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PIPELINE / VOLUME 21 / ISSUE 4

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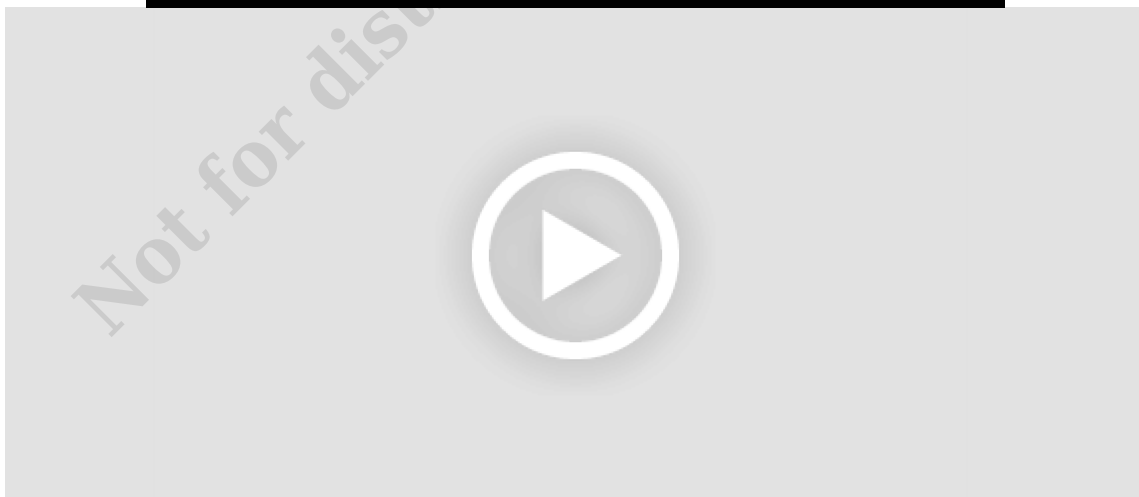
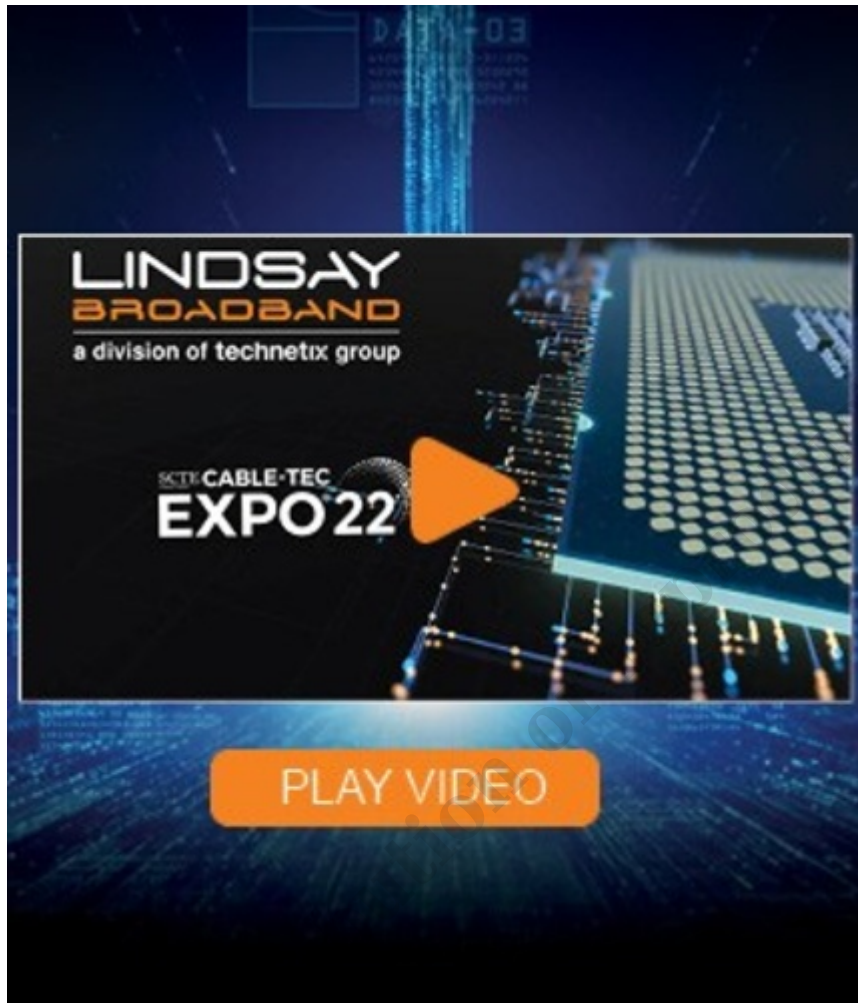
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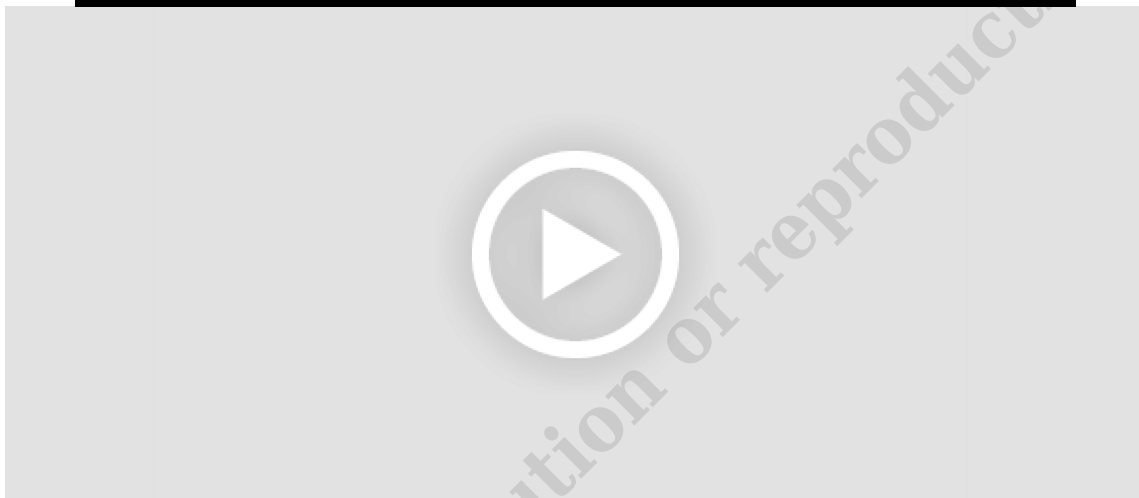
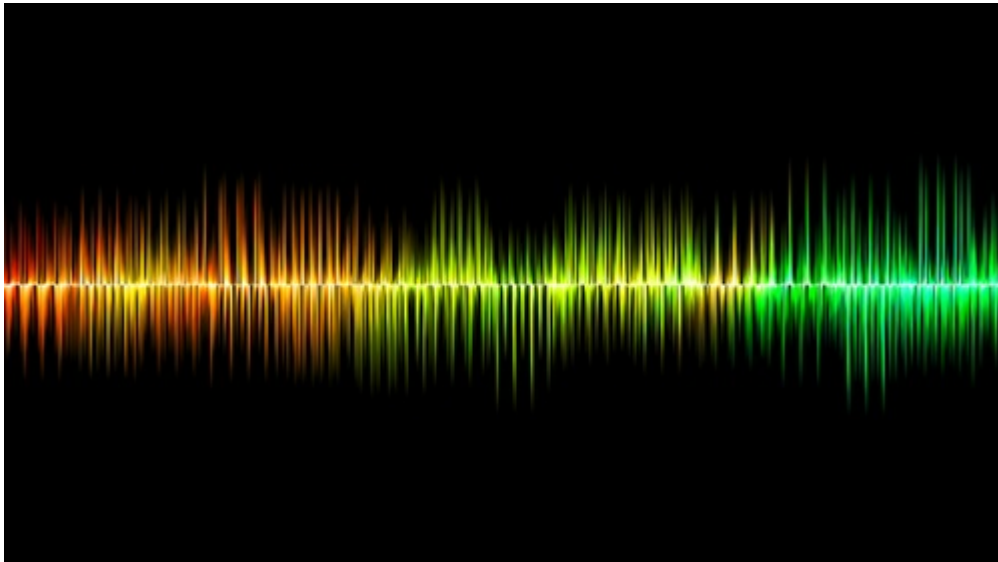
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### End-to-End Solutions for Broadband Networks

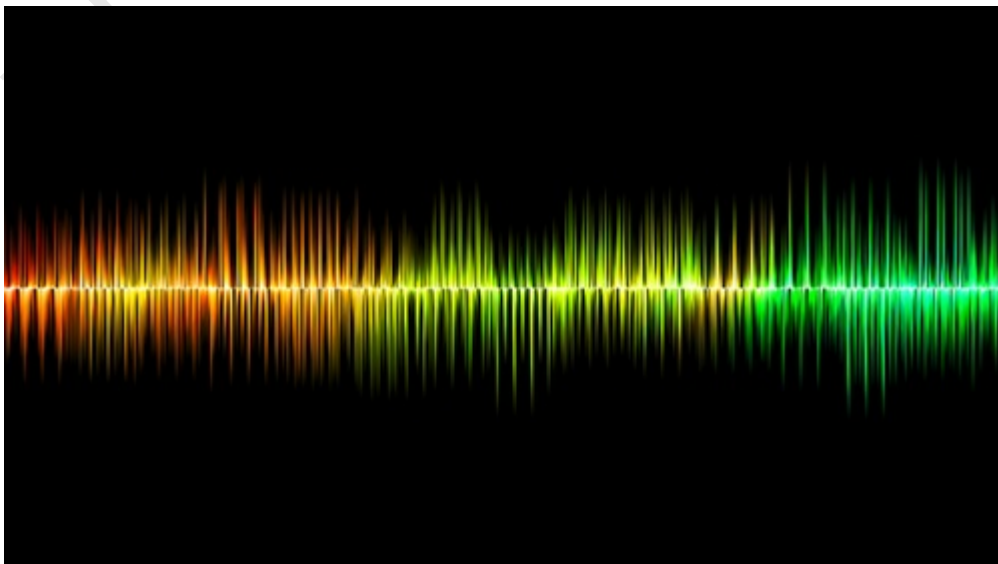
In case you missed Lindsay Broadband - a division of Technetix group at the SCTE Cable-Tec Expo, this video highlights the must-have, end-to-end solutions for your network.





## 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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*A Dynamic Panel Discussion Featuring  
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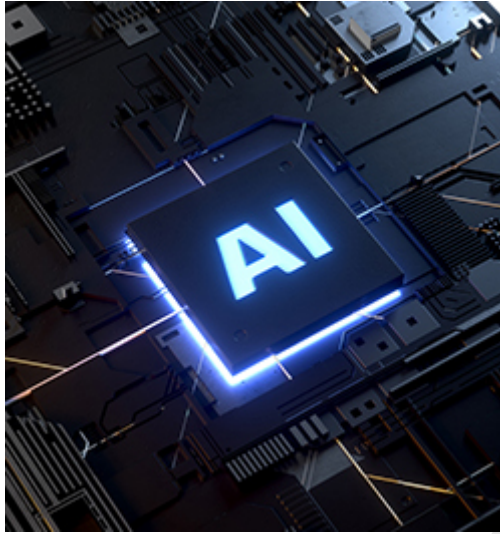
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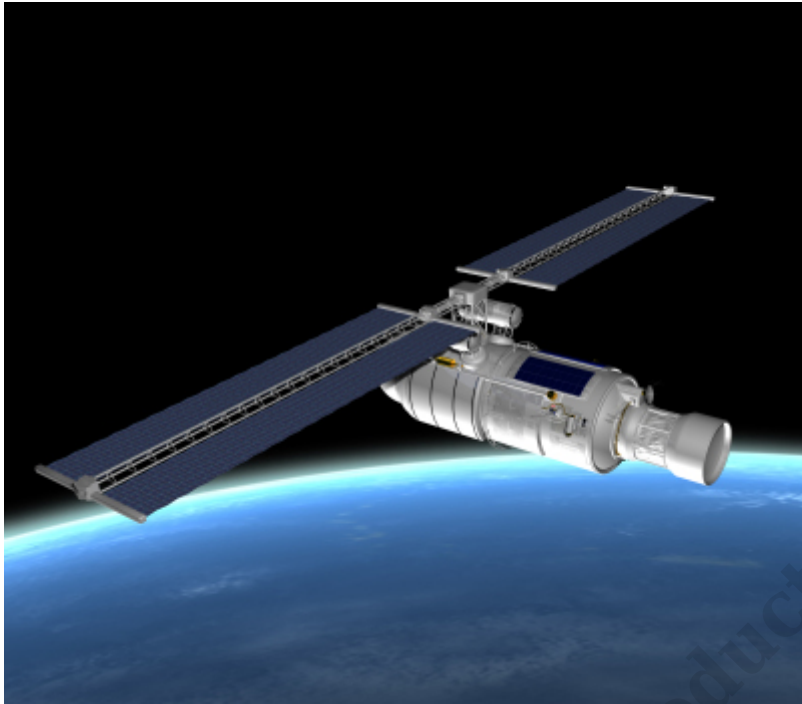
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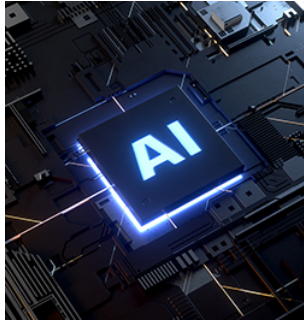
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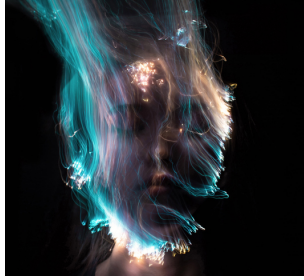
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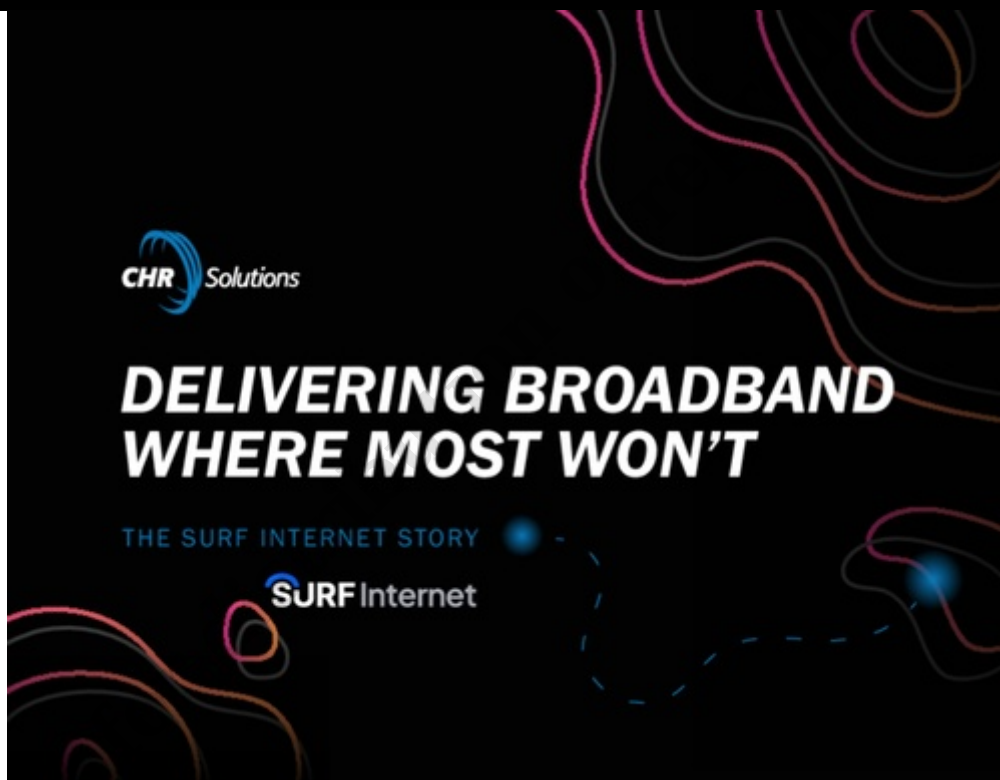


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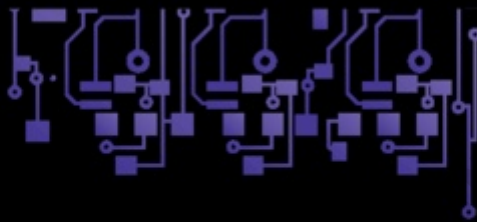
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## GSM v. CDMA: Technical Comparison of M2M Technologies



## SPIRIT COMMUNICATIONS

Switches to EMC Watch4net and reduces  
OPEX by 60%



### ESSENTIALS

#### Challenges

- Customer contracts required robust SLA monitoring solution
- The legacy system (InfoVista) grew too expensive and difficult to maintain
- InfoVista was slow to deliver upgrades
- InfoVista's upgrade costs were comparable to purchasing an entire solution

#### Solution

- Watch4net was deployed in just a few days
- Watch4net is running in a virtualized environment
- Dedicated Oracle Solaris resources are no longer required, resulting in cost savings

#### IT Improvements

- 60% reduction in cost-per-managed device
- 40% savings on collectors and additional modules
- Replaced Java JRE with fast AJAX/Web 2.0 front end
- Troubleshooting is simpler, faster due to Watch4net's streamlined architecture

#### Business Benefits

- Increased revenue from premium portal offerings
- Improved data retention (from 7 days to 7 months of "5-minute" data)
- Improved SLA metrics and more accurate billing from more granular bandwidth utilization reports
- Enhanced service offering with ad-hoc reporting and automated report delivery

CUSTOMER PROFILE

### ABOUT SPIRIT COMMUNICATIONS

Headquartered in Columbia, SC, Spirit Communications provides carrier-class telecommunications services to businesses and government agencies throughout the southeastern U.S. over its private fiber-based MPLS network. Spirit offers a wide variety of solutions including VoIP, SIP trunking, local and long-distance calling, wholesale long distance SS7 AIN, on-demand video conferencing, audio/Web conferencing and hosted Internet services. Spirit Communications prides itself in providing solutions that are reliable, flexible and responsive to customers' business needs.

Monitoring efficiently the wide choice of bandwidth and quality of service along with the service level agreements (SLA) is essential to the success of their enterprise.

### BUSINESS CHALLENGE

Spirit operates a mixed network comprising equipment from Alcatel-Lucent, Cisco, Adva, Adtran, Ciena, Brocade and more – over scores of servers and several thousand network devices. Proactive performance monitoring is strategic to Spirit success in delivering a competitive offering that features a variety of options for granularity of bandwidth and quality of service (QoS). Spirit provisions service level agreements (SLAs) that allow customers to select end-to-end performance metrics based on CIR, frame loss, delay and jitter. Spirit's customer contracts absolutely require robust SLA monitoring solution.

In 2006, Spirit implemented InfoVista's performance management solution. The product met the initial requirements, but as time went on, the software became more cumbersome to upgrade and maintain; additionally, Spirit needed upgrades to support the Alcatel-Lucent 5620 SAM and these were slow in coming. Spirit decided to investigate a variety of alternatives, including using open source tools to build their own solution as well as purchasing commercially available products.

### EVALUATION AND SELECTION

Spirit embarked on a search for solutions capable of providing performance reporting for Alcatel-Lucent equipment. Spirit determined that the cost of InfoVista upgrades equaled the cost of purchasing an entirely new solution. Next, the IT team carefully

EMC<sup>2</sup>





# The Balancing Act of Mobile Workforce Management

FULFILLING MULTI-SERVICE OBJECTIVES  
WITH PRIORITY-BASED OPTIMIZATION

A Viryanet White Paper



VIRYANET

## Trusted Communications Superheroes

### Which Superhero are you?



**Asset Protector**  
I assemble and securely know where all the assets are in my network. A common language accomplishes this by identifying network assets in a consistent manner to facilitate interoperability.

**83%**  
consider having access to the right information at the right time critical to their business.

**95%**  
answer a call when they know it's from a trusted source.



**Identification Verifier**  
I can ensure my business customers know who they are speaking with, and consumers can have the confidence to trust their caller ID and answer the phone safely.



**Fraud Fighter**  
I can spot and stop suspicious phone numbers to protect network integrity, safeguard customer relationships, protect margins and defend against nefarious activity.

**\$29B**  
helping service providers recoup the \$29B annual revenue lost to fraud.

**20%**  
locking the 20% of service provider CapEx that is wasted each year.



**Operations Guardian**  
I can operate as efficiently and safely as possible, since I know the details of how my network is sourced and deployed.

### Special Weapons

**I am transforming**

- Wizard of network planning and service provisioning
- Colossus of network utilization
- Skilled financial reporter and compliance adviser
- Procurement powerhouse

**I am confident**

- Smart blocker of nuisance calls and spam
- Verifier of caller ID
- Restorer of consumer trust in calls and texts
- Increase of call answer rates

**I am thriving**

- Provider of accurate phone number data
- Slayer of fraud and suspicious activity
- Reputation defender
- Restorer of consumer trust in calls and texts

**I am evolving**

- Champion of digital transformation initiatives
- Steward of asset tracking and inventory management
- Guru of financial reporting and compliance
- Masterful deliverer of service

Source: © Statista.com, 2016-18



It's time to join the legions of Trusted Communications Superheroes hard at work each day.

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## PTP Test Applications

Harmendun 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 in service	Field technician	- EtherSAM (Y1564) - PDV GE measurements - Client emulation	30 minutes at 7 hour	NetFlacker Series
Sync network installation	Performed when a sync network is being deployed or when a new grandmaster is added	Network engineer	- Wander measurements - DC PDV offset - Slave/client emulation	24 to 48 hours	SyncWatch PRO
<b>Troubleshooting</b>					
Basic troubleshooting	Packet metrics issues/detective slave client	Field technician	- EtherSAM (Y1564) - PDV GE measurements - Client emulation		NetFlacker Series
Advanced troubleshooting	Incorrect clock output/detective grandmaster	Network engineer	- DE, MTE - DC PDV offset - Slave/client emulation		SyncWatch PRO

Table 1. Synchronization applications

**EXFO** | Assessing Next-Gen Networks

## Sigma Systems and TiVo

### Orchestrating New and Enhanced Entertainment Experiences

As consumer demands for a more personalized video entertainment experience continue to skyrocket, service providers are seeking new ways to remain competitive and seamlessly deliver over-the-top (OTT) content to subscribers. Today, Sigma Systems and TiVo have developed an integration partnership to help service providers achieve this goal by embracing and provisioning the TiVo video platform as a part of their bundled service offerings.

#### One Managed View of Video Access Entitlements

Critical to the success of offering a service like TiVo to customers is the ability to seamlessly enable them to access and view subscribed content from the TiVo device. Sigma Systems provides the service orchestration for the necessary authorizations, entitlements and provisioning of the TiVo service for subscribers through a single OSS solution – an essential element to delivering both on-network and 3rd party content and entertainment services. Subscribers receive the content they want, while service providers maintain customer satisfaction.

#### Provision and Manage Premium Video Service Products & Packages

Delivering new entertainment experiences to subscribers doesn't have to involve an immediate and costly video network evolution. Sigma Systems empowers service providers to leverage existing video networks in order to move beyond linear for services such as digital TV, PPV, VOD and DVR/PVR through support for next-generation IP video platforms, like TiVo, on a single integrated OSS service management platform. This co-existent service fulfillment environment manages the provisioning and activation of all video services, helping service providers to launch new premium video services and bundled packages that drive new revenue and reduce customer churn. In addition to viewing premium video and entertainment services offered by TiVo, service providers can also integrate with and deliver existing video products on the TiVo set-top box.

#### Effectively Manage the Entire Video Delivery Chain

Sigma Systems is the only OSS vendor today that has created a TiVo solution adaptor. With this unique solution adaptor, we have extended our video service fulfillment expertise beyond linear TV by enabling the support, integration, and provisioning of the TiVo service. Our single, integrated OSS solution seamlessly provides order management, provisioning and entitlement management across all technologies and systems. This single integrated solution manages the entire value chain of the TiVo service delivery value chain for the subscriber, network, device and content from the cloud.



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#### Next Generation Billing and CRM

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

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

#### Centralized Customer Management

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

#### Dynamic Product Catalog

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

#### Powerful Business Analytics

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

#### Market Leading CRM

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

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101 guideline

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



by Arindam Banerjee | April 2009

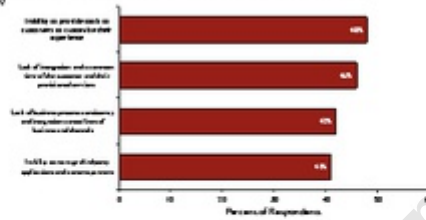
## Executive Summary

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

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

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

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



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

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