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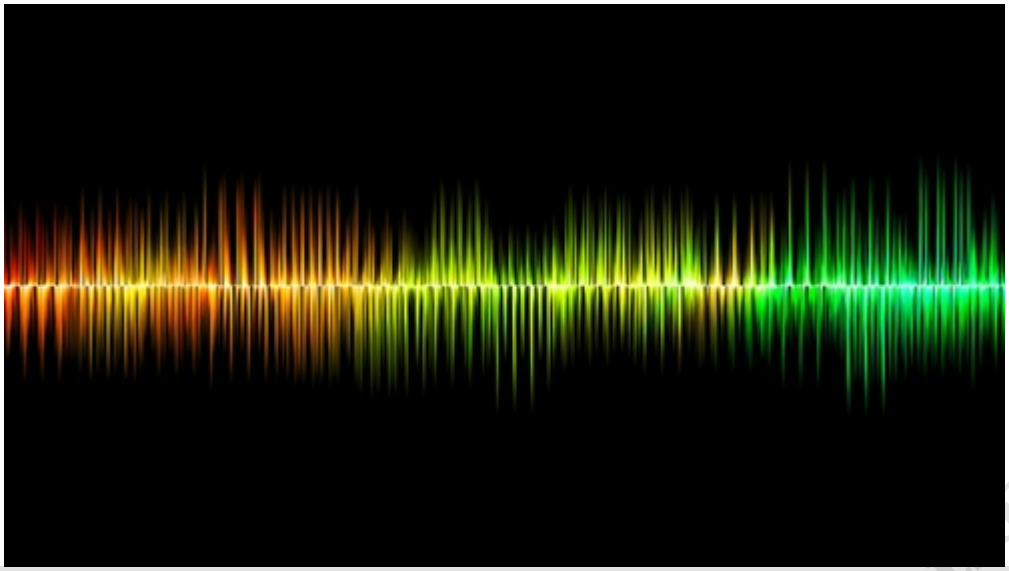
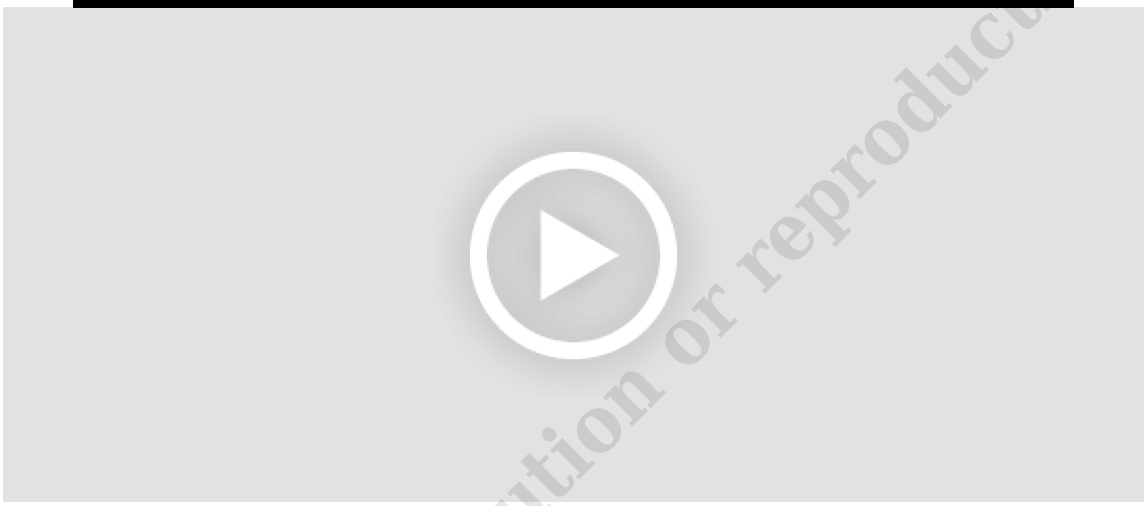
End-to-End Solutions for Broadband Networks

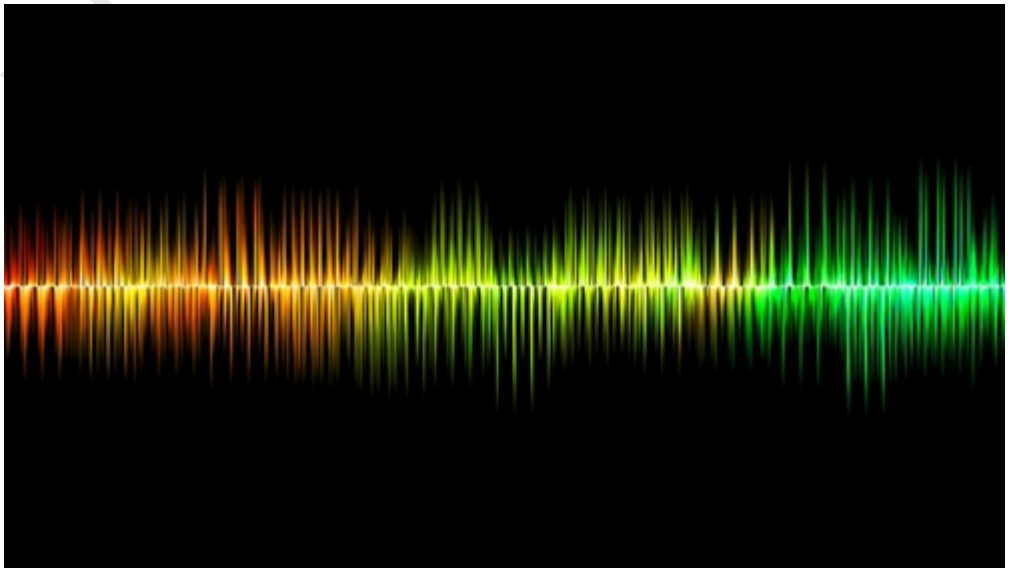
In case you missed Lindsay Broadband - a division of Technetix group at the SCTE Cable-Tec Expo, this video highlights the must-have, end-to-end solutions for your network.





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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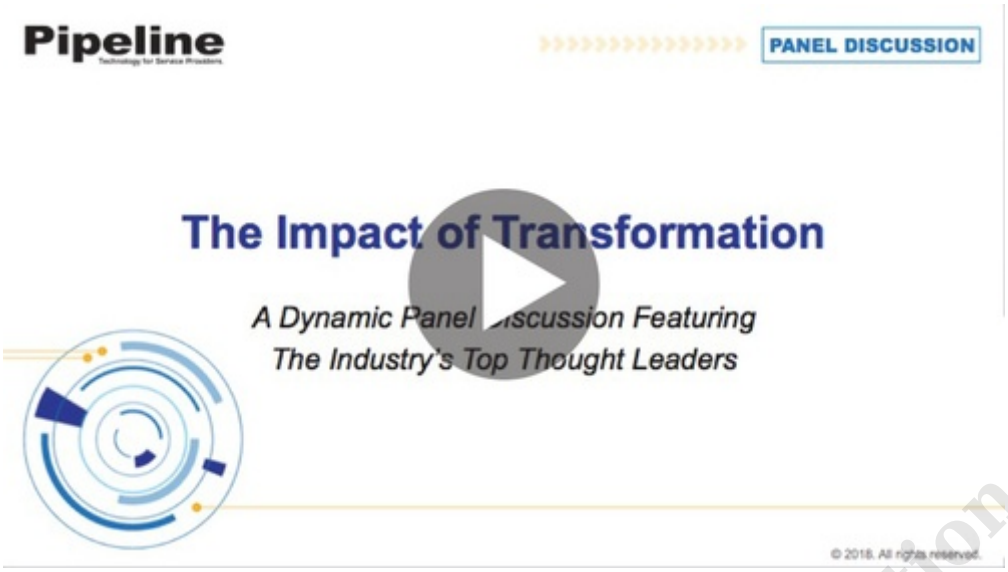

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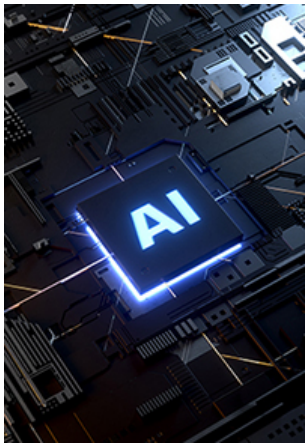

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Implementing a Scalable, Common Element Management System for Large Multi-Vendor Networks

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 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***.

Nakina Systems

Acumen CPQ™ Overview

Configurable CPQ built for the Digital Communications Service Provider.

Acumen CPQ is a powerful Product Catalogue and Configure, Price, Quote tool for Service Providers of all sizes – enabling an interface for both the Sales and Engineering teams, and the Enterprise Customer. It is an intuitive and easy-to-use shopping-cart style quotation tool that is rules and role driven for both sales teams and end-customers. It is fully configurable with a powerful admin section and comes with 30+ out of the box features.

Acumen CPQ™ | Core Capabilities & Features

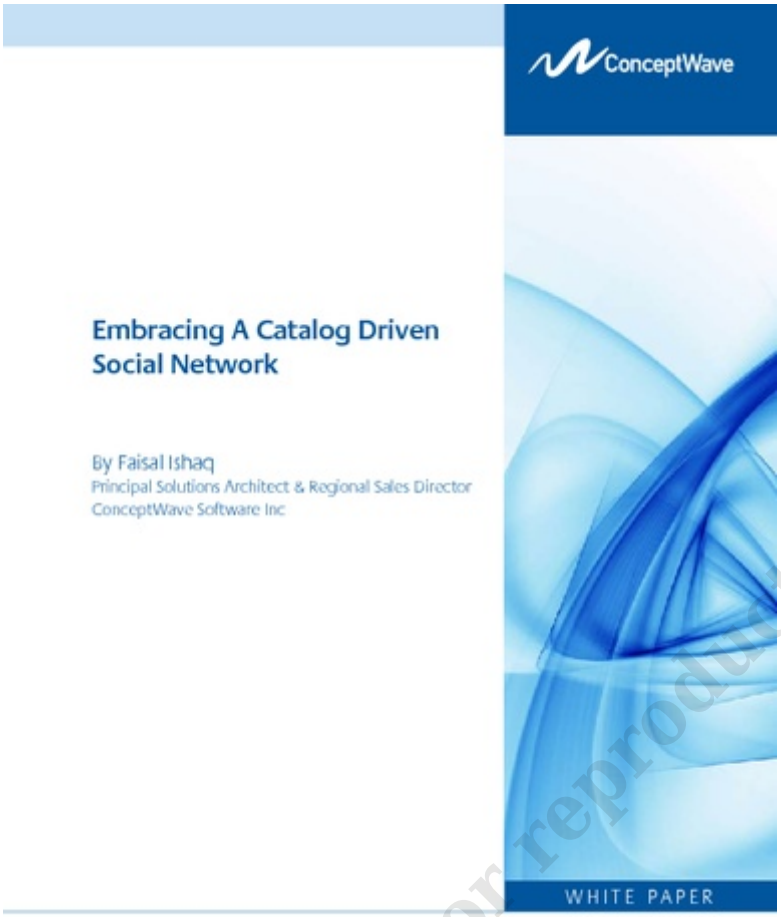
Super Admin Capabilities

- Products
- Price Query
- Reports
- Product Configuration
- Manage Roles and Workflow
- Configure Generic SOF Parameters
- Configure Supplier
- Customer Association
- Local Loop Margin/ Tax
- Currency Conversion
- Notes Configuration
- Manage Widgets
- Useful Information

Core Features

- Guided, shopping-cart style sales UI.
- Configurable product catalog supporting wide range of telecom products.
- Configurable products and rules to support non-standard pricing.
- Meaningful role specific dashboards and reports.
- Roles and permissions-based access to features.
- Multi-currency support and currency conversion.
- Accurate and customizable pricing.
- Customer specific rate cards.
- Configurable discounts that can be customized for individual user roles.
- Quick quote generation.
- Quotation version management.
- User friendly UI with the ability to create quick copies/clones of line items and quotes.
- Extensive audit logs.
- Get prices for multiple bandwidths and contract terms in a single click.
- Quick quote comparison for option analysis – create multiple copies of quotes with minor differences.
- Google maps based local loop pricing UI.
- Country and vendor specific tax and margins for local loop pricing.
- Third party vendor management.
- Support of last mile pricing within the product database as well integration capability with third party providers.
- Capability to host millions of local loop building lists and prices within the product database.
- Real time margin analysis.
- Automated and configurable pricing approval workflows.
- Benchmarking data for competitive pricing.
- Ability to present bundled prices in customer quotation.
- Parent-child relationship in related products.
- Sales funnel and quotation data reports, price query reports.
- Third party supplier management module.

Acumen CPQ™ Overview CLOUDSMARTZ.COM CloudSmartz



ADVA SOLUTION BRIEF

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). And to help, 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

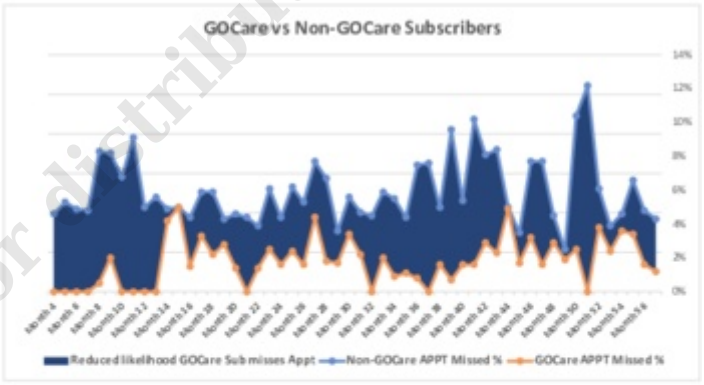
Access speeds will increase dramatically for 5G networks, and base stations will move from 1GbE to 10GbE and 25GbE uplink interfaces. Backhaul networks must rapidly grow to 100Gbit/s aggregated capacity. MNOs need to design and operate these higher-speed networks with proven technologies and established 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

Missed Appointment Analysis



When possible, it makes sense to compare the behavior of a customer opted in to GOCare vs customers that are NOT opted in to GOCare. Prior to the GOCare deployment, this operator averaged roughly 6% -8% of subscriber appointments as "no access". AFTER the GOCare deployment, GOCare subscribers were routinely below 2% of subscriber appointments as "no access" or 70% fewer missed appointments for GOCare subscribers. As the opt-in rate increased, GOCare was successful in dramatically reducing the overall missed appointment rate. At an estimated $150 cost per truck roll, the savings in missed appointments more than covered the cost of the GOCare offering.

Potential OpEx Impact:

Missed Appointment Analysis: Calculate an estimated 8% missed appointment KPI monthly, multiplied by an assumed $150/truck roll. A 70% reduction in missed appointments represents an EBITDA improvement of significant revenue annually.

In addition to the savings of OpEx, assuming the "no access" improvement applies equally to new installs, the improved completion ratio will ***accelerate revenues*** at improved margins.

Brochures

Brochures

ADVA

FSP 3000 OLS

A versatile and truly open line system

5G and cloud-based applications offer enterprises, carriers and service providers enormous potential for growth. However, this continuous and rapid change also creates the need for more network capacity and flexibility. It's essential to build today's networks on an open, flexible and scalable optical layer ready to accommodate evolving demand and innovation. Featuring a fully modular and open design, our FSP 3000 open line system (OLS) provides complete versatility and best performance in metro, core and data center interconnect (DCI) applications.

Truly open

Open disaggregated optical networking is one of the industry's hottest trends. By decoupling terminal functions from the line system, this approach offers complete flexibility to adopt the latest technology when and where needed. Our FSP 3000 OLS is truly open, allowing total freedom to evolve and optimize each network layer separately. Network operators can leverage and expand their infrastructure at any time with the technology of their choice. What's more, with open and standard interfaces, our FSP 3000 OLS easily integrates into software-controlled networks.

Build your own OLS

Our FSP 3000 OLS empowers network operators to create the solution that meets their exact requirements. With a modular architecture, multiple amplification and multiplexing options, and different chassis sizes, our FSP 3000 OLS enables customized solutions. Operators can simply mix and match the optimum filters and amplifiers and pack them into the best-fitting shelf. This makes our FSP 3000 OLS ideal for any type of network infrastructure.

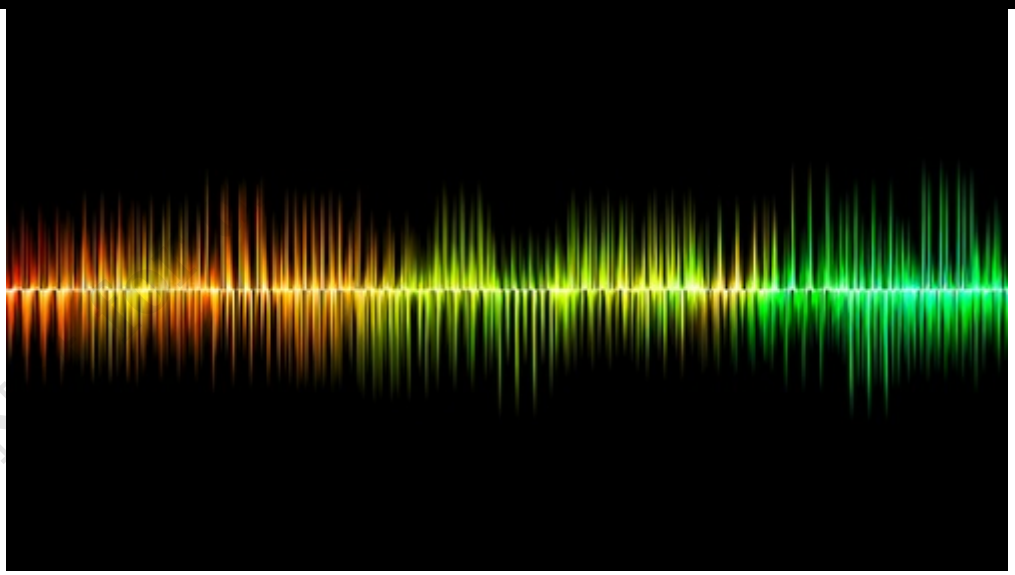
Future-proof investment

Coherent modulation schemes are becoming increasingly diverse to maximize transport network capacity and minimize the cost-per-bit of transport. Flexible terminals with variable modulation formats and baud rates enable highest capacity-reach ratio. The ultimate network performance relies also on line system capabilities, and that's why open line systems have increasingly become important strategic assets. With a combination of high-performance features, our FSP 3000 OLS transports any coherent modulation format as well as all varying signal baud rates with best performance. The high-resolution flexgrid and modular architecture of our ROADMs guarantee a future-proof OLS that can scale and accommodate any modulation format and baud rate. What's more, our FSP 3000 OLS provides a new level of flexibility with configurations able to support direct detect technologies.

Your benefits

- **Open hardware**
  No technology or vendor lock-in, successfully tested in multi-vendor environments
- **Open programmable interfaces**
  Easy integration into software-defined networks with open, programmable APIs
- **For any type of network infrastructure**
  Modular design with multiplexing filters and filter options to meet your exact requirements
- **Purpose-built components**
  Amplifiers and filter options engineered for metro, core and DCI-specific demands, and optimum transport of latest innovation, e.g., 400ZR and high baud rates
- **Visualization and control**
  Comprehensive monitoring and diagnostic tools, spectrum visualization and fiber surveillance
- **Ecodesign**
  High-density design with low power consumption
- **Flexible footprint**
  Chassis sizes from 1RU to 12RU, ETSI / data center racks, AC/DC power options

Videos



Presentations

Telia Carrier

CLOUD CONNECT

TRANSFORM YOUR BUSINESS IN THE CLOUD

Extend your network perimeter to the cloud with dedicated and private connections to AWS, Google, Azure, Oracle, and IBM — using Telia Carrier's global backbone.

CONTROLLED CLOUD CONNECTIVITY

Using our direct connections to the major cloud providers, we provide you with a secure onramp to the cloud. Cloud Connect is a private and dedicated connection that bypasses the public internet – giving you more control of your bandwidth, with high levels of security and reliability.

FLEXIBLE PRICING

We offer flexible pricing options to accommodate your changing bandwidth needs. You have the freedom to modify contract terms at short notice and configure your connection to suit your business needs. The service options are easily accessible by using our online portal with simple purchasing options.

REACH MULTIPLE CLOUDS AT SCALE

Cloud Connect allows you to use a single port to connect to one or multiple cloud providers – making it a cost efficient way to scale cloud connectivity. Your bandwidth needs for cloud usage will always be serviceable as we operate with ample capacity to ensure our global backbone is optimized for highly scalable, burstable workloads.

DID YOU KNOW?

You can order your Cloud Connect service in less than 1 minute, using our online portal MyCarrier!

BENEFITS IN BRIEF

CONTROL

Your traffic traverses our global backbone, bypassing the public internet. Providing a more predictable cloud experience.

FLEXIBILITY

Our pricing model accommodates your changeable bandwidth needs, with choice of 1Gbps and 10Gbps ports and freedom to change contract terms on short notice.

SCALABILITY

We have ample capacity on our backbone to support bandwidth-intensive workloads.

Application Note 278

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.

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

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 cloud content. This connectivity provides the ability to move data 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?

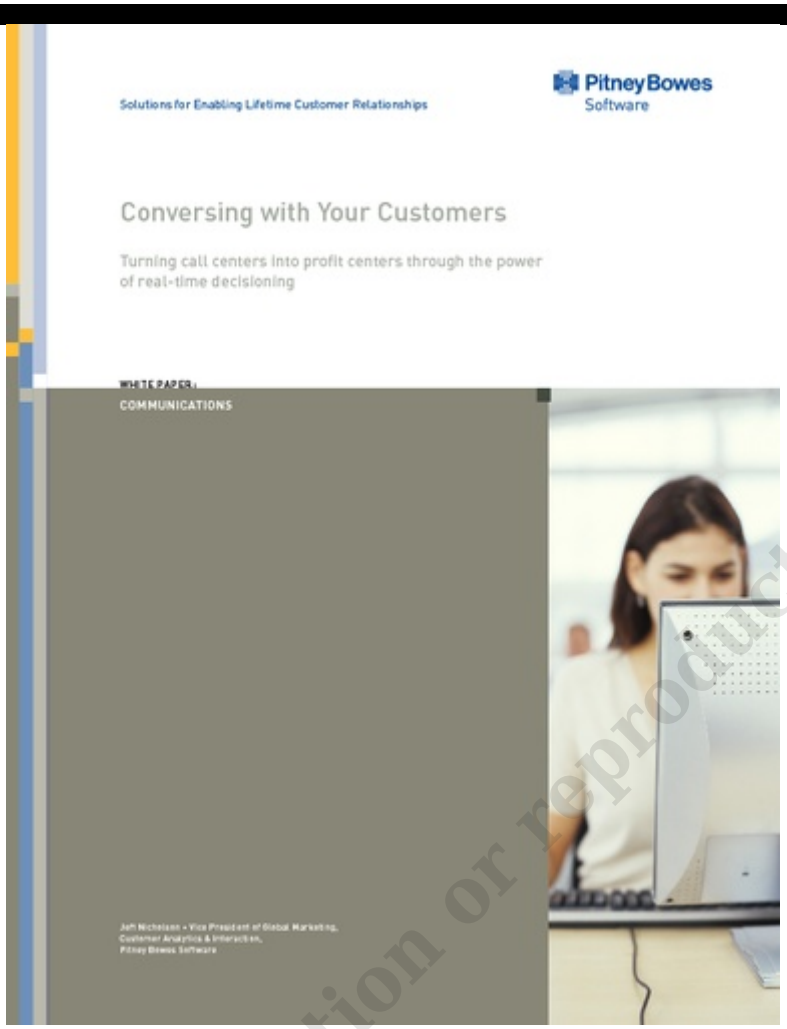
To deliver cloud computing services, cloud providers must possess the computing infrastructure necessary to process and store very large amounts of data, and rely on cloud carriers to connect all the pieces together. This section covers the different types of connectivity used to deliver cloud computing 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 [MEF CS].

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

EXFO | Assessing Next-Gen Networks



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