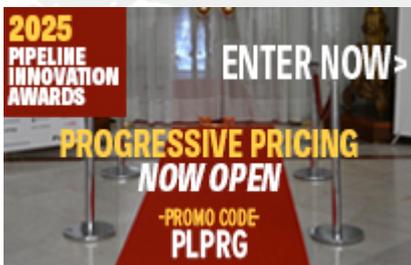


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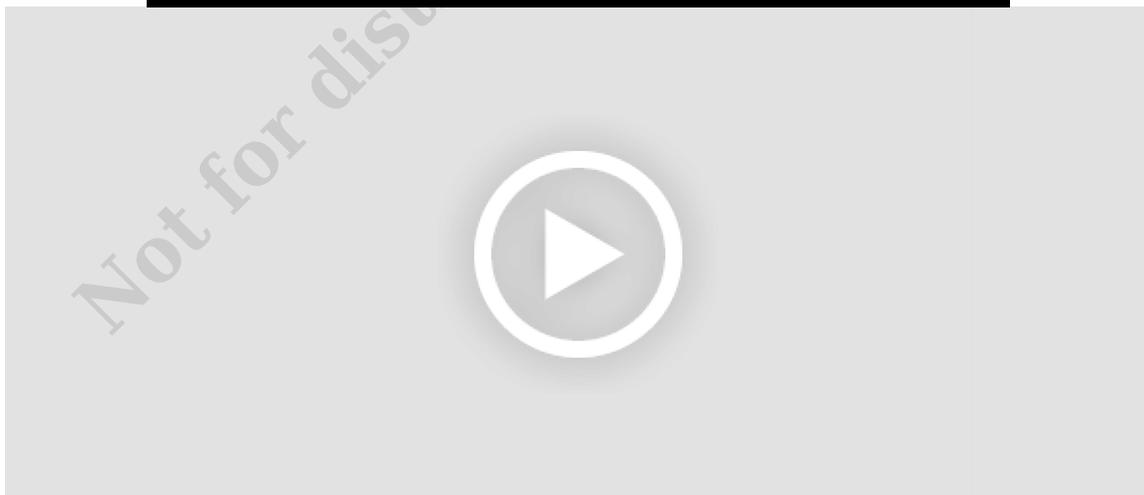
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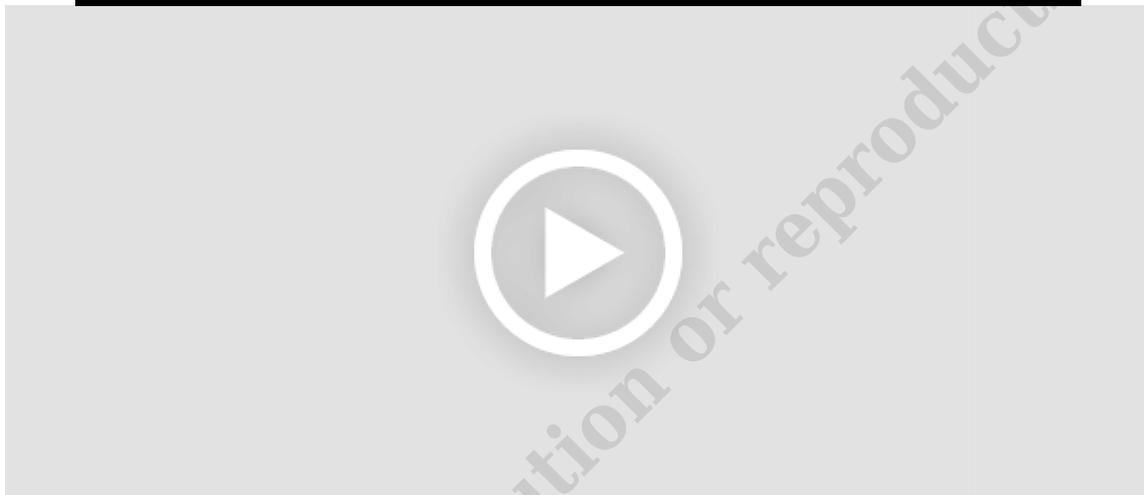
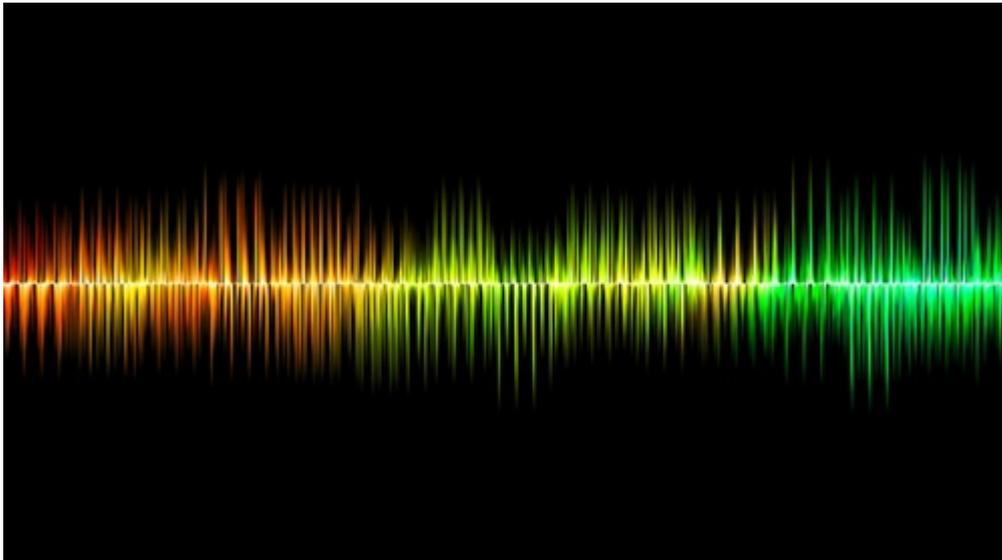
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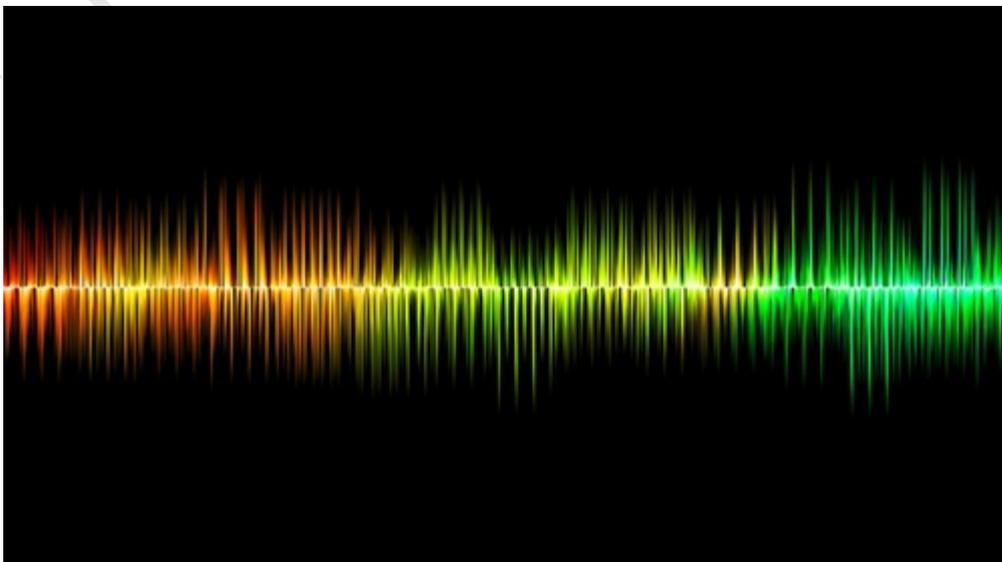
End-to-End Solutions for Broadband Networks

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



Predicting Colonial Pipeline: Mitigating Risk and Compliance

Mitigating risk and compliance for lawful intercept using lawful intelligence is explored in this Pipeline article feature SS8. Learn how CSPs can comply with lawful intercept regulation, while empowering law information with critical, real-time data.





Podcast: The Evolution to 6G

The world's eyes are already looking forward to the potential of 6G. Demands resulting from innovative use cases, for instance specific requirements from different industries and other user groups, as well as overarching goals like sustainability, are driving the standardization and development of mobile technologies.

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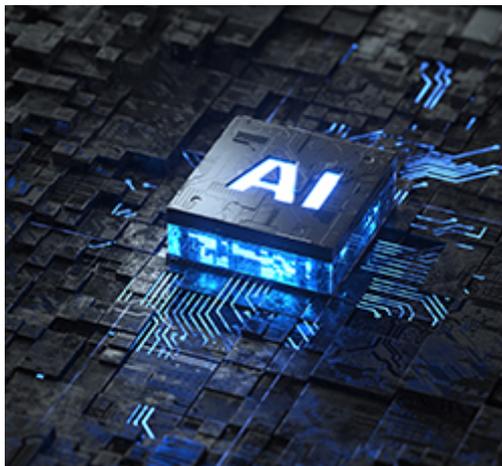
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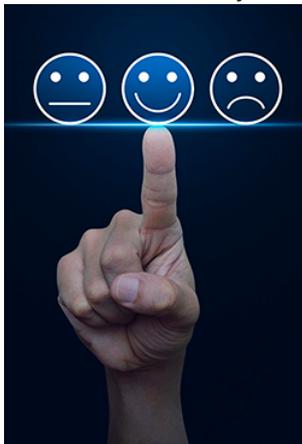
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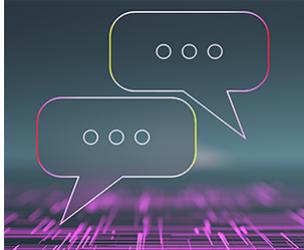
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Document Version: 1.0

Date: July, 2011

Author: Fredel Thomas, Director of Product Management



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



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

Challenges faced by MNOs in their 5G transport network planning

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

MNOs plan to make a strategic investment in fibre for mobile transport, with microwave and mm wave radio deployed only where needed¹. Drivers for microwave include cases such as avoiding delays in fibre deployment and overcoming obstacles in geographic regions such as roads and railway infrastructure.

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

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

¹ <https://www.gsmi.com/sectors/transport/content/uploads/2020/04/Mobile-Backhaul-Options.pdf>

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 burn rate; it's about enabling business leaders to do what they do best: run the business."

¹ *Strategic Playbook for IT Operations Management*, 2011

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 EMC² Solution for Service Assurance:

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



Introducing our New State-of-the-Art Geographic Platform

One of the ultimate goals of Broadband providers is to bring fast, reliable service to their customers, who are often located in rural parts of the country. Connecting unserved or under-served communities through broadband technology improves their way of life and closes the digital divide. But doing so can be costly and time-consuming.

What if there were a way to make it all easier by streamlining each phase of your network implementation, improving decisions by using real-time data and therefore optimizing your current and future operations?

CHR Solutions is a proven industry leader with over 75 years of experience and we have found a way to expedite your builds, decrease labor costs, forecast in real time, and increase monetization to speed up broadband access to rural America.

Geospatial Data is Not New— But the Way We Use It Sure Is.

By using Geospatial data in a unique way, we provide our clients with a platform that utilizes real-time information to improve efficiencies, take the guesswork out of decisions, and ultimately increase speed to market. The platform features a customizable dashboard that enables all aspects of your business to format and display the data in a way that optimizes its use in their specific operations.

CHR's Geographic Platform

- Improves efficiencies
- Takes the guesswork out of decisions
- Increases speed to market

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The 2014 COMET Executive Summit

November 5 - 7, 2014 — San Diego, California

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Pipeline continues its legacy of bringing together the world's leading service providers and technology innovators this fall at the 2014 COMET Executive Summit.

This exclusive event is gathering key executives from the world's leading operators with key technology developers and enterprises in an intimate symposium to explore the latest trends and challenges in communications and entertainment technology (COMET).

The COMET Executive Summit is a flexible, highly interactive format that is filled with unprecedented networking opportunities designed to build relationships that can be carried forward to solve the issues and challenges facing service providers and industry today.

Register today to stay on the edge of topics to be covered at the COMET Executive Summit, such as:

- Network security
- Big data & analytics
- Agile Architectures
- Network evolution & virtualization
- Customer experience management (CEM)
- Exploring cloud offerings
- Enabling new business models
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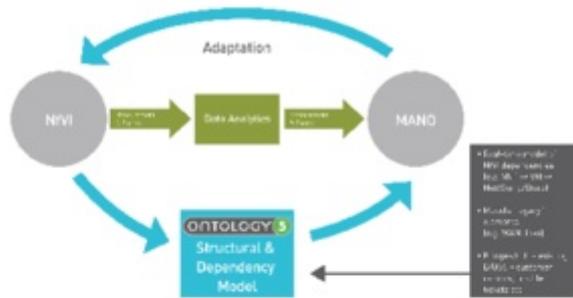
For more information and to register, visit:
www.pipelinepub.com/enb/comet/2014_comet_summit.php

As NFV moves from labs and trials into production, the need to assure the services it delivers has become urgent, but legacy tools struggle to deliver because they are unable to absorb the new reality of automated, high-speed orchestration.

Ontology 3 builds a real-time service topology across legacy, physical, logical and virtual service components and uses it to power next-generation service inventory and assurance functions for NFV, hybrid and multi-domain services.

This complete view of service elements, at all layers in the infrastructure in complex and high-automation environments, is indispensable to operationalising NFV enabling functions such as:

- Service assurance and service impact analysis in both next-generation and hybrid environments
- Fault investigation
- Coordination of multiple orchestration components
- Close integration with the OSS/BSS - required for functions such as order and trouble ticket management



Building coherent and complete views of "legacy" infrastructure and services is a hard problem because of the variety and quality of the source data required to do so: it is spread out over many systems and is generated by processes with many manual steps that introduce noise. This is a problem that Ontology 3's Intelligent 360 for Network Operators has already solved.

The high-automation in virtualised environments will mean that data is of much higher quality - within each of those environments - but it will nevertheless come from a range of sources - VMs, orchestration, data centre management and, of course, the OSS - and it will be much higher velocity data. OSS and network data will start to look like "big data": high velocity, high volume and high variety. Ontology 3's real-time features are ready to address this.

Cost-effectively combining these two worlds is what Ontology 3 does, so you can continue to **know your network now.**

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

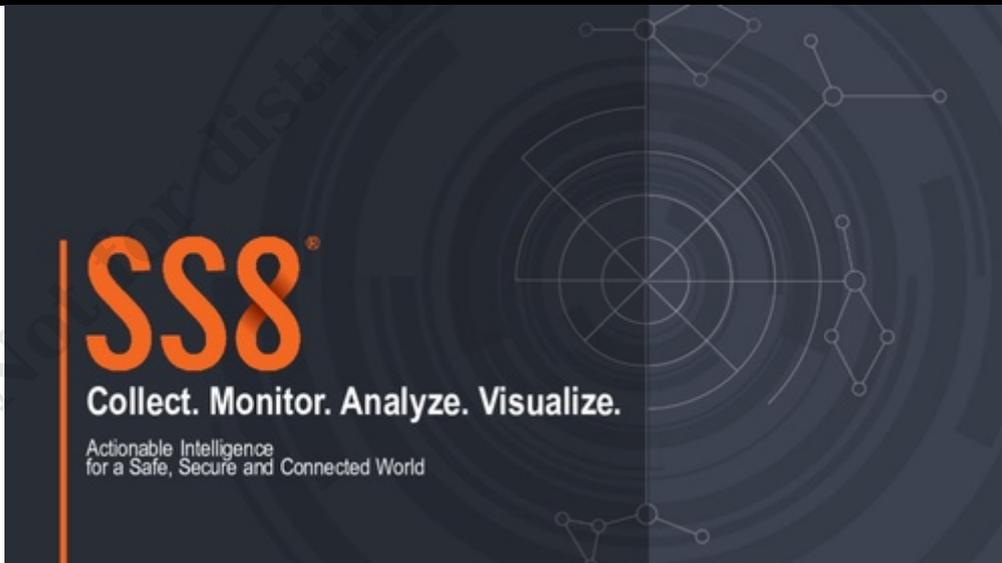
Delivering new entertainment experiences to subscribers doesn't have to involve an immediate and costly video network evolution. Sigma Systems empowers service providers to leverage existing video networks in order to move beyond linear for services such as digital TV, PPV, VOD and DVR/PVR through support 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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**DATA DRIVEN. RESULTS ORIENTED.
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Rural America needs access to broadband. But closing the digital divide can be complicated—and with so many service providers facing increased competition, mounting costs, supply chain issues and eroding revenues, you need more than a quick fix.

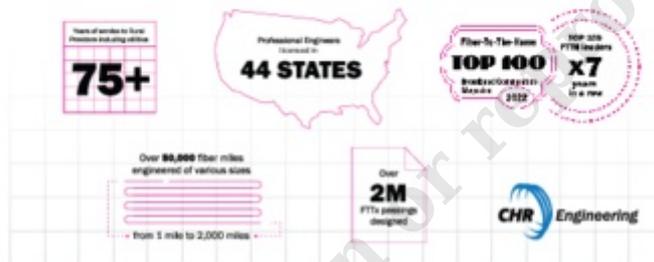
CHR Solutions has the technology and the expertise to help you make informed decisions that enable you to get the job done efficiently, on budget and on time. From feasibility studies to network design to construction, we partner with you every step of the way to optimize your operation and increase your speed to market.

“

CHR helped to train and guide us through the fiber-to-the-home design, engineering and permitting processes. They have become my go to liaison with city, county and state permitting authorities. If you want to work with people that are willing to help and get your foot in the door in your state right-of-ways, I highly recommend CHR (they even do wireless & tower engineering too)!

-Jason Pond, CEO, Grizzly Broadband, LLC

Our Experience. Your Advantage.



Whitepapers



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 geosites 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, 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 anytime.

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.



Case Studies

CUSTOMER SUCCESS STORY: SINGTEL OPTUS



Expert Billing For the Top-End of Town

SingTel Optus (Optus) needed to differentiate itself from its competitors and create a valuable service to attract and retain high-value customers. The company wanted to optimise its service to large corporate and government entities and therefore needed a billing and transaction management system to support that market segment.

STRATEGY

As the largest competitor to Australia's incumbent, Optus has taken a very strategic approach to winning high value customers.

Optus introduced superior customer-focused service to the market, along with premium product and service bundles. The corporate and government market in particular was requesting a better method to manage their communications portfolios.

To support this business decision, Optus selected Singleview as the strategic billing and transaction management system for their corporate and government customers. They chose Singleview because of its flexibility and functionality, which supports the concept of a "market of one".

RESULTS

Optus has reduced overall cost of ownership and improved operational efficiencies with lower bill processing cycle times and seamless internal operations, not to mention reduced spend on accessing data and increased time on servicing its corporate and government customers.

OPTUS – AN OVERVIEW

Optus, now owned by telecommunications giant SingTel, commenced operation in 1992 and is one of the largest communications service providers in Australia. It has more than six million customers today and provides a broad range of communications services including mobile, national and long distance services, local telephony, international telephony, business network services, internet and satellite services and subscription television.

ORGANIZATIONAL STRUCTURES REFLECTED WITH EASE

Singleview's hierarchies provide powerful aggregation features, which allow for the management of complex corporate and government accounts. The ability of Singleview to imitate these organizational structures is achieved via its superior and multifaceted hierarchies. Each account is treated individually, allowing billing, reporting and invoicing to be tailored to meet the client's individual business model. These hierarchies can sometimes be 8-9 levels deep with thousands of nodes.

BILLS AND REPORTS AS A SELLING TOOL

Optus is able to use the options provided by Singleview as a key differentiator for high value corporate clients. With Singleview, Optus customers have total control when they want it and how they want it.

- There are two key benefits for Optus customers:
- One single bill for all products and services.
 - Advanced multiple reporting functionality.

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*Seven Steps for Network Operations, Marketing,
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Technology for Service Providers

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



Mobile Video Policy Control

Benefits at a glance

- Generate new revenue with mobile video services
- Create mobile video services tailored to specific customer segments
- Align revenue and network costs using dynamic policy controls

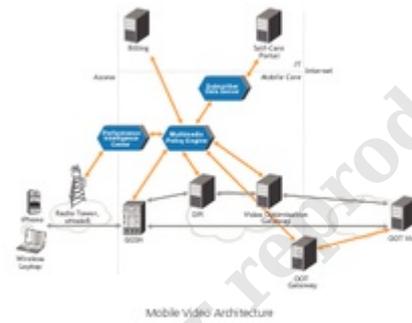


Business Requirement

There is no question that video is both popular and consumes more network resources than almost any other application. A look at current data points tells the story: YouTube has become the second largest search engine. Mobile video is predicted to grow 66-fold from 2009 to 2014 and consume 66 percent of all mobile bandwidth by 2014. Clearly, finding ways to mitigate the impact of mobile video on the network in a way that still meets consumers' demands is critical to the success of mobile operators.

Challenges

Previous network solutions for handling data services primarily centered on static service provisioning in which operators take a "one-size-fits-all" approach. However, with the advent of data-rich services like mobile video, that approach has a number of shortcomings. In fixed networks, geographical service demand can be accurately predicted and the network built out accordingly. However, mobile networks, by nature, enable movement, which makes it more difficult to predict geographical service demand and network build out. Moreover, operators are increasingly investigating and deploying tiered pricing plans, which offer end users a variety of service levels and options that go far beyond the "one-size-fits-all" static provisioning approach.



Trusted Communications Superheroes
Which Superhero are you?

Asset Protector
83% consider having access to the right information at the right time critical to their business.
I can identify 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.

Identification Verifier
95% answer a call when they know it's from a trusted source.
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
\$29B helping service providers recoup the \$29B annual revenue lost to fraud.
I can spot and stop suspicious phone numbers to protect network integrity, safeguard customer relationships, protect margins and defend against nefarious activity.

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

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September 2015



LTE and Offline Charging:
Driving the Need for a
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WHITEPAPER, BY ROBERT MORRISON



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