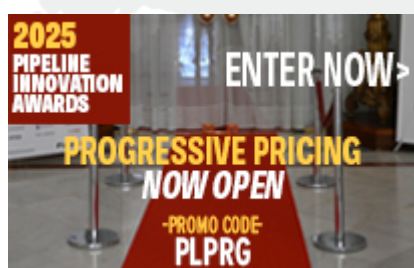


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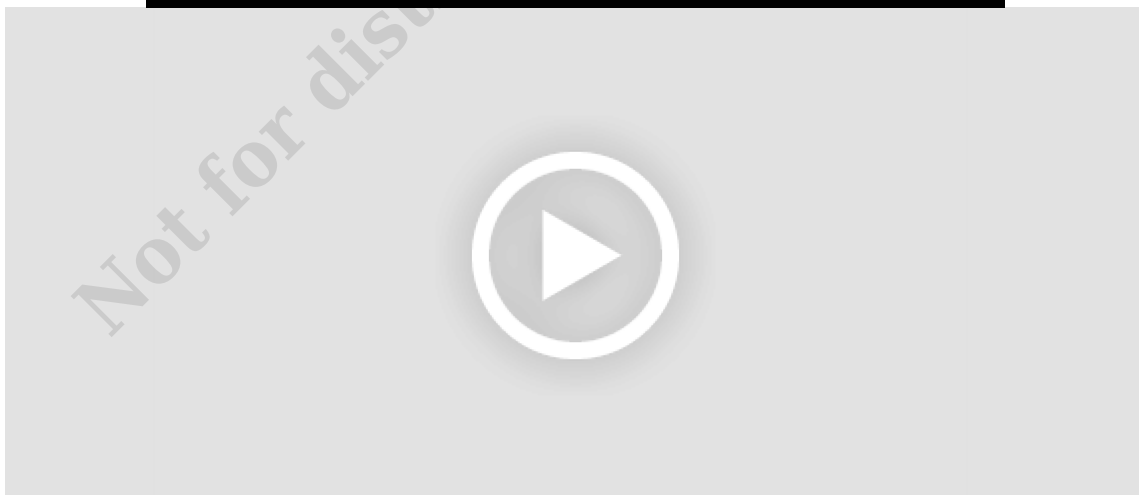
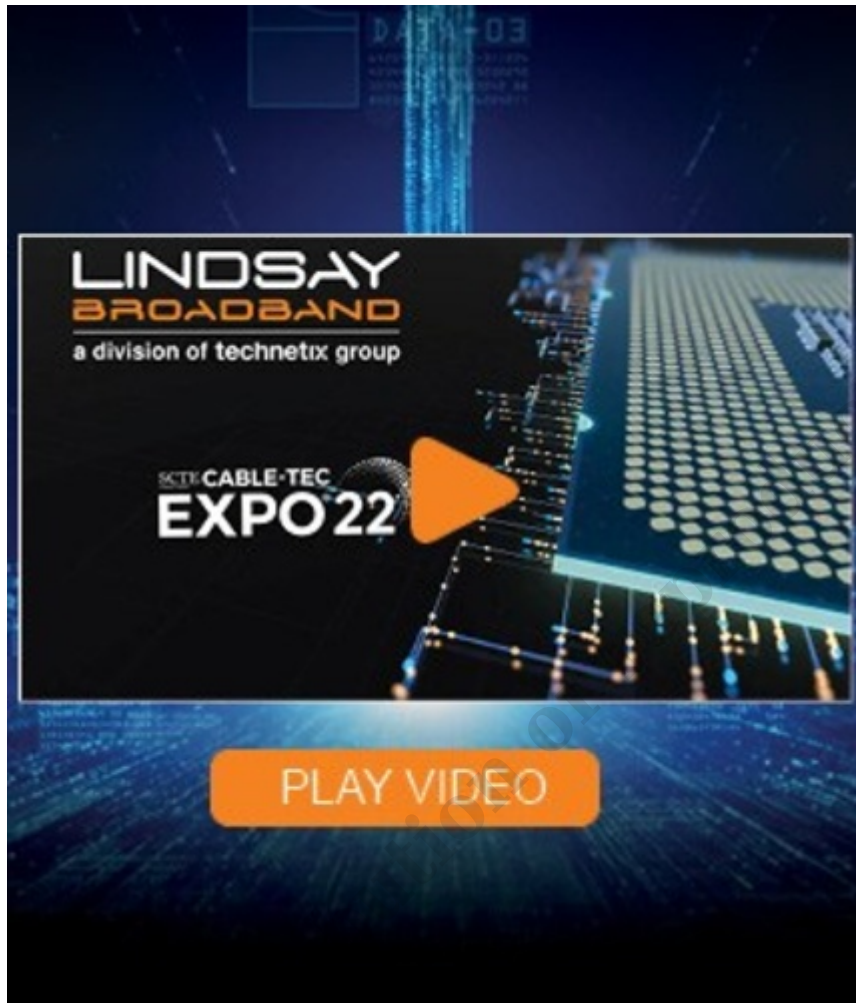
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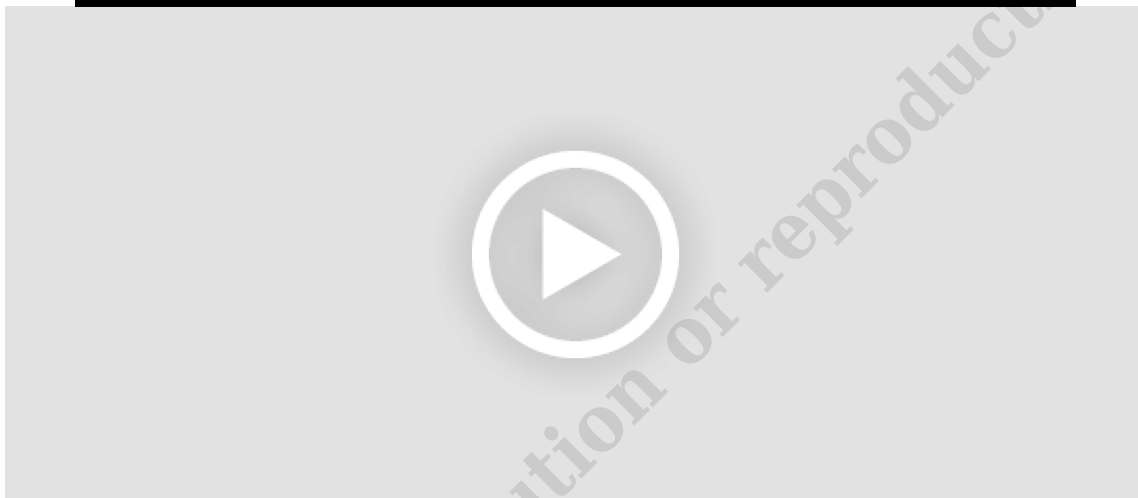
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### End-to-End Solutions for Broadband Networks

In case you missed Lindsay Broadband - a division of Technetix group at the SCTE Cable-Tec Expo, this video highlights the must-have, end-to-end solutions for your network.





## 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.

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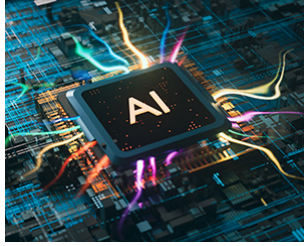
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Designed to interface seamlessly with your B/OSS and Microsoft® Mediaroom<sup>™</sup>, Media(n) provides a true end-to-end automated experience for provisioning and activating services. Rather than struggling through the complexities and uncertainties of IPTV integration, Media(n) is a predictable solution that ensures successful integration.

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- Credit limit management
- Automated provisioning



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The slide features a laptop displaying a dashboard with various charts and maps, a pencil holder with pencils, and a red alarm clock on a desk.

# Acumen CPQ™ Overview

## Configurable CPQ built for the Digital Communications Service Provider.

Acumen CPQ is a powerful Product Catalogue and Configure, Price, Quote tool for Service Providers of all sizes - enabling an interface for both the Sales and Engineering teams, and the Enterprise Customer. It is an intuitive and easy-to-use shopping-cart style quotation tool that is rules and role driven for both sales teams and end-customers. It is fully configurable with a powerful admin section and comes with 30+ out of the box features.



## Acumen CPQ™ | Core Capabilities & Features

Super Admin Capabilities	Core Features
<ul style="list-style-type: none"><li>• Products</li><li>• Price Query</li><li>• Reports</li><li>• Product Configuration</li><li>• Manage Roles and Workflow</li><li>• Configure Generic SOF Parameters</li><li>• Configure Supplier</li><li>• Customer Association</li><li>• Local Loop Margin/ Tax</li><li>• Currency Conversion</li><li>• Notes Configuration</li><li>• Manage Widgets</li><li>• Useful Information</li></ul>	<ul style="list-style-type: none"><li>• Guided, shopping-cart style sales UI.</li><li>• Configurable product catalog supporting wide range of telecom products.</li><li>• Configurable products and rules to support non-standard pricing.</li><li>• Meaningful role specific dashboards and reports.</li><li>• Roles and permissions-based access to features.</li><li>• Multi-currency support and currency conversion.</li><li>• Accurate and customizable pricing.</li><li>• Customer specific rate cards.</li><li>• Configurable discounts that can be customized for individual user roles.</li><li>• Quick quote generation.</li><li>• Quotation version management.</li><li>• User friendly UI with the ability to create quick copies/ clones of line items and quotes.</li><li>• Extensive audit logs.</li><li>• Get prices for multiple bandwidths and contract terms in a single click.</li><li>• Quick quote comparison for option analysis - create multiple copies of quotes with minor differences.</li><li>• Google maps based local loop pricing UI.</li><li>• Country and vendor specific tax and margins for local loop pricing.</li><li>• Third party vendor management.</li><li>• Support for last mile pricing within the product database as well integration capability with third party providers.</li><li>• Capability to host millions of local loop building lists and prices within the product database.</li><li>• Real time margin analysis.</li><li>• Automated and configurable pricing approval workflows.</li><li>• Benchmarking data for competitive pricing.</li><li>• Ability to present bundled prices in customer quotation.</li><li>• Parent-child relationships in related products.</li><li>• Sales funnel and quotation data reports, price query reports.</li><li>• Third party supplier management module.</li></ul>

Acumen CPQ™ Overview

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## Case Study: CDMA acquisition and conversion

### PROJECT

CDMA acquisition and conversion

### SITUATION

When a GSM provider acquired a CDMA competitor in order to expand its geographic footprint, it needed to integrate the acquired network, subscribers and inventory into its existing order-to-cash billing platform.

The provider engaged Cycle30 to convert the acquired CDMA system customers so that they could be billed and managed from the same platform as the provider's other services.

### CHALLENGE

The acquired CDMA provider enjoyed a small, local-company reputation among its customers, and had historically referred to its new parent company as "the big competitor" in its marketing campaigns. This created a high standard for the parent company to attain as it reached out to this newly acquired customer base ahead of the conversion.

Assimilating 42,000 pre-paid and post-paid subscribers from a different consumer brand and wireless technology required careful planning for a cost-effective and positive customer experience. Each difference in technology between CDMA and GSM systems had to be evaluated and reconciled to integrate them successfully, without duplication or error.

### RESULTS

- Cycle30 delivered the provider's conversion with a minimum total system downtime
- Conversion delivered on time
- Conversion delivered on budget
- 99 percent customer record data accuracy; remaining items resolved before next cycle
- Delivered the new billing cycle with no pro-rates or adjustments

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C015-0010



If you want to get where you're going, you need an accurate map. Nakina Systems' Inventory Discovery & Reconciliation solution provides a true picture of your network's physical and logical inventory, so you can see beyond the horizon.

#### Setting sail

In today's hyper-competitive environment, service providers are tasked with rolling out new services quickly — and delivering a superior customer experience. Yet rapid network expansion presents new challenges. Discrepancies between inventory and the real network are the norm, causing reduced order processing capacity, slower fault isolation and provisioning delays. Nakina Systems' Inventory Discovery & Reconciliation solution discovers optical, Ethernet, IP/MPLS, and other network equipment and reconciles against industry standard inventory systems to reduce fallouts and provisioning times. Without an automated discovery and reconciliation solution like Nakina's, the investment in network-wide inventory systems is impossible to monetize.

#### Staying on-course

A true picture of your network topology is an absolute necessity for rapid rollout of new services, efficient operation, and a predictable customer experience. Nakina's continuous

reconciliation capabilities ensure the highest level of network integrity. The discovery engine is constantly in contact with the network, performing regularly scheduled inventory discovery and reconciliation with network inventory data bases. This constant feedback loop helps highlight inconsistencies before they become difficult problems. Nakina's customers can identify poor capacity management, lack of redundancy and many other challenges before they cause outages or other problems.

#### Finely tuned instrumentation

Nakina Systems' network integrity solutions enable our customers to accelerate time-to-revenue through faster deployments. Without a high integrity image, matching capacity to demand is a hit-or-miss affair: work orders and customer orders fall out due to non-existent or over-allocated ports; scarce capital resources are consumed when spare capacity is unused elsewhere. With an accurate and current picture of the network, there is no destination too far.

#### Key Functions

Nakina Systems' Inventory Discovery & Reconciliation replaces ad hoc data with a true network integrity solution. With an accurate picture of the network, you can feel more confident about the state of the network and your ability to deliver new services on-time and on-budget.

#### Multi-Vendor, Multi-Domains Topology Discovery

- Discover Optical Ethernet & IP/MPLS N/Ws (OO/VO/VS networks)
- Reduces provisioning times

#### Full Discovery of Physical & Logical Inventory

- Topology, Lines, Protection Groups, End-End Circuits
- Eliminates fall-outs due to inaccurate inventory

#### Pre & Post Circuit Qualification

- On-the-fly qualification of resource availability to support Assign & Design process

#### Integrated Security Solutions

- Eliminates fall-outs due to access issues and password issues
- Policy-based protection of access to network information

#### Standards-based Interfaces

- Simple, Configurable Integration with 3rd Parties



COLLECT. MONITOR. ANALYZE. VISUALIZE.

Actionable Intelligence for a Safe,  
Secure and Connected World

SS8 Networks provides the fastest and simplest way to collect, monitor, analyze, and visualize lawful interception data. For more than 20 years, we have been evolving and innovating to match the changing needs of Communications Service Providers (CSPs) and Law Enforcement Agencies (LEAs), while delivering comprehensive solutions that are easy to use and optimized for the best results.

Our solutions make analyzing, enriching and managing complex data sets simple, helping LEAs stop organized crime, catch criminals, and prevent terror attacks. For CSPs, we provide a trusted foundation for meeting regulatory requirements efficiently and effectively.

## OUR SOLUTIONS

Compliance mediation  
and interceptionLaw enforcement  
monitoring center56 regulatory  
complianceEnd-to-end Lawful  
Intelligence systemComprehensive  
data analyticsACTIVE IN  
**35**  
COUNTRIESCOVERING  
**1BN**  
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US&UKWe are the top provider in the US and UK for  
Mediation and Monitoring platforms.8 OF 14  
WORLD'S LARGESTWe work with  
8 of the world's  
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communication  
service  
providers.150 VENDOR  
INTERFACESProven network equipment interoperability with over  
150 vendor interfaces to expedite deployment.

# CSG Point-of-View: The Promise of Television Commerce

*Interactive Television Technologies Can Deliver New Ways to Engage Your Customers and Increase Revenue and Upsell Opportunities in Real Time.*

## Using Interactive Television to Build Revenues, Engage Customers

The television viewing experience has been forever changed by the Internet. Consumers want to engage and interact with their favorite television content—much like they do with content on their computers, mobile phones and other technology devices.

The mass adoption of web-enabled devices is transforming the way households access and consume media content on their televisions—and how they interact with businesses via the TV. Market research firm InStat projects that more than 200 million web-enabled devices will be in use in the United States by 2014, and the average household will own between five and 10 such devices—televisions included.

With the set-top box in millions of U.S. households, cable and OTS providers have a clear advantage in leveraging T-commerce models to settle new revenues and deliver new ways of interacting with customers that build loyalty and deliver a more personalized experience.

With new technology standards from CableLabs—namely the Enhanced TV Binary Interchange Format (EBIF)—T-commerce is a viable business model for cable and OTS providers.

The EBIF standard has already made its way into 25 million subscriber homes, offering an innovative and immediate way for providers to entice new consumers and retaining existing ones.

## Interactive Customer Care Drives Loyalty

Interactive TV models enable cable and OTS providers to deliver a more enriched customer experience. What better and more direct way to communicate with consumers than through their television?



The beauty of interactive TV is that it enables two-way communication between a provider and their customers in real-time.

Providers can send messages directly to subscribers about their bill, and then prompt the subscriber to view and pay their cable bill right from the television screen using their remote control.

With direct integration from the set-top box to back-office billing, customer care and other applications, any changes a customer makes to their account from the comfort of their couch are updated in real-time.





**With over 75% of your IT budget dedicated to maintenance,\* it's difficult to move ahead.**

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Our comprehensive suite of Managed IT Services free you from capital constraints and resource restrictions. Simply put, we focus on your network so you can grow your business.

Managed IT Services provide the benefits of dependable business continuity and IT innovations that are in line with your business processes. CHR's team of experts will partner with you to uncover hidden costs within your IT operation and develop such tools as cost savings analysis models.

\*According to Gartner Research study

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- 24x7 PC Management
- Baseline Audit & Assessment
- Support Center Services
- Backup Services
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- Vendor Management
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## MATRIXX SUBSCRIBER POLICY & CHARGING SYSTEM

MATRIXX Subscriber Policy & Charging System (SPCS) integrates the use of subscriber policies and preferences with sophisticated online charging to drive emerging business models to success in the Telco 2.0 era. It takes policy management and online charging to the next level by providing operators with a single, flexible way to control and charge for network traffic, combining it with subscriber preferences that both enforce fair usage and empower the subscriber to have visibility and control over their spending. This comprehensive view enables service providers to create new real-time relationships with their subscribers that are more personalized and profitable than those of today's market.

MATRIXX subscriber policies interact with customer pricing and products to provide a better level of visibility, more control and real-time service interaction for subscribers. By enabling them to set their own preferences, controls, notifications and spending limits, service providers can offer more personalization, better visibility, and highly differentiated products and services.

### Personalization Drives Differentiation and Loyalty

In the era of instant information, twitter, 24 hour news channels, and almost ubiquitous Internet connectivity, subscribers expect the same visibility and access to information about their spending on communications services as they do on their credit card or iTunes account. As devices and applications grow in availability and capability, it becomes more critical that subscribers understand and control how and when they use services and what factors impact how they are charged for services. By providing subscribers the ability to set preferences on service access, spending limits, balance sharing, quality of service, and other factors, service providers can drive a more meaningful subscriber relationship resulting in stronger customer loyalty.

In many markets today, mobile penetration is approaching saturation. In some markets, penetration is more than 100% as subscribers own multiple devices. In this highly competitive climate, the only way to obtain a new customer is

to take one from your competitor. While exclusive or bleeding edge devices traditionally drove service provider differentiation, current economic conditions have resulted in consumers placing higher value on family plans, bundles, pricing, self-care and spend management features. A host of retailers are also flooding the market with low end offerings. The result is that traditional 'one size fits all' service offerings do not provide the level of differentiation required to attain and maintain subscribers.

With MATRIXX, subscribers can choose to set spending controls, policies and preferences to personalize their offer and drive a more subscriber-oriented experience. They can set spending limits and notifications at the service level such as setting a higher level of spending for email than for Web browsing. Subscribers can limit access to specific services or limit usage to certain hours of the day. They can also set policies on how balances are shared among devices or family members.

Additionally, service providers can set policies that impact service usage or pricing to enforce fair usage, reward their best customers, or encourage subscribers to use high bandwidth services when network traffic volumes are low. Information about credit score, historical spending, or customer status can influence how services are priced and charged for.

## Case Studies



Report

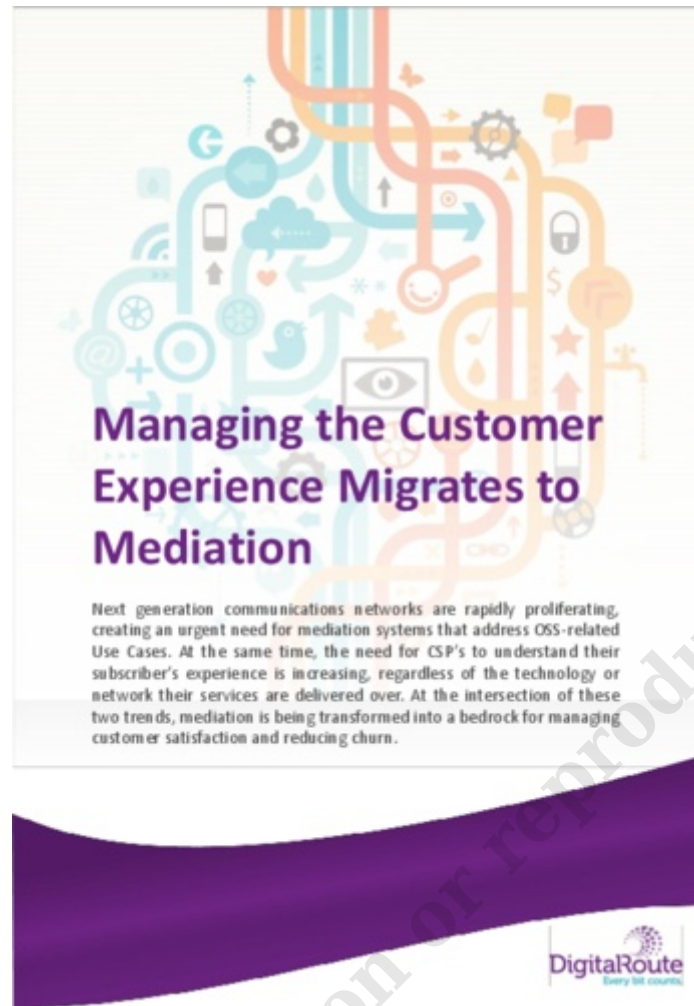
Reducing order fallouts: Key to  
success with business services

January 2015

Mark Mortensen and Anil Rao

[www.analysysmason.com](http://www.analysysmason.com)

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# DATA SERVICES OVER 25 YEARS, 150,000 MILES OF DATA

SAVE money on data services  
GUARANTEE best practices  
ENSURE data accuracy  
AVOID government regulatory obstacles

Enghouse Data Services (formerly Moore Resource Systems) is a specialized team of GIS experts who make it possible for organizations to create and maintain geo-spatial enabled data for their next generation enterprise IT applications. The services that Enghouse provides can involve large data entry tasks to help populate unique data models or specific data updates based on field changes to a company's assets.

Our Enghouse Data Services team specializes in providing seamless project management support for an organization's own team. Data Services works with an organization's staff to assist in the tracking and completion of tasks on a daily basis to meet specific and prioritized needs.

## DATA VALIDATION & QA

The Enghouse Data Services team offers specialized tools that enable validation of source data before conversion to the target. These specialized tools can highlight problem areas that need to be corrected (e.g. data integrity rules) that might be broken by migrating to the target system.



## DATA TRANSFORMATION

In a complex data cleansing and migration effort, data very often needs to be transformed between one or more formats. The Enghouse Data Services team accurately transforms the most challenging data, whether spatial or non-spatial.



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## NEXT GENERATION DATA CENTER STRATEGIES FOR SERVICE PROVIDERS

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## White Paper

# Preparing the OSS Back Office for New SMB Services & Bundles

Written by:

**Alan Breznick**, Senior Analyst, Heavy Reading, in cooperation with

**Rick Mallon**, Vice President, Product Management, Sigma Systems

June 2011





## outsmart the fraudsters

### ever-growing complexity of telecom fraud

Telecom fraud is constantly evolving as fraudsters are finding new ways to commit fraud using your networks. Whether it is subscription fraud, Winging, PEX hacking or international Revenue Share fraud (IRSF), it can be difficult – even for experienced fraud managers – to guard against the latest attack methods.

Although great strides have been made in reducing fraud across the industry, fraud managers and consumers need to remain vigilant in their pursuit to keep the fraudsters at bay.



### the ripple effect

The CHCA 2017 Annual Fraud Loss Survey estimates that \$29B is lost to fraud each year. Of course, the actual cost is far higher due to the collateral damage to your brand reputation, organizational efficiency and customer satisfaction.

In the highly competitive telecommunications marketplace, you are focused on creating and launching innovative services to differentiate yourself from competitors. Each technology and service added creates new opportunities for fraudsters to infiltrate your network. To combat this, your security and fraud strategies need to remain robust to stay several steps ahead of the latest techniques. For instance, detecting fraudulent numbers before connecting the call requires a collection of calls to premium and unallocated numbers as they are happening. The good news is that with high-quality routing data you can proactively protect your business from being the unwitting victim of new attacks and criminal activity.

### staying one step ahead

Even for the savviest fraud managers, outsmarting the fraudsters requires enhancing existing platforms and systems. This gives you added intelligence to carry fraudulent and potentially risky traffic even if it is brand new to your network, which allows you to prevent revenue loss and improve risk management. Comprehensive solutions allow you to proactively block call to fraudulent numbers and perform targeted mitigation of inbound traffic for call strategies.

iconectiv

## Accelerating the deployment of 5G with simple and flexible transport networks



Mobile Network Operators (MNOs) are struggling to meet the demands of connecting their existing 4G/LTE networks, building out transport for new 5G networks, and laying the groundwork for distributed compute. ADVA can help with a proven solution that meets the operational requirements and the demanding business case.

### Challenges faced by MNOs in their 5G transport network planning

MNOs aiming to deploy 5G face a fundamental question of how to design their transport network. This is the network connecting cell towers and small cells to their core network. It is referred to as Mobile Backhaul, Fronthaul, Midhaul and X-Haul, depending on the technology used.

MNOs plan to make a strategic investment in fibre for mobile transport, with microwave and mm wave radio deployed only where needed<sup>1</sup>. Drivers for microwave include cases such as avoiding delays in fibre deployment and overcoming obstacles in geographic regions such as roads and railway infrastructure.

In addition to the physical medium for transport, MNOs face other questions in three broad areas:

- Support of existing 4G macro cells, and new 5G cells
- Architecture and technology selection
  - Architecture options such as the optimal location of edge compute
  - Technology options and protocol selection - such as use of small cells, massive MIMO, C-RAN, common radio public interface (CPRI), eCPRI, O-RAN, and backhaul
- Accommodating sharing of the transport network to bring cost per cell site down

<sup>1</sup> <https://www.gsma.com/technologies/wp-content/uploads/2019/04/1-Mobile-Backhaul-Options.pdf>



## PTP Test Applications

Hamadoun Dicks, Product Specialist, Transport & Datacom Business Unit

4G/LTE deployments and increased bandwidth requirements in Carrier Ethernet services are the driving force behind the new backhaul network technology. Synchronization is required for cellular and wireless network operations because base stations must be synchronized in order to hand off calls between base stations, minimize dropped calls and ensure proper billing. Since precision time protocol (PTP) provides both phase and frequency, it is quickly becoming the synchronization technology of choice for packet networks.

### WHAT IS IEEE 1588V2/PTP?

PTP provides high clock accuracy in a packet network by continuously exchanging packets with appropriate timestamps. In this protocol, a highly precise clock source, referred to as the grandmaster clock, generates timestamp announcements. It also responds to timestamp requests from boundary clocks, thus ensuring that the boundary clocks and the slave clocks are precisely synchronized with the grandmaster clocks. By relying on the holdover capability, the precision of the integrated clocks and the continuous exchange of timestamps between PTP-enabled devices, the frequency and phase accuracy can be maintained within a submicrosecond range, thus ensuring synchronization throughout the network.

The objective of PTP deployment is simple: by exchanging timestamps, the slave clock can determine its offset from the grandmaster clock and thus adjust itself. This provides frequency and phase synchronization through packet distribution.



Figure 1. PTP network

### PTP USE CASES

PTP is a packet-based technology. As the synchronization packets used by PTP are forwarded throughout the network between the grandmaster and hosts, they are subject to delay (latency), delay variation (packet jitter) and frame loss. Despite applying high priority to synchronization flows, synchronization packets will still experience congestion as well as routing and forwarding issues (e.g., out-of-sequence packets and route flaps). The host clock's holdover circuit must be stable enough to maintain synchronization in the event that synchronization packets experience these network events.

In addition to testing packet metrics to make sure they meet the service level agreement (SLA), in some cases, it may also be critical to validate the frequency measurements of the sync signal. A few use cases are detailed herein. Table 1 summarizes the different synchronization testing applications.

Service Turn-Up	When	Who	Tests	Duration	Product
Ethernet backhaul and PTP client turn-up	Performed every time a tower is put to service	Field technician	- EtherSAM (Y1564) - PDV GL measurements - Client emulation	30 minutes at 1 hour	NetBaker Series
Sync network installation	Performed when a sync network is being deployed or when a new grandmaster is added	Network engineer	- Wander measurements - DC PDV offset - Slave/client emulation	24 to 48 hours	SyncWatch PRO
<b>Troubleshooting</b>					
Basic troubleshooting	Packet metrics issues/defective slave client	Field technician	- EtherSAM (Y1564) - PDV GL measurements - Client emulation		NetBaker Series
Advanced troubleshooting	Incorrect clock output/defective grandmaster	Network engineer	- DE, MTE - DC PDV offset - Slave/client emulation		SyncWatch PRO

Table 1. Synchronization applications

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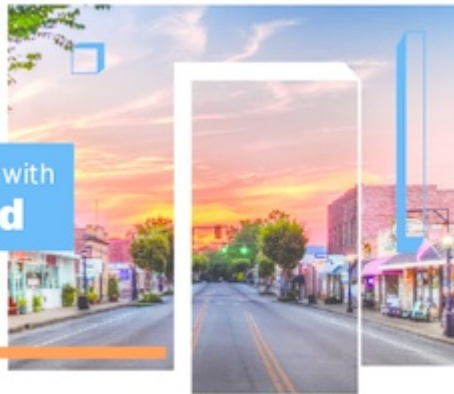
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A Stratecast Whitepaper





## Building the Future with Broadband



### Creating Communities

Communications service providers play a vital role in building rural America. Connecting unserved or under served communities through broadband technology improves their way of life and closes the digital divide by providing economic opportunities otherwise not possible.

CHR Solutions is a proven industry leader with over 75 years of experience and will help you invest in broadband. Our complete solution gives you the tools necessary to make strategic business decisions for building, marketing, and monetizing your network.

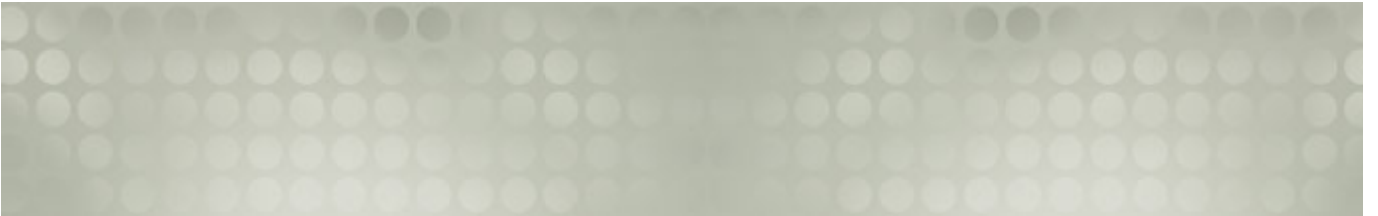
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Network Planning & Design Broadband Viability and Feasibility Studies Outside Plant Engineering (Architecture, Field Notes, Design, Permitting) GIS/CAD Services Project/Construction Management Loan & Grant Assistance	Customer Management Billing Service Activation Sales & Marketing Order Capture Facilities Management Dashboards Case Management Financials	Regulatory Marketing Product Management Customer Service Billing CyberSecurity NOC Monitoring Invoice Fulfillment Systems Rollout



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