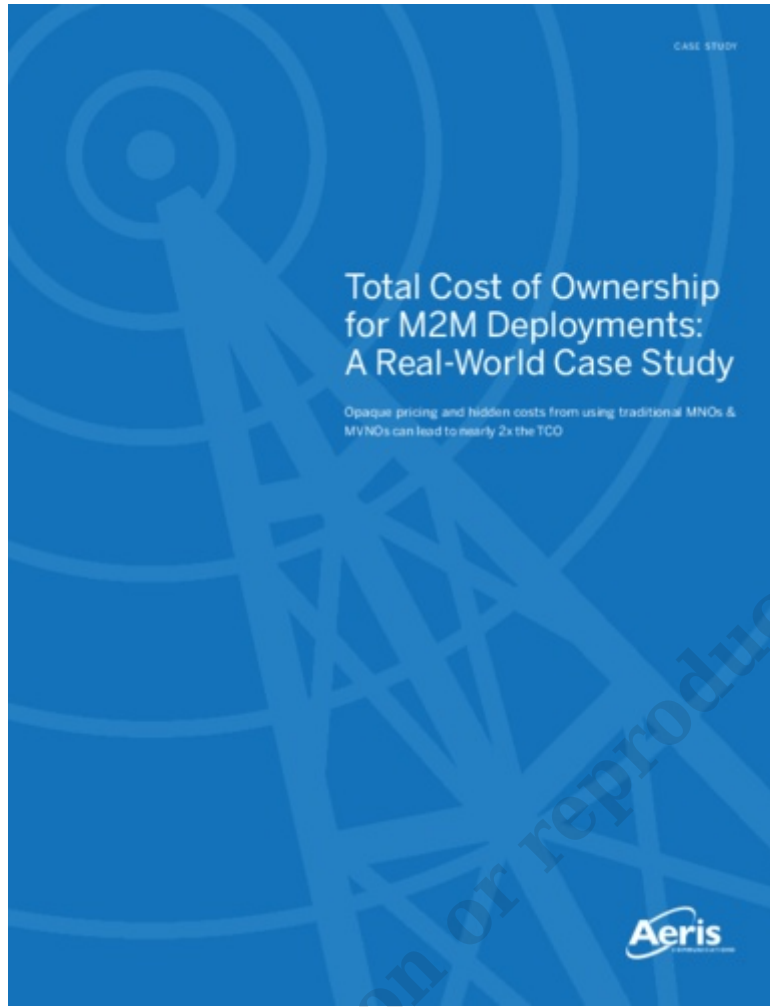


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