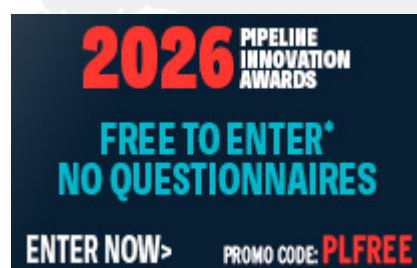


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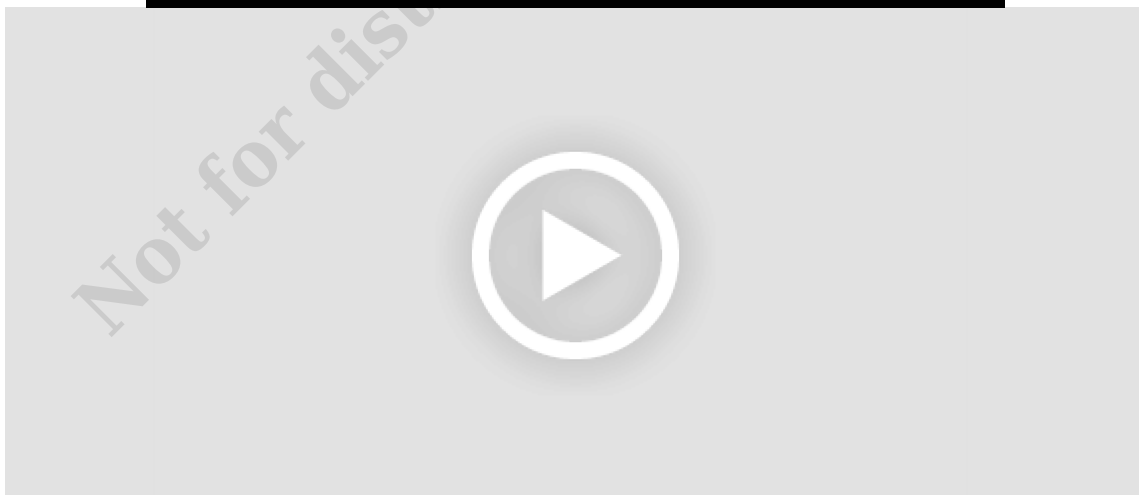
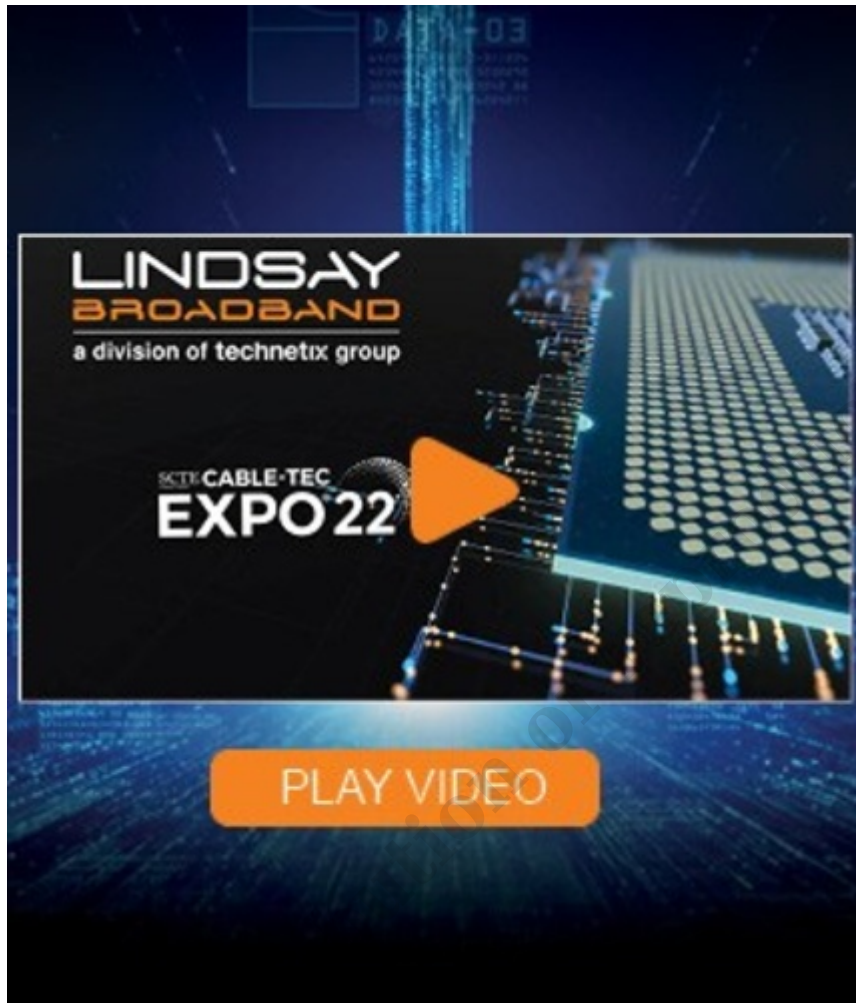
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### End-to-End Solutions for Broadband Networks

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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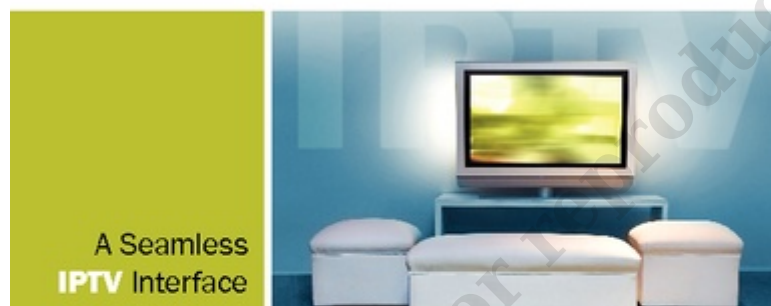
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## CASE STUDY: MULTI-CHANNEL CUSTOMER INTERACTIONS



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
- Post-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 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
- Integration 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-cure 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
- Post-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-cure 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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## THE EMC SOLUTION FOR SERVICE ASSURANCE

Transform Healthcare IT with an application-first approach to IT management



### ESSENTIALS

#### Virtual Data Center Visibility

- Unified management of physical and virtual IT environments

#### Configuration Management

- Coverage across networks, storage, and servers

#### Identify and Act

- Advanced root-cause analysis for separating symptoms from problems

### THE FOCUS OF IT OPERATIONS

"The goal of IT operations is to enable the business to operate more effectively, more efficiently, and with lower risks and costs...In short, IT operations isn't about bits, bytes, and bare metal; it's about enabling business leaders to do what they do best: run the business."

Garner—Key Issues for IT Operations Management, 2012

### ENSURING HEALTHCARE SERVICES AND APPLICATION PERFORMANCE

As a CIO or IT leader of a Healthcare company, you have a tri-fold charge:

- Ensure applications and IT services are delivered consistently and at the highest possible levels—because that's what the business and end users care most about.
- Fully understand and effectively manage your IT service delivery environment, so that service levels to the business can be met or exceeded, ongoing operational costs are minimized, and problems—when they occur—can be resolved rapidly with minimal impact.

### CHALLENGES TO TRANSFORMING IT

Moving applications to the cloud makes service assurance anything but easy. Factors such as the dynamic nature of a virtual data center (VDC), the rapid pace of IT change, lack of operational visibility and insight, and ineffective problem management make providing service assurance more of a long-term goal than short-term reality for many IT leaders. They need answers to critical management questions, including:

- How can I ensure applications and IT services are delivered consistently and at the highest possible levels?
- How do I understand risk conditions and business impact so I can prioritize my team's actions?
- How do I monitor, isolate, report on, and prioritize fault and performance problems more effectively and efficiently?

### IT MANAGEMENT THAT ENABLES SERVICE ASSURANCE

Fully understand and effectively manage IT service delivery, and, in turn, provide service assurance to the business with the EMC® Solution for Service Assurance:

- Virtual Data Center Visibility
- Configuration Management
- Identify and Act

EMC SOLUTION

EMC<sup>2</sup>

## W<sup>2</sup>CM Smart Replay

New Service Product Manager, EXFO

### INTRODUCTION

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

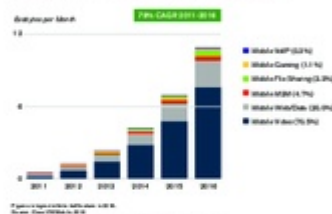


Figure 1. The explosive growth in mobile data.

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

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

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

### HONORING SLAs

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



Figure 2. Multi-tenancy network operators (MNOs) need to proactively manage network usage.

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

### EFFICIENT MANAGEMENT OF NETWORK RESOURCES

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

### REVENUE GENERATION

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

EXFO



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# The Balancing Act of Mobile Workforce Management

FULFILLING MULTI-SERVICE OBJECTIVES  
WITH PRIORITY-BASED OPTIMIZATION

A ViryaNet White Paper



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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



Customers expect organizations to be aware of their distinct preferences and to interact with them on an individual basis rather than as part of customer segments or groups. Providing each person with individualized messaging, offers, and products ensures a personalized customer experience.

## Toward Superior Customer Experience: Building Blocks for Personalization

November 2022

Written by: Eren Eser, Associate Research Director, Services, IDC Türkiye

### Introduction

Customers have always wanted a hassle-free experience in their interactions with brands. In the meantime, customer expectations for smooth and enjoyable experiences are constantly changing and evolving due to the ever-accelerating pace of digital technology and advances in the market. In parallel with its growing importance among customers, customer experience (CX) has become a strategic concern for businesses. According to IDC's Future Enterprise Resiliency and Spending Survey, enhancing customer experience was enterprises' top business goal globally for a five-month period (September 2021–January 2022, inclusive).

Customer experience now has significantly less friction thanks to developments in customer experience technologies across advertising, marketing, commerce, sales, customer service, and more. However, focusing purely on technological advancement without considering the human connection in CX projects hinders organizations in creating and sustaining emotional connections with customers.

Differentiating by efficiency or product is doomed to failure. The return on investment for efficiency improvements will eventually be close to zero at some time in the near future. The capacity to differentiate at the product level has been hampered by technology because every new product feature or function can easily be copied by rivals and introduced to the market. Customers now consider brand experience their key criterion for choosing which items to buy and use, since they perceive less differentiation at the product level, with products essentially identical in terms of desired features.

### AT A GLANCE

#### KEY STATS

According to IDC research:

- Improving customer experience is a top business priority for most enterprises.
- Personalization improves engagement rates by 35–40% versus non-personalized communication.

#### KEY TAKEAWAYS

- Customers now view personalization as the default engagement standard.
- Organizations can differentiate themselves and achieve a long-term competitive edge by offering highly personalized customer experiences.

## Brochures

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

Bruno Giguère, Advisor – CTO Office, EXFO

## INTRODUCTION

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

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

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

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

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

## GOT CONNECTIVITY?

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

### Cloud Transport Connectivity

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



Figure 2. Current challenges in the cloud service delivery.  
(Source: Metro Ethernet Forum)



Figure 1. Cloud connectivity.

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

1. Cloud transport connectivity
2. Cloud application connectivity

**EXFO** | Assessing  
Next-Gen Networks

Brochures

Artificial Intelligence (AI) has become one of the most powerful, transformative technologies that enable the development of new business models, new product/service offerings, and business ecosystems in many industries. AI technologies help organizations to enhance performance and productivity by enabling effective automation which provides larger revenue increases, greater cost reduction, and higher customer loyalty.

**Why Etiya's AI Platform?**

Etiya uses the building block of future technology, artificial intelligence technologies, and enables automation between service and operation processes. It allows companies to be able to offer personalized services and propositions through emotional, contextual predictions and recommendation mechanisms.

**Advanced capabilities with ML & NLP**

Etiya AI Platform, Cognitus, is an advanced artificial intelligence platform that provides standardization, simple and centralized management, monitoring and improvement, easy ROI detection and measurement, fewer implementation failures, and scaling with its advanced capabilities along with advanced machine learning and natural language processing services.

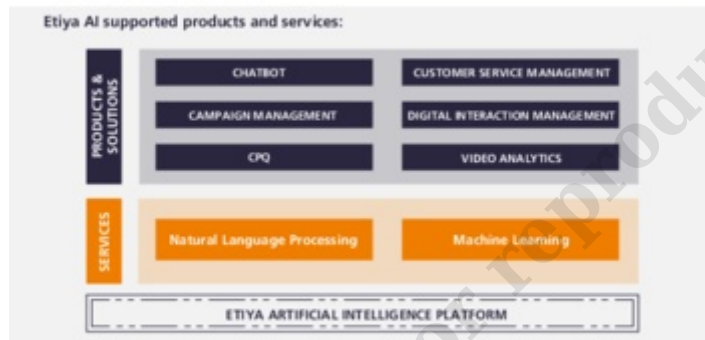
**Multi-language Support**

The platform currently supports Turkish, English, French, and Spanish languages. In addition to these, developments continue to support more languages in a short time.

**Increasing Revenue & Reducing Costs**

Etiya also offers innovative and experience-oriented approaches that will contribute to the digital transformation of the corporate processes of companies and create cost advantages with Artificial Intelligence-Cognitus supported products and solutions in its product portfolio. At this point, Cognitus which is also located at the heart of Etiya product architecture, works in harmony with all Etiya's products, solutions, and services and enhances their features with AI capabilities.

These AI-supported Etiya products and solutions enable effective automation and operational productivity by making information understandable in different business areas.



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## Case Study

# Implementing a Scalable, Common Element Management System for Large Multi-Vendor Networks

## Verizon Business and Nakina Systems Case Study

In 2005, Verizon Business, set out to build a state-of-the-art, ultra-long haul (ULH) transport network and converged packet access (CPA) network initially comprised of more than 20 different types of equipment from 10 different equipment vendors.

### Service Delivery Challenges

In order to deliver a new service across multiple network equipment providers (NEP) devices and SONET/SDH, WDM, Ethernet, and IP/MPLS networking technologies, Verizon Business needed to integrate a complex set of networks and applications spanning up to thousands of network nodes.

Adding a new device type or application to this heterogeneous environment often required upgrading both hardware and software across the entire network. For a large scale networking environment, this can be an incredibly complex task since the new services need to be delivered via different NEP products and networking technologies.

The network initially comprised 20 different types of equipment from 10 different equipment vendors, spanning hundreds of thousands of network nodes.

### Operations and Integration Challenges

Verizon Business used a mixture of operational and business support systems (OSS/BSS). These systems were deployed on unique platforms from different NEPs, operating with proprietary software applications and communications protocols.

NEP-provided EMSs tend to use proprietary OSS interfaces with varying levels of security and lacking the scalability needed by a large, global network operator.

Substantial system and software integration work was needed to make each EMS function sufficiently for the network operations personnel to manage the network. The effort to maintain multiple systems including hardware, element management systems (EMSs), testing and training could not be easily sustained to support the new services Verizon Business wanted to deliver.

The challenge facing Verizon is typical for a large, global communications service provider and can be summed up in a single word: complexity.



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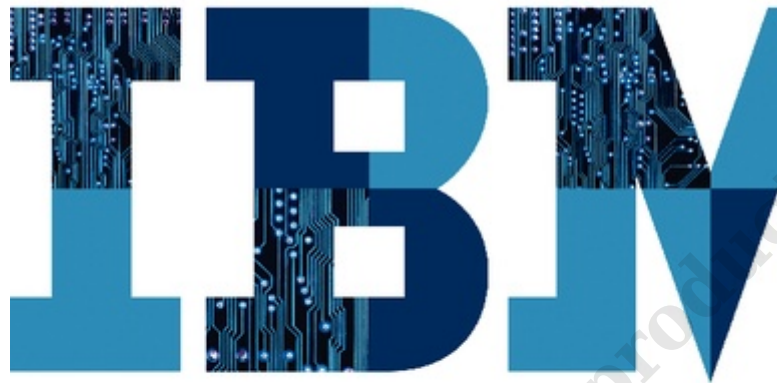


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## Delivering a new ROI for communications

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IBM

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## 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)<br>- PDV GL measurements<br>- 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<br>- DC PDV offset<br>- Slave/client emulation | 24 to 48 hours       | SyncWatch PRO   |
| <b>Troubleshooting</b>                   |  |                  |  |                      |                 |
| Basic troubleshooting                    | Packet metrics issues/defective slave client                                       | Field technician | - EtherSAM (Y1564)<br>- PDV GL measurements<br>- Client emulation    |                      | NetBaker Series |
| Advanced troubleshooting                 | Incorrect clock output/defective grandmaster                                       | Network engineer | - DE, MTE<br>- DC PDV offset<br>- Slave/client emulation             |                      | SyncWatch PRO   |

Table 1. Synchronization applications

**EXFO** | Assessing Next-Gen Networks



## 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

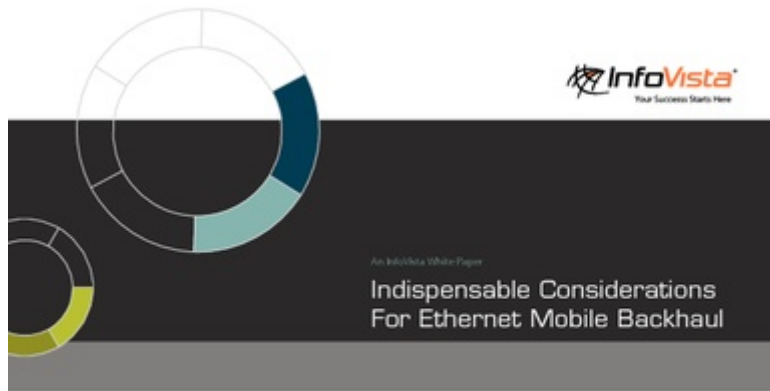
Jim Dunlap – President  
Ariel Baird – Business Operations  
Andrew Dunn – Application Architecture  
Wendy Gonzalez – Products + Services  
Jeth Harbinson – Global Sales  
John Hegarty – Service Delivery  
Isaac Szymanczyk – Communications + Marketing

### 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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## 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 eCommerce and mBanking, the connected society includes social media, video subscriptions, file sharing, ride hailing, and home stay, all of which have quickly become a regular part of our lives every day. While the convenience is a lure, the risks can be alarming. These applications often contain payment and other confidential information that need to be secure in order to ensure that only the right people are properly entitled to access the information or assets involved. To stimulate a market further, applications are constantly trying to improve the user experience by reducing the friction in the authentication process. Unfortunately, making access easier for the customer 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 \$30,000 USD 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. Hackers 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 millennials, but also doctors, nurses, and everyday consumers. Even the chief cybersecurity officer of the very organization vested with the responsibility to protect consumers by spotting, and preventing or fraudulent practices in the marketplace has been a victim of fraud. Interestingly, the telephone number, which is the entryway for 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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