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WITH:
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**NIS2 SUPPLY
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INTEGRATING
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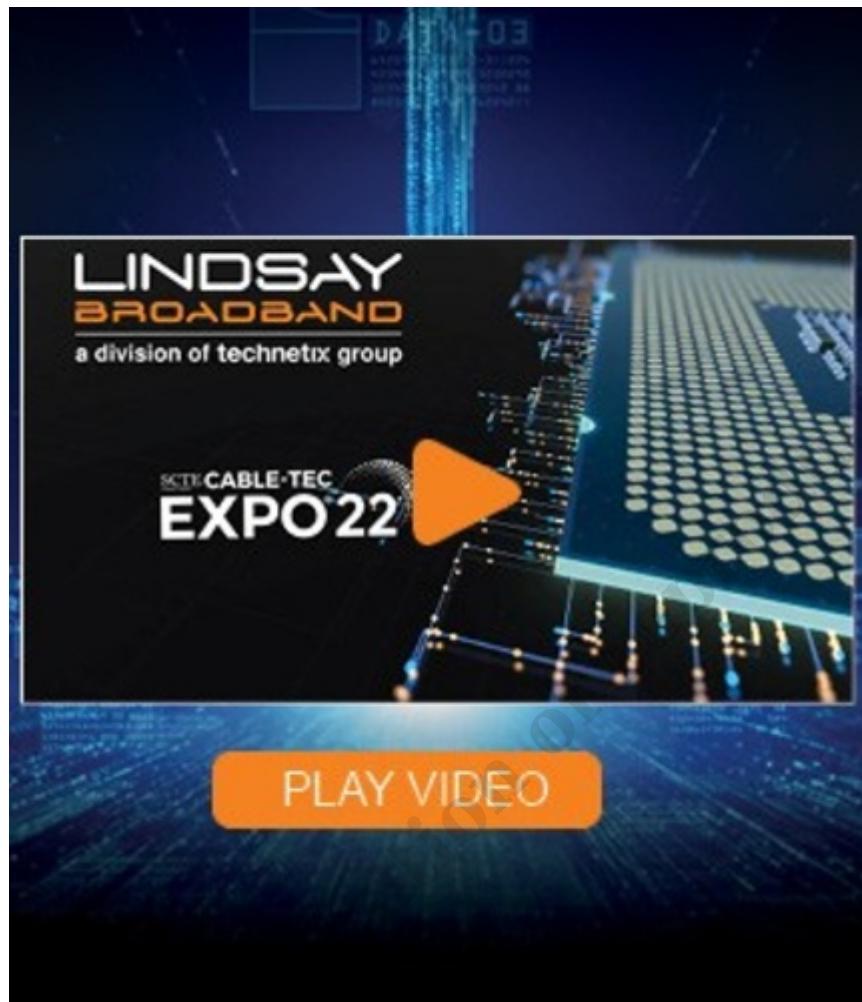
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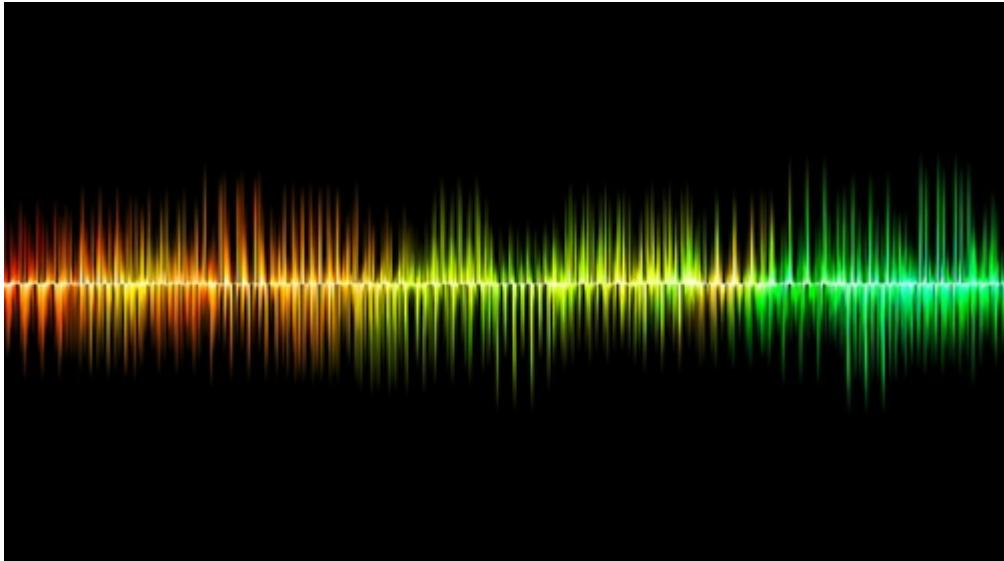


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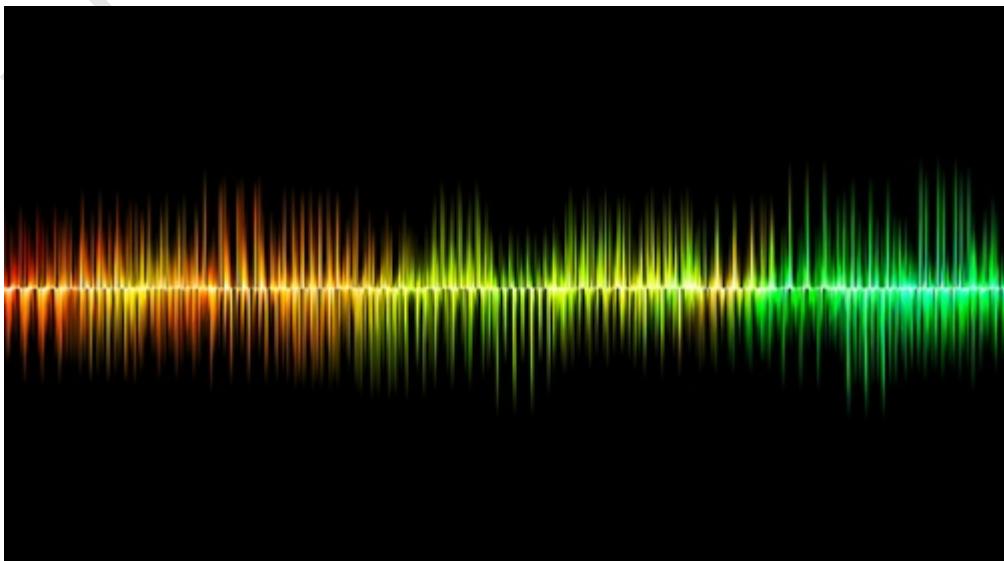
End-to-End Solutions for Broadband Networks

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
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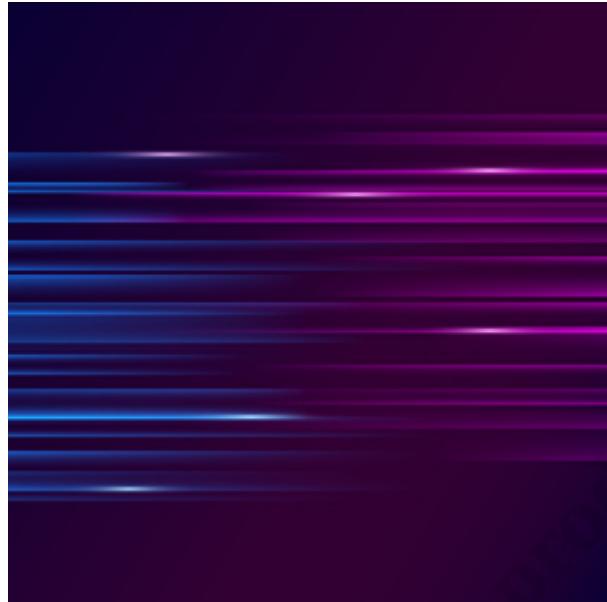
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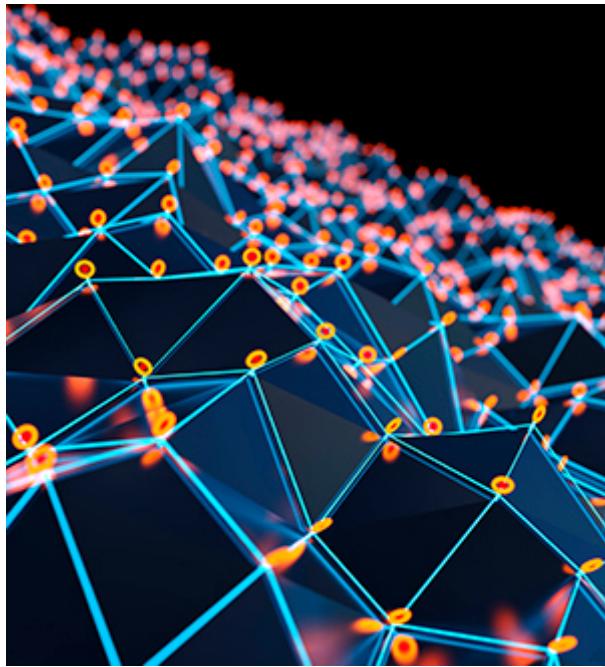
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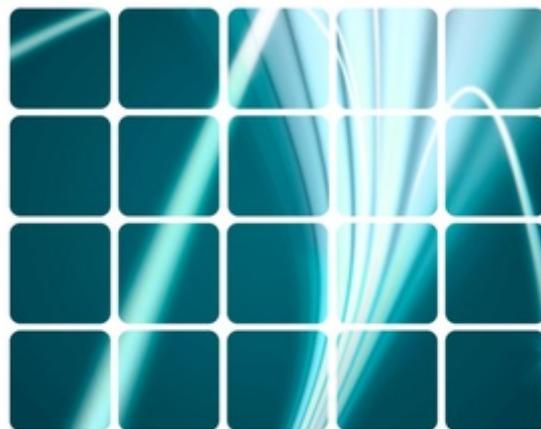
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**LTE and Offline Charging:
Driving the Need for a
Lower Total Cost of Mediation**

WHITEPAPER, BY ROBERT MORRISON

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DIGITAL TWINS
POWERING INSIGHTS TO EXPERIENCES



A faint, semi-transparent background image of a woman's face, with a circuit board pattern visible inside her head, symbolizing digital technology and AI.

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**we
focus**
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network
**so
you can
grow**
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With over 75% of your IT budget dedicated to maintenance,* it's difficult to move ahead.

CHR's world-class **Managed IT Services** drive down operational costs and create new revenue streams.

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*According to Gartner Research study.

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*An Excerpt - BRIDGING THE OSS/BSS GAP –
STRATEGIES FOR DYNAMIC ORDER MANAGEMENT*
(OSSCS 11-11)



January 2011

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MATRIXX 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 Smartphone, set top boxes, tablets, PCs, laptops, gaming consoles, and mp3 players to access services via cable, DSL, FTTB, 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.

MATRIXX 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

MATRIXX 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

MATRIXX Software

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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 DSS providers have a clear advantage in leveraging T-commerce models to seize 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 (ETBF)—T-commerce is a viable business model for cable and DSS providers.

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

Interactive Customer Care Drives Loyalty

Interactive TV models enable cable and DSS 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.

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Whitepapers



Company Fact Sheet

About Cycle30

Cycle30 provides hosted order-to-cash billing services for telecom, cable and utility operators in North America. Cycle30 is a subsidiary of GCI, Alaska's largest telecommunications and cable provider (NASDAQ: GNCMA).

Over 10 years, the Cycle30 organization helped transform GCI from a multi-product carrier of disparate services to a truly converged operator of bundled telecom services, consolidating nine billing systems, and increasing operational efficiency and competitive agility. The Cycle30 platform also enabled GCI to improve product strategy and successfully merge consolidate multiple providers under a common billing/OSS system.

Proven over years of real-world operator experience with GCI, the Cycle30 organization now operates as a separate company, offering its converged billing platform as a hosted service to small-and-medium-size converged operators everywhere.

Cycle30 Services

Around its core billing engine, Cycle30 has integrated leading commercial software for ordering, provisioning and business support. This makes the Cycle30 hosted platform the only one of its kind in the world, with all the ordering, provisioning, billing and back-office revenue systems a converged provider needs for a complete order-to-cash system.

Management

Jim Dunlap – President
Ariel Baird – Business Operations
Andrew Dunn – Application Architecture
Wendy Gonzalez – Products + Services
Jeth Harbinson – Global Sales
John Hegarty – Service Delivery
Isaac Szymanczyk – Communications + Marketing

Operations

Cycle30 manages all operations from its headquarters in Seattle. The primary data center is located in Aurora, Colorado, with recovery and on-demand data centers in Scottsdale, Arizona and Philadelphia, Pennsylvania.

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03/09/10

Brochures



Case Studies



Case Study: GSM wireless network build

PROJECT GSM wireless network build

SITUATION

When a converged telecommunications services provider faced the sale of its wireless partner properties to a large, national wireless company, it chose to expand its market penetration by building its own wireless GSM network.

The provider engaged Cycle30 to build out, integrate, and deploy all of the BSS & OSS functions to support the new GSM network and wireless services in three metropolitan areas, over an aggressive nine-month timeline.

CHALLENGE

Critical to the ROI of the buildout was the ability to successfully acquire a number of new wireless subscribers, while retaining 99 percent of existing subscribers from the old MVNO network.

Cycle30 planned and delivered all necessary BSS, OSS and conversion functions to support two separate network and product go-live dates, dictated by a strict schedule from the provider acquiring the partner assets.

In addition, severe winter conditions across the provider's geography forced Cycle30 to compress the timeline in order to complete the conversion before winter.

RESULTS

- Cycle30 conducted end-to-end testing of the network and conversion process to ensure a seamless customer experience while finishing the deployment
- Delivered the project on time
- Delivered the project 10 percent under budget
- Cycle30 flexed to the provider's network deployment needs, so that BSS/OSS and conversion activities accelerated progress instead of impeding it
- Provider successfully converted 48,000 subscribers to its new GSM wireless network
- Customer conversion retained 99.2 percent and added 42,000 new subscribers.

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Brochures

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 succeed 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 attain 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.



Inventory Discovery & Reconciliation

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, lower fault isolation and provisioning efficiency. Nakina Systems' Inventory Discovery & Reconciliation solution discovers optical Ethernet, IP/MPLS, and other network equipment and reconciles against industry-standard inventory systems to reduce faults and provisioning times. Without an automated discovery and reconciliation solution like Nakina, 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 levels 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. The constant feedback loop helps highlight inconsistencies before they become difficult problems. Nakina customers can identify poor capacity management, lack of redundancy and many other challenges before they cause outages or other problems.

Flexibly harnessed instrumentation

Nakina Systems' network integrity solutions enable our customers to accelerate time-to-incomes through faster deployments. Without a high integrity image, matching capacity to demand in a heterogeneous environment and customer order fulfillment due to non-existent or over-allocated ports, scarce capital resources are consumed while spare capacity is wasted 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-Domain Topology Discovery

- Discover Optical Ethernet & IP/MPLS NIDs (O/L/2/2/5 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 design & design process

Integrated Security Solutions

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

Standard-based Interfaces

- Simple, Cost Effective Integration with 3rd Parties

WWW.NAKINASYSTEMS.COM

Dynamic Product Management for Communication Service
Providers (CSPs) – The Time is Now

A Stratecast Whitepaper



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never underestimate the power of identity

hackers in an increasingly vulnerable digital world

Without question, the power of the digital economy permeates nearly everything we do. Evolving well beyond e-commerce and banking, the connected society includes use of mobile, video subscriptions, file sharing, ride hailing, car sharing, etc. which have quickly become a regular part of our lives every day. While the convenience is a lure, the risk can be daunting. These applications often contain payment and other confidential information that need to be secure in order to ensure that only the right people are granted permission to access the information or assets involved. To simplify matters further, application developers constantly try to improve the user experience by reducing the friction in the authentication process. Unfortunately, making access easier for the consumer is also making it easier for fraudsters.

"Hackers can have access to your bank accounts, bitcoin, payment services and many other aspects of your digital life before anyone is the wiser."

According to an article by CBS News New York, a woman lost more than \$20,000USD when a fraudster posing as her bank took over her account. The article says the scammer did this by telling the woman her account was compromised, then sent her text messages to change her password – giving the scammer access to her account. As users can have access to your bank accounts, bitcoin, payment services and many other aspects of your digital life before anyone is the wiser. That is a powerful proposition for fraudsters.

Clearly, the digital world is increasingly vulnerable. Fraud is getting progressively sophisticated and more difficult to prevent, resulting in billions of dollars in financial losses annually. Victims are not only unsuspecting senior citizens and elderly connected individuals, but also CEOs in enterprises and everyday consumers. Even the giant organizations of the world are not immune which the feasibility to protect consumers by adopting fair, deceptive or fraudulent practices in the marketplace has been a victim of fraud. Interestingly, the telephone number, which is the entryway to much of this fraud, is being exploited by adept criminals in novel ways. Fortunately, the victims no longer need to be victimized because much can be done to protect consumers from this type of identity theft and related harms.



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Rethinking Communications to Improve Retention

Transitioning from campaigns to ongoing dialogues

WHITE PAPER
COMMUNICATIONS

Jeff McLean • Vice President of Global Marketing,
Customer Analytics & Interaction,
Pitney Bowes Software





Distributed cell site gateway from ADVA and Edgecore

Open and disaggregated path to 5G infrastructure



As innovation and growth in packet and wireless networks continues to accelerate, communication service providers (CSPs) and mobile network operators (MNOs) no longer have time to wait for their vendors to come up with higher capacity devices that meet the latest requirements. Now there's a new way to grow networks that combines the agility of software-based feature development with the performance and economics of bare-metal switches. Building a network for 5G access is now as simple as selecting a hardware component with higher capacity and installing the network operating system (NOS). ADVA and Edgecore have combined forces to deliver a disaggregated cell site gateway (DCSG) solution that provides the required features in an open and multivendor fashion.

Meeting the bandwidth demand in 5G

Access speeds will increase dramatically for 5G networks, and base stations will move from 10GbE to 100GbE and 25GbE uplink interfaces. Backhaul networks must rapidly grow to 10GbE aggregated capacity. MNOs need to design and operate these higher-speed networks with proven technologies and established processes. At the same time, MNOs need to make their networks much more agile to unleash the power of 5G new radio (NR). They need to move from hardware-centric, static networks to software-defined architectures. With the latest software-defined networking (SDN) and network functions virtualization (NFV) network technologies, disaggregated radio architectures and networking

are paving the way for open, agile, and efficient mobile ecosystems.

Moving from closed to open

MNOs and CSPs want to break open single-vendor silos to increase competition and reduce cost. That has led to increasing interest in disaggregated networking with packet network devices implemented as white box switches and open network operating systems. That's why the Telecom Infra Project (TIP) defined the DCSG as well as OpenRAN. Both are essential to supporting the move to next-generation radio architectures.

According to TIP's [DCSG Technical Specification](#), the DCSG is "an open and disaggregated platform based on commercial off-the-shelf components and



Business Process Outsourcing services

CHR provides a full suite of Business Process Outsourcing (BPO) services to enable Communication Service Providers (CSPs) to meet the escalating competition, reduce operating and capital costs, and address the increased complexities of converging technologies that make it challenging to run their business. CHR's BPO Services, on average, can reduce your operating costs ten percent (10%) to forty percent (40%). Your business could avoid hundreds of thousands, and in some cases millions of dollars of capital expenditures while improving your operational effectiveness at a fixed and predictable price.



NOC SERVICES

CHR provides 24x7 Managed NOC Services for CSP Poole networks and ISP operations. Our NOC is staffed with technical experts armed with the latest technology and world class best practices to assure your network and systems uptime. We can operate as Tier 1 to Tier 4 support, or as a backup or nighttime coverage for your staff.

IT MANAGED SERVICES

CHR provides 24x7 IT Services for your internal IT operations. Our IT Service is staffed with technical experts armed with the latest technology to assure your internal IT network and systems uptime. We can advise and guide you on world class best IT practices and provide a single service desk that can deliver Tier 1 to Tier 4 IT support 24x7 or as a backup or nighttime coverage for your staff. Our services include all end-user support, systems patching, data backup, remote control, span and virus scanning, systems administration, monitoring and planning.

ISP SERVICES

CHR's 24x7 Managed ISP Services provide world-class customer support—leveraging CHR's tech support expertise, real-time network monitoring and convenient customer communications, portal, cloud based e-mail, backup services, spam and virus filtering, hosted content management systems and websites. We provide support options including management and troubleshooting into the end customer's private based equipment.

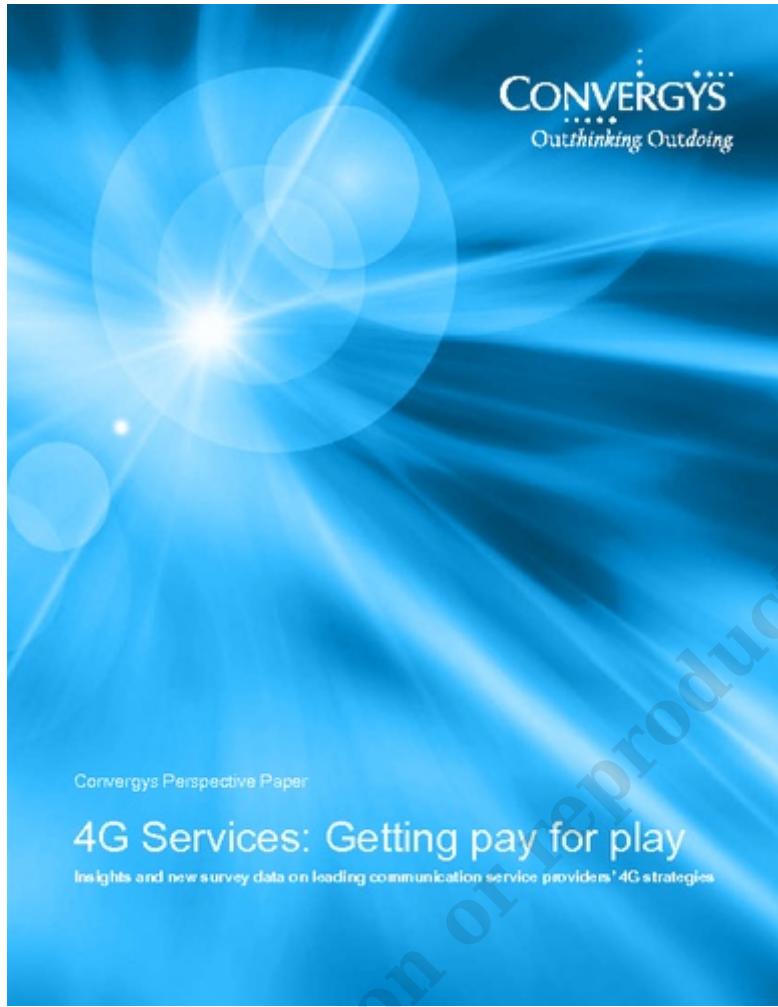
GES/CAD SERVICES

CHR's GES/CAD Services provides a turnkey solutions for managing all plant and operational CAD records in our cloud based systems. Our technical resources, proven process and systems assure business continuity, improve operational efficiencies and reduce reporting errors through real-time geo-referenced intelligence. GES/CAD services empower the client to make more informed decisions with active and relevant data. CHR's GES/CAD is scalable and highly customizable—capable of integrating with any BOMS system.

BILLING SERVICES

CHR provides turnkey back-office management including system updates, administration, reporting, running billing and all other aspects required to operate your business. CHR can provide this function on our cloud based systems or your on-site systems – even if it's not our BOMS/BSS solution. We will apply our best practices and industry expertise to reduce your operating costs and improve your operations.

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