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PIPELINE / VOLUME 21 / ISSUE 4

# PL

## MOBILE ECOSYSTEM TRANSFORMATION

### SAVING POWER WITH MOBILE O-RAN FEATURING: **SOLID**

### 2025 SATELLITE TRENDS

### MAXIMIZING MOBILE CONNECTIVITY

### UNDERPINNING IOT, 5G, 6G AND BEYOND



### SOLVING MOBILE LATENCY REALLY, REALLY SMART PHONES AI & NETWORK TRANSFORMATION



### MVNO BREAKOUT

### V2X & AUTONOMOUS DRIVING

### MOBILE & WIRELESS

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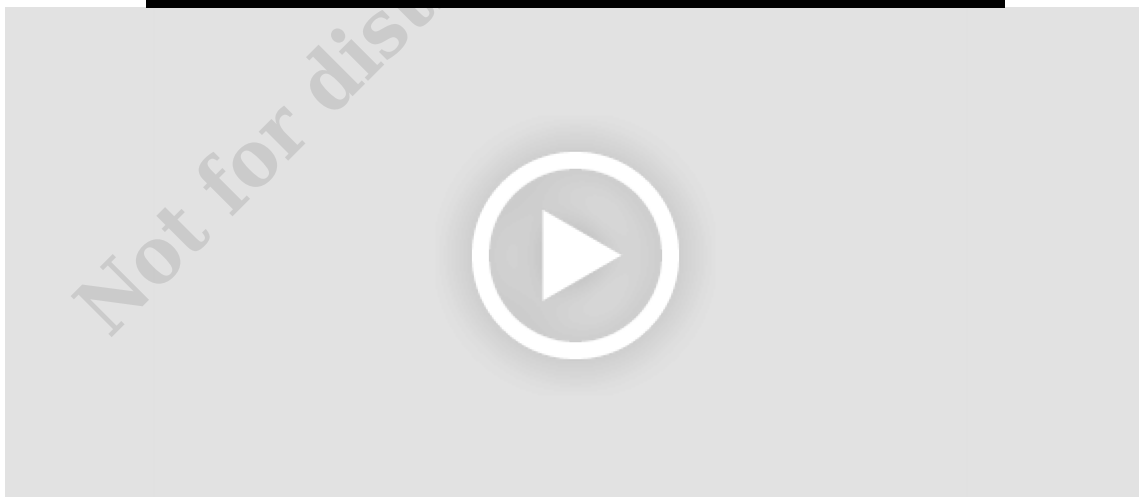
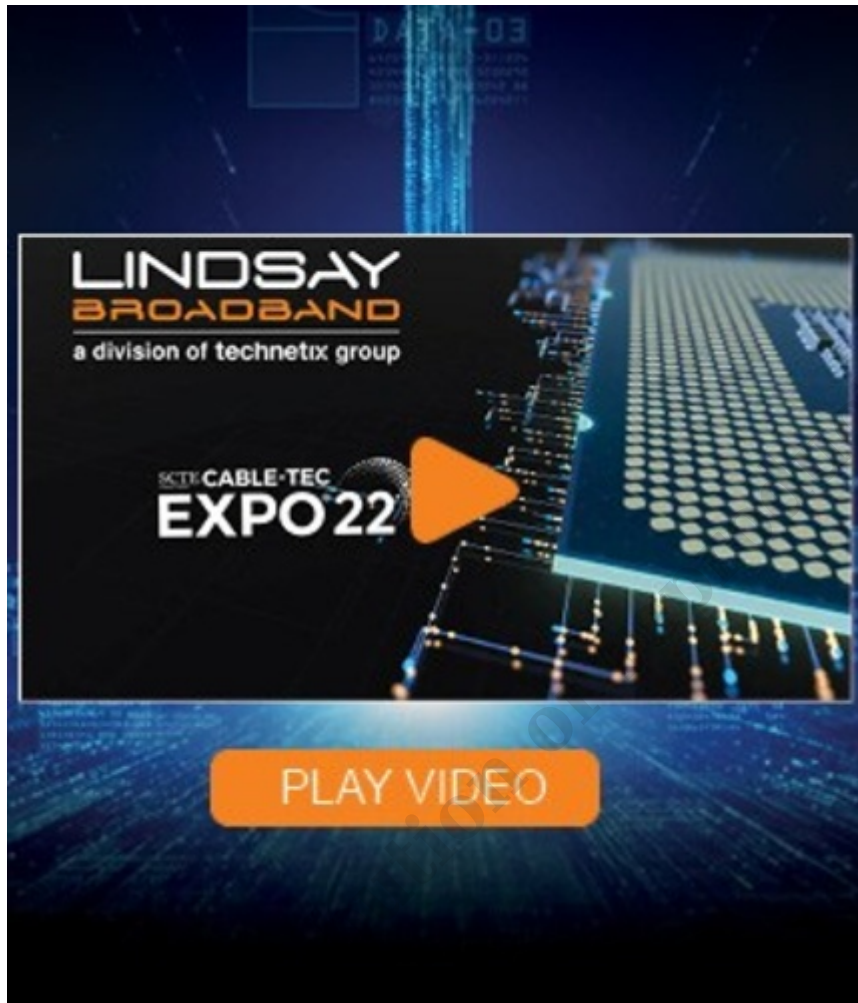
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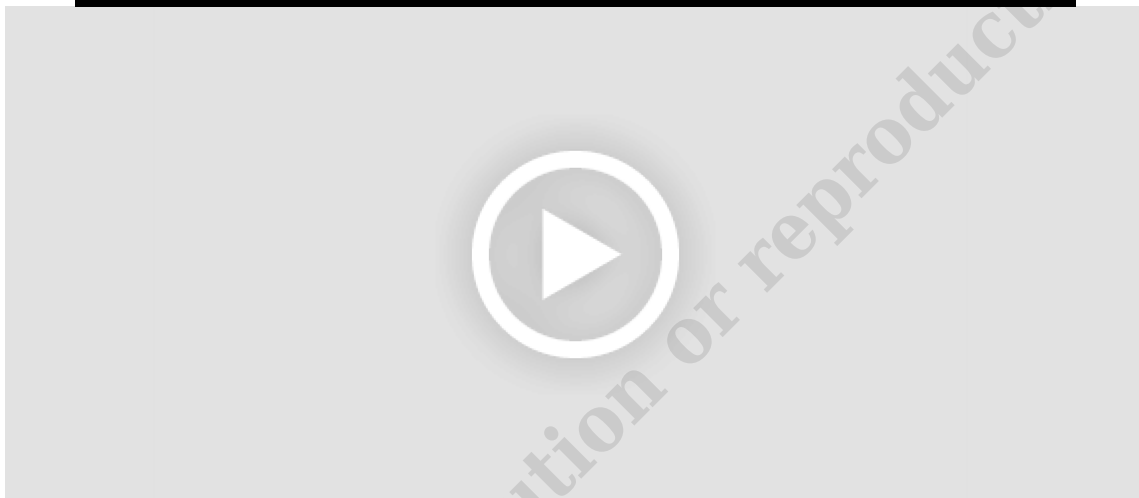
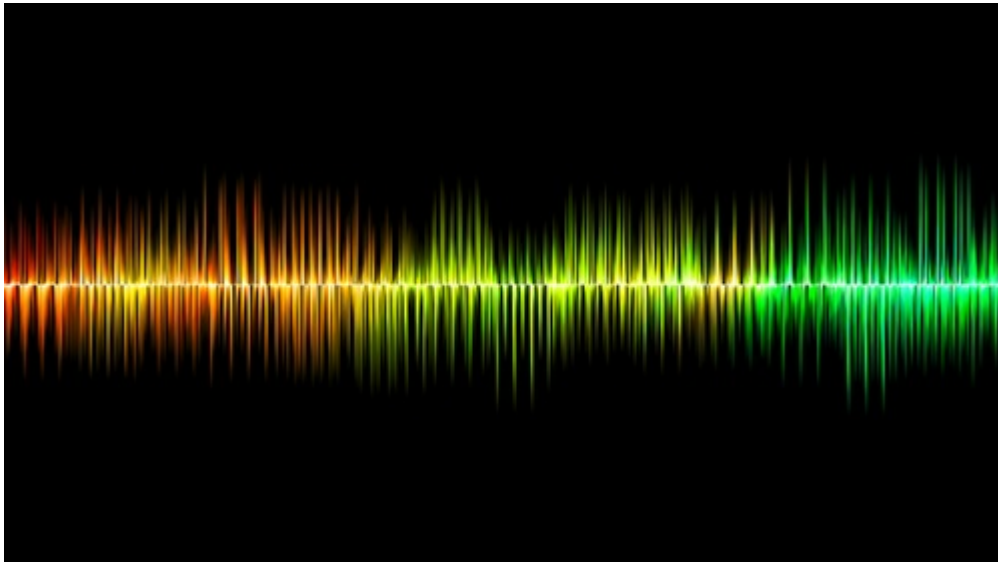
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### End-to-End Solutions for Broadband Networks

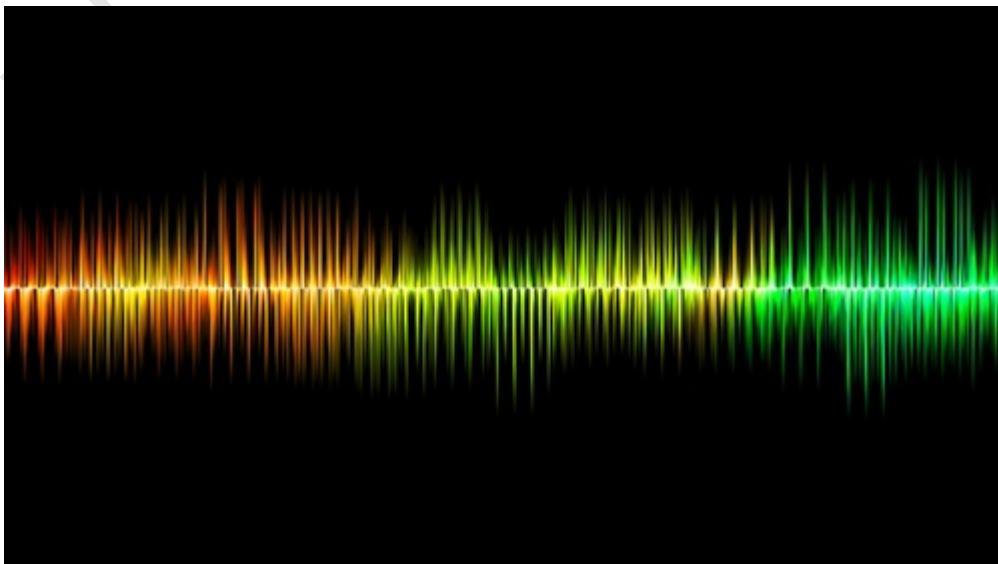
In case you missed Lindsay Broadband - a division of Technetix group at the SCTE Cable-Tec Expo, this video highlights the must-have, end-to-end solutions for your network.





## 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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## The Impact of Transformation

*A Dynamic Panel Discussion Featuring  
The Industry's Top Thought Leaders*



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## The Network Transformation Imperative

*A Dynamic Panel Discussion Featuring  
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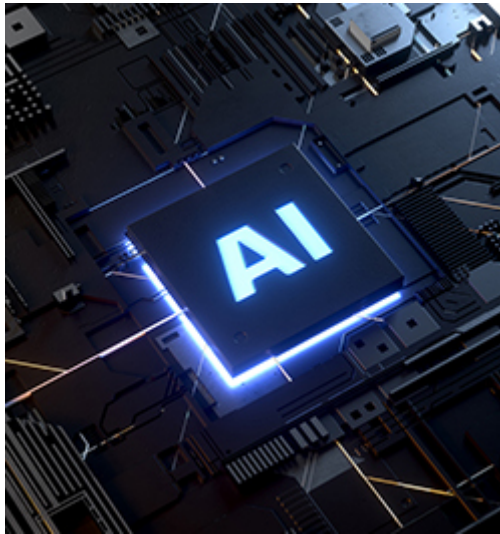
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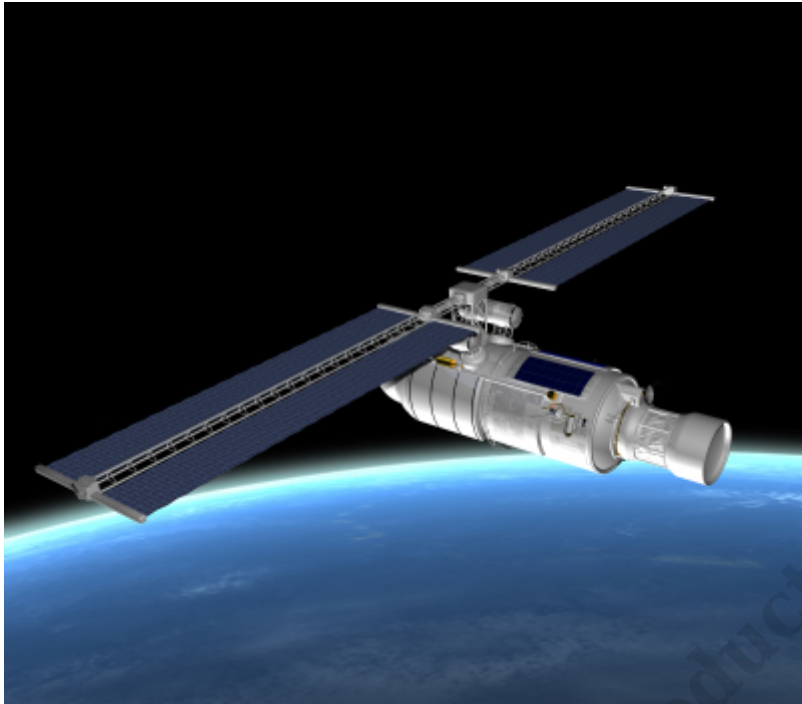
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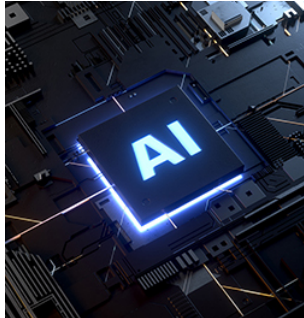
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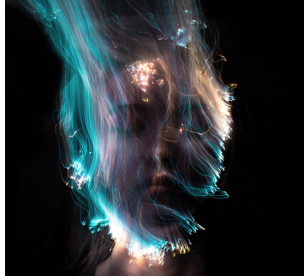
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### WiFi solutions

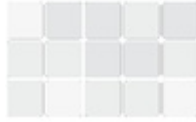
For more than 75 years, CHR has designed, built, managed and maintained networks that matter— including one of the first five LTE networks in the nation and fully integrated WiFi networks for the Department of Defense.

Whether your goal is to implement a WiFi network that guarantees outstanding coverage for broadband Internet access or you're seeking new revenue streams by becoming a VoIP or Wireless Internet Service Provider, our experience enables the entire ecosystem.

CHR's WiFi Solutions include flexible end-to-end or à la carte options that range from concept to construction, to customer management. Our certified engineers and best-of-breed partners stand ready to aid in every aspect of your WiFi project.

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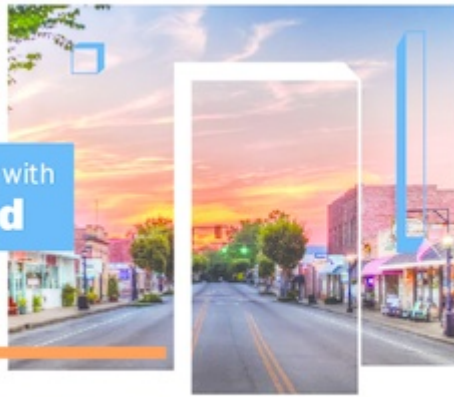


The Cable Customer of the Future:  
More Autonomous, Mobile & Personalized  
3 Key Trends that will Dramatically Change the  
Cable Industry Over the Next 5 Years  
**CSG International | May 2012**

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## 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.

ENGINEERING SERVICES	BUSINESS SOFTWARE	BUSINESS CONSULTING
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**Know your network: Now.**



**ONTOLOGY 5**

Ontology 5 Intelligent 360 for Network Operators | v4.0 2015

## Navigating the Chaos: Identity Access and Configuration Management Strategies for SDN & NFV



### 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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Know your network: Now.

Ontology, NFV and the Future OSS  
September 2015

## Case Studies



### WITCOM deploys open multi-vendor solution to power smart city initiative

Secure open platform powers edge cloud for IoT, video and next-gen services

WITCOM provides business customers, government institutions, and ITC service providers in Wiesbaden with professional telecommunication services and secure data center services. Now WITCOM is deploying an open uCPE platform as an edge cloud to host smart city services, including IoT, traffic control, surveillance, and wholesale services.

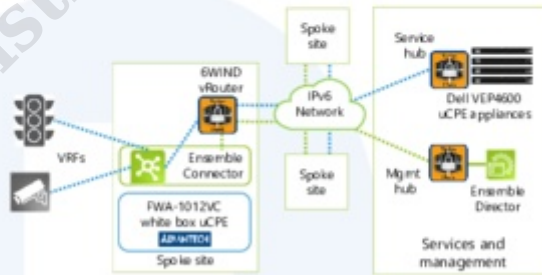
With network functions virtualization (NFV) and universal CPE (uCPE), smart city operators like WITCOM can rapidly and efficiently deploy next-generation services. And prior to the uCPE servers and software are deployed, the operators can use it as a platform for innovation. New services can be added dynamically, without changing the deployed hardware, drastically increasing the size of the solution.

As a service provider in southwestern Europe, WITCOM assembled a solution using best-of-breed suppliers to power this innovative deployment. Working together, the suppliers learned up to six times as quickly, meeting requirements for performance, cost, ease of deployment and security.

The solution is deployed on a central hub site as well as wholesale spoke sites (as shown below).

Security is an essential element of the solution, and is provided by the 6WIND Turbo IPsec vRouter. The vRouter is deployed in virtual machines (VMs) at each of the spokes, and at the hub as an aggregator.

The spoke sites are located in outdoor cabinets featuring the widely adopted FWA-1012VC white box uCPE from Advantech. This optimized and versatile appliance integrates the Intel Atom® C3758 processor (8 cores), and 2x 1GbE SFP and 6x 1GbE RJ45 interfaces, providing sufficient compute headroom and flexible connectivity to meet edge site requirements.



## Brochures



## 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's subscription fraud, Wishing, PBX hacking or international Revenue Share fraud (IRSF), it can be difficult – even for experienced fraud managers – to gain 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 CFAA 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 cessation 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 fraudster requires enhancing existing platforms and systems. This gives you added intelligence to identify fraudulent and potentially risky numbers off the band new to your network, which allows you to prevent misuse and improve risk management. Comprehensive solutions will allow you to proactively block calls to fraudulent numbers and perform targeted segmentation of inbound traffic for call strategies.

iconectiv

Brochures

**YOU  
HAVE THE  
VISION  
to grow your  
infrastructure,  
WE  
HAVE THE  
RESOURCES  
to bring it  
to life**



Looming deadlines, limited resources and a fiercely competitive market make it difficult to complete your wireless network. By outsourcing your **ENGINEERING, FURNISH AND INSTALLATION (EF&I)** we'll ensure the job is done right and on time.

CHR's experienced engineering and technical teams combined with our multi-vendor relationships and decades of regulatory experience ensure a successful integration of your wireless system - everything from site acquisition to optimization.

- Network architecture and design
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- Logistics and support (Rack and Stack)
- Implementation and training
- Regulatory and finance
- FTTH, IP and IPTV specialties
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**Whitepapers**

# Testing the Cloud

Mark Sytko, New Technologist 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.



# CASE STUDY: MULTI-CHANNEL CUSTOMER INTERACTIONS



Client: Leading Retail Entertainment Provider (The Company)

## CHALLENGE

The Company was looking for a single vendor to deliver a comprehensive solution that combined agent-led customer care, multi-channel inbound and outbound customer interaction management, 1st and 3rd party collections, in-store data lookup (Reverse Phone Append), and consolidated customer reporting while simultaneously reducing overall customer care costs. The initiative was to consolidate services being handled by two vendors and connect one of the Company's selected in-house operations.

## CROSS-CHANNEL SOLUTIONS PROVIDED

- Inbound Store and Customer Care
- 1st and 3rd Party Notifications and Automated Collections
- Past-due Postcard Reminders
- Interactive Self-help IVR
- Secure Payment IVR
- Customer Satisfaction Surveys

## SOLUTION

CSG deployed inbound and outbound self-service customer care and collections solutions that utilized two of its direct customer interaction on delivery channels: Interactive Voice Response (IVR) and direct mail (postcard notifications). By utilizing these proactive customer interaction delivery channels, CSG was able to supplement current agent activity with a automated self-service interactions, which helped the Company control costs and increase agent productivity and customer convenience.

- Speech-enabled inbound IVR solution for in-store and online customers, which supports self-inquiry and self-resolution
- Integrates with the Company's historical database for customer identification
- Dynamic customer routing to the appropriate associate based on skill set to facilitate first call resolution
- Designed an enhanced pre-collection strategy that leveraged outbound interactive voice messaging and Postcard Reminders for past-due videos and games
- Secure Payment IVR (CSG is a PCI-DSS Level 1 Service Provider) for customer self-resolution of past-due accounts
- In-store account lookups based on home telephone number (Reverse Phone Append)
- Customer Satisfaction Surveys allow the Company to improve the customer experience based on customer feedback
- 1st and 3rd party Automated Collections (outbound & inbound) for self-care within the automated call (Secure Payment IVR)
- Delivers reporting to separate corporate and franchisee store collections
- Integrates with the Company's collection associates to augment automated systems
- Past-due Direct Mail Postcard Reminders deliver a hard-copy written format reminder that an item is past-due and gives the customer self-service options to purchase the past-due item immediately by calling into CSG's self-service Secure Payment IVR

## RESULTS

- Implementation of Automated Collection Solutions reduced the Company's annual collection costs by \$1.7 million
- 1st party Automated Collections notifications and self-care options significantly reduced the number of accounts being sent to 3rd party collections — cutting average collections costs per customer by more than 50%
- Solution generated approximately \$2.9 million in additional collections
- Solution decreased the Company's client roll rate by 3% as well as its days sales outstanding (DSO) and delinquency rates

csgi.com

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## Rethinking Communications to Improve Retention

Transitioning from campaigns to ongoing dialogues

WHITE PAPER  
COMMUNICATIONS

Jeff Michelson - Vice President of Global Marketing,  
Customer Analytics & Interaction,  
Pitney Boves Software



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## Embracing A Catalog Driven Social Network

By Faisal Ishaq  
Principal Solutions Architect & Regional Sales Director  
ConceptWave Software Inc.

WHITE PAPER

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**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 people 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 and 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 any time.

**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.



# MARKETING PLANNER WORKSHEET



Use the Pipeline Marketing Planner to create an integrated program to achieve your annual marketing objectives and corporate strategy. Select the brand building, thought leadership, and content creation services that will propel your company to new success. Plan the timing of these activities to coordinate with the issues of Pipeline that align to the topics most important to your company.

## UPCOMING ISSUES

### STRATEGIC MARKETING OBJECTIVE

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Monthly Newsletter Advertising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Executive Spotlight/Video Interview	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Cover Page Executive Photo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trade Show Newsletter Advertising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICT Executive Summit Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trade Show and Event Partnerships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Webinar Branding Sponsorship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation Awards Sponsorship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketing, Writing, and Design Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### THOUGHT LEADERSHIP:

Company, Executive, or Technology Spotlight Article	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sponsored Thought Leadership Article	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commissioned Article	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Executive Spotlight/Video Interview	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whiteboard Video	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whitepaper Writing and Distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource Center Asset Hosting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketplace Directory Listing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industry Reports and Surveys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICT Executive Summit Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation Awards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Webinar Participation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pipeline Guest Speaking & Event Support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pipeline Guest Blogging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### LEAD GENERATION:

List Rentals with Lead Reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Direct Content Advertising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource Center Asset Hosting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Content Distribution and Sponsorship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spotlight Articles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sponsored Articles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digital or Physical Article Reprints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICT Executive Summit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Webinars with Extended Lead Generation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketplace Directory Listing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

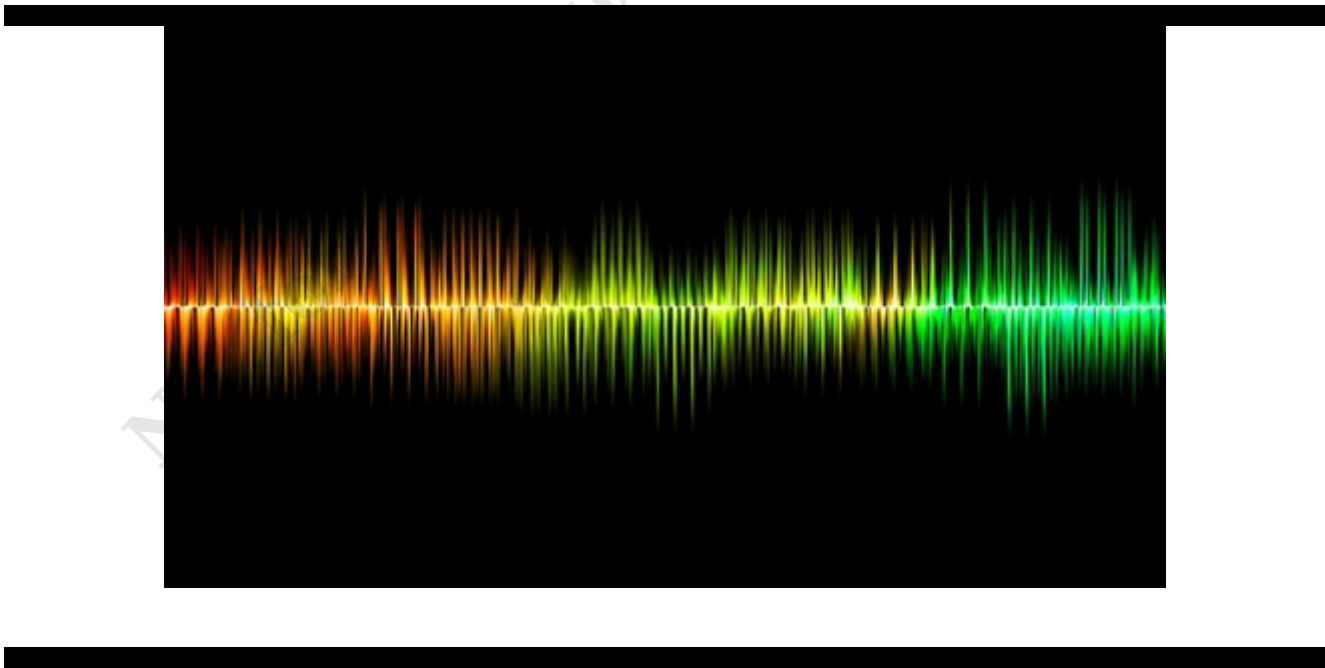
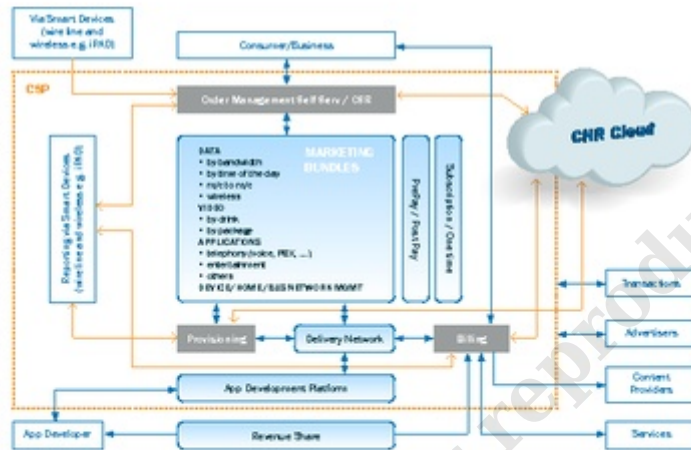
# cloud services

Leveraging the power of Cloud Services is crucial to the future of your company. With converging technologies and crippling competitive pressures, CHR's Cloud offers answers in uncertain times. Building your business becomes only a question of how high and how fast you want the Cloud to carry you.

### GENERATE NEW REVENUE

With CHR Solutions' Cloud Services, the sky is the limit. Drive down operating costs, improve efficiencies and create new revenue streams to elevate your business.

Over the last several years, CHR has constructed a leading edge ecosystem which supports advertising, applications, transactions, services and content. This synergistic environment offers limitless opportunity for creating new revenue without the capital expense.



remain in compliance during regulatory change



Regulatory considerations are crucial to the success of any communications company. Do you need expert testimony or interpretation of a tariff or FCC order? Perhaps you've worried about GALEA, CPNI and Red Flag compliance, or need a wireless, efficient or interconnection agreement. More importantly, do you need assistance in interpretation and identifying the revenue impacts of the FCC's most recent USF/ICC Reform Order?

CHR's Business Compliance group provides you with the information needed to stay on top of important federal issues affecting small and rural telcos - allowing your business to remain in compliance during regulatory change.

CHR can help you with timely compliance reporting and assist with the implementation of regulatory requirements. CHR's FCC Report provides crucial information on key regulatory issues affecting your day-to-day business operations. Our Business Compliance group provides state and national regulatory services and implementation services associated with regulatory requirements. The Business Compliance group works with regulatory commissions, legislative bodies, and national and state associations to help develop and implement telecommunications policies.

Services provided by our Business Compliance group includes

- Revenue and billing assurance
- Municipal franchise and right-of-way agreements
- Preparation and filing of FCC/state reports
- Bundling and pricing of services
- Switched and special access pricing, rating, and audits
- State and federal USF funding requirements
- USF compliance filings
- ETC compliance filings
- Traffic termination and interconnection agreements
- Regulatory monitoring
- Revenue impacts of USF/ICC reforms
- Local and access tariffs



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