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Access Intelligence

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Virtuous Cycles

There's a point in Ron Hranac's column this month about an operator who has deployed 64-QAM (quadrature amplitude modulation) in the upstream that bears repeating.

"To understand what it takes to make upstream 64-QAM work," he writes, "we have to go back a few years to when a decision was made by this cable operator to get serious about preventive maintenance."

Getting serious about PM. That's like getting serious about eating right or exercising or spending more time with friends or family. Irreproachable as goals, they can be fiendishly hard to implement.

That's partly because urgent tasks have this tendency—familiar enough to editors—of crowding out the important ones. Answering a triple-alarm fiber cut or addressing a triple-play customer's complaints (or hitting multiple deadlines) are urgent tasks. But putting out fires can divert time and resources from daily activities that lead to network (and personal) health and productivity. In turn, such neglect only increases the odds of facing another meltdown scenario.

It all reminds me of something that **Comcast** SVP Len Rozek said last year about the "virtuous cycle" in which Comcast Seattle, our 2006 System of the Year, had found itself. "It's nice … to be in and really hard to get there."

Breaking a vicious cycle takes multiple steps. On the workforce management side, it could entail making dispatch more dynamic, along the lines of what **Charter's** Tom Gorman and Valerie Hartman are writing about this month. It could involve deploying more automated workforce tools, such those that **Cox** is using from **TOA Technologies** and **Time Warner Cable** from **CSG Systems**.

Whatever path it takes to get there, a cable system running efficiently on all cylinders is a thing of beauty. It's something we like to put on our cover. So here's this month's call to action: If you've seen an outstanding system lately—or work for one—send me a note. We'll consider it for this year's System of the Year award.

Jonathan Tombes
Editor
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OCAP Coming out of Idle

At the 2006 Consumer Electronics Show in Las Vegas, cable operators and **CableLabs** rolled out the big guns for a press conference on the progress of CableLabs' OpenCable Application Platform (OCAP). So where are we a year later? A little closer, is the short answer.

OCAP, which was developed by cable operators and CableLabs, is a stack of software that resides between applications and the operating system within a consumer electronics device such as a set-top box or OCAP-compliant TV set. Unlike legacy set-top boxes, OCAP devices can have new information or applications ported to them because of their two-way capabilities.

Currently, **Cox** is trialing OCAP in **Motorola** and **Scientific Atlanta** headends and hopes to add automated provisioning before moving to market trials later this year or the first quarter of 2008.

Time Warner Cable had a trial using **Samsung**'s OCAP TV and is slated to install Scientific Atlanta OCAP set-top boxes in subscribers' homes in May en route to having all of its systems ready for OCAP by July. TWC will also have OCAP in its guide later this year.

In 2006, **Comcast** prepped four markets for OCAP-compliant devices: Philadelphia, Denver, Boston, and Union, NJ. Comcast will be taking the lessons learned from the work in those four cities to launch OCAP into two commercial markets before the end of this year.

OCAP at Charter

Charter hoped to have OCAP trials in key markets last year, but Doug Ike, Charter's vice president of advanced engineering, said the full-function version of the navigation software wasn't available.

"We've been working with versions of the navigation software that are appropriate for lab and possibly technical trials; however, these versions don't support our current legacy applications," Ike said. "There were some software availability problems; however, our goal (last year) was to do lab work around the OCAP platform, specifically the **TV Guide** GuideWorks implementation."

Charter is currently testing **Panasonic** and Motorola DCH 6416 set-top boxes with CableCards, as well as host devices from Motorola and Scientific Atlanta.

Just about ready to put this thing in gear

Charter's OCAP team, which largely came over mid-year in 2006 from **Adelphia**, focused on getting the Motorola DAC headends ready first. Bob Blackburn, Charter's senior director digital engineering, said Charter is prepping for trials this quarter on the Motorola side and hopes to have early alpha testing in those same markets in the second quarter.

"We do have the full TV Works platform up and running in our (Denver) lab," Blackburn said. "We also did go through and identify where we needed to have basic video headend upgrades on the Motorola and Scientific Atlanta sides. We basically had to go buy 18 new DACs that can run the new software that supports OCAP, so we did all of those field upgrades. I think we still have one or two DACS to go out of our 37 that are upgraded and ready to do OCAP in the field."

The headend upgrades included 3.1.1-x software updates to the DACs while SA DNCSs were upgraded to SR 4.2. Infrastructure supporting DOCSIS Set-Top Gateway (DSG) needed work, as well as ensuring that multicast and appropriate IP numbering schemes were implemented. On the Motorola side, new RADDs that point to the CMTSs were needed for DSG, in addition to the configuration and software upgrades on the DACs. Blackburn said Charter will use DSG in an OCAP environment for a trial slated to start this month.

"That will be our first DSG conversion and our first OCAP trial," Blackburn said. "We'll get the DSG up and running first and then throw in the OCAP infrastructure, all of the headend servers and carousels that are required to support OCAP."

Charter will focus on using DSG for its out-of-band OCAP needs.

"I believe the Charter perspective right now, specifically for supporting retail devices, is we would to stay away from, if possible, using the legacy out-of-band protocols from Motorola and Scientific Atlanta," Ike said. "We believe that DSG is the correct direction to go and we'll put that in as a precursor to deploying OCAP."

While Charter has a Samsung OCAP TV in its lab, it has sat largely idle of late with the focus on OCAP basics such as DOCSIS and DSG pieces, time of day servers, DHCP configurations and object carousels, among others.

"I think we're pretty much in line with the MSOs who are not actively developing OCAP applications," Ike said. "It's pretty safe to say that Time Warner Cable and Comcast are indeed doing all of the heavy lifting, and some of us who don't have those kinds of resources are in the mode of figuring out how to best integrate and implement the solutions that come to market."

Innovation in the Spotlight at CableLabs

At this its Winter Conference in early March, **CableLabs** hosted what it called an Innovation Showcase to bring focus to some of the cutting-edge ideas represented at its semi-annual events. The showcase highlighted 10 venture capital stage companies that represented themes including growth and revenue generating products, network connectivity and service management, and consumer personalization.

"We think there is a great amount of innovation that is developed and recognized in the cable industry, and we want to facilitate further development of that innovation," said David Reed, CableLabs executive vice president and chief strategy officer. "(The innovation showcase) seeks to identify best new ideas emerging in cable on a regular basis."

"What this showcase demonstrates is that innovation is coming from a number of different quarters, and not in the traditional areas (you) generally think of with cable," said Louis Toth, managing director of **Comcast Interactive Capital**.

The companies singled out to present were chosen through collaboration among CableLabs and its members, including the CEOs sitting on the organization's board. Participants included **DARTdevices**, which promotes interoperability between digital devices; **Casabi**, which delivers Web-based content and services to handsets; and **Oversi**, which offers P2P network solutions. The others were **BlackArrow**, **Radiospire Networks**, **Simple Star**, **SupportSoft**, **uControl**, **VUVOX** and **Wyse Technology**.

Personal media

Audience members were polled to determine which of the 10 ideas were the best received. Runners up were BlackArrow with its on-demand ad management solutions and uControl, which offers home security solutions. The company deemed the most interesting, however, was Simple Star, singled out in part because its key message was easily and quickly understood. Its PhotoShow software is a personal media sharing platform consumers can use to create content with personal photos, videos and music, which they can then share online or through VOD.

Some bright ideas at the Winter Conference

Oceanic Cable, a division of **Time Warner Cable** in Hawaii, currently offers PhotoShowTV free to subscribers who have both digital cable service and Road Runner High Speed Online. "It has been a successful first launch ... I think I can say that both Time Warner and Simple Star were really surprised at the level of viewing that has occurred. It is among the most popular content on VOD in Hawaii. What we have learned is that consumers are really enjoying not only creating content, but also viewing what is going on in the local community," said Chad Richard, CEO of Simple Star.

Time Warner planned to add the service to its Staten Island market on March 22, and Simple Star expects to make announcements with additional operators in April. Incidentally, all content is reviewed before it is broadcast to make sure it doesn't include copyright violations or offensive material. Richard said that less than 1 percent of the shows thus far are rejected and attributes this track record to the "nature of the platform," meaning that its target audience is families.

CableLabs intends to make the showcase a regular installment at both summer and winter conferences.


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Getting to Know You: TWC Dials Up Analysts

In early March, **Time Warner Cable** executives hosted a conference call with industry analysts. The get-together came the day before TWC's shares made their debut on the **New York Stock Exchange**, which prompted one analyst to jokingly ask if CEO Glen Brit and other executives if they were sure they wanted to go through with being a publicly traded company.

A lot of numbers were tossed around for analysts, including that TWC is predicting EBITDA to increase this year in the mid to upper 30 percent range, but the conference call also provided a roadmap of where the company is headed this year and beyond.

TWC COO Landel Hobbs said three operational goals for this year were getting Start Over across the majority of the MSO's footprint, increasing the use of switched digital video (SDV) and

Going public is good, but not always easy

"refinement of the bundle." As part of its sustainable network strategy, which is based upon building out the network in advance of consumer demand, TWC plans on having SDV in about three-quarters of its systems by year's end and digital simulcast completed in the rest of its legacy systems. Last year, TWC had digital simulcast in 20 divisions and SDV in eight.

TWC expects to spend $200 million this year on its sustainable network strategy after forking out $80 million last year.

TWC would also like to refine its strategy on advanced advertising and bring a more Internet-like experience into play, including real-time ads, for customers and advertisers.

"We don't really need to do anything with our systems because the capability is largely software," Brit said in response to a question about what needed to take place in order to deploy advanced advertising. "The real issue is understanding with advertisers what they want to do and then implement it."

In addition to advertising, TWC's other major initiatives for the year include launching commercial phone service in its legacy footprint and honing its wireless strategy.

Adelphia systems need work

The biggest challenge going forward for TWC is getting the former **Adelphia** systems up to speed, particularly the ones in Dallas and Los Angeles, which combined account for half of the subscribers acquired from Adelphia. TWC has added digital phone services to roughly 900,000 homes in the new markets and converted 14 of the 23 billing systems, but Los Angeles and Dallas accounted for 80 percent of the company's lost subscribers in the fourth quarter.

The Los Angeles division faces integration issues after being three separate systems previously while Dallas needs its plants upgraded.

"While these systems present the biggest challenges, they also represent significant long-term opportunity," Hobbs said. "Both have complex integration efforts and will require substantial focus and resources to turn around, but, let's be clear, we have every expectation of turning them around."

By Ron Hranac, Senior Technology Editor

Upstream 64-QAM Success Story

My September 2002 *CT* column, "16-QAM Success Story," started out with the following introduction: *"It works great in the lab, but forget trying it in a real network."*

"QPSK barely works in my system, so there's no way I can do 16-QAM."

"We tried 16-QAM, but the packet loss was unacceptable."

Do these comments sound familiar? The idea of switching from quadrature phase shift keying (QPSK) to 16-QAM (quadrature amplitude modulation) can be a daunting one ….

Fast forward to today, and substitute 64-QAM for 16-QAM in the above intro. Using 6.4 MHz channel bandwidth. Not in the lab, but in a system with paying subscribers.

Upstream 6.4 MHz bandwidth 64-QAM? Yep.

It's for real

I can already hear the wailing and gnashing of teeth. But it's real, and problem-free, in a half dozen nodes in one of a Midwestern cable operator's systems. The secret? Good ol' Cable 101. I had a lengthy chat with the company's senior RF engineer about their upstream 64-QAM deployment. Describing this particular top-25 MSO as a "quiet achiever," he asked me to not divulge names or specific locations, but said OK to sharing their success story. Fair enough.

The company's systems were built with a two-way 860 MHz HFC architecture. The average number of homes passed per fiber node is about 600, although in some cases—including those with upstream 64-QAM—node splits have resulted in around 400 homes passed per node. Subscriber drops are mostly tri-shield, with some quad-shield in problem areas. F-connectors are of the compression crimp variety. High-pass filters are not used. The upstream carrier-to-junk ratio is maintained in the 35 to 40 dB range over the roughly 18 to 42 MHz portion of the spectrum. The company has a comprehensive preventive maintenance program in place (more on this in a moment), and its cable modem service uses 256-QAM downstream and 16-QAM upstream digitally modulated signals in all of its systems. The exception to the latter is where upstream 64-QAM has been rolled out, of course.

What it takes

To understand what it takes to make upstream 64-QAM work, we have to go back a few years to when a decision was made by this cable operator to get serious about preventive maintenance. The plan: Forward and reverse plant in all systems swept every 18 months; all nodes certified for proper operation and fiber link alignment every 18 months; ends-of-line checked; all power supplies visited at least every nine months; the corporate spec for signal leakage was set at 5 microvolts per meter (µV/m), although the general rule-of-thumb was and is if any leak is found, fix it. **Trilithic** leakage detectors with the channel tag option are used, and the tagging helps minimize chasing noncable noise from "the traffic light two blocks away." **JDSU**'s PathTrak is employed to monitor all full service nodes. And training. Lots of it. The result of all of this? After about the first two- to two-and-a-half years of the PM program, service calls dropped some 85 percent to 90 percent.

When it came time to move from QPSK to 16-QAM, the comprehensive maintenance practices and aggressive leakage monitoring and repair played a huge role in being able to do so. The company used **Sunrise Telecom**'s upstream characterization toolkit to qualify the plant's ability to support upstream 16-QAM. All high transmit level modems (+55 dBmV and greater) were identified, and problems causing the high upstream levels


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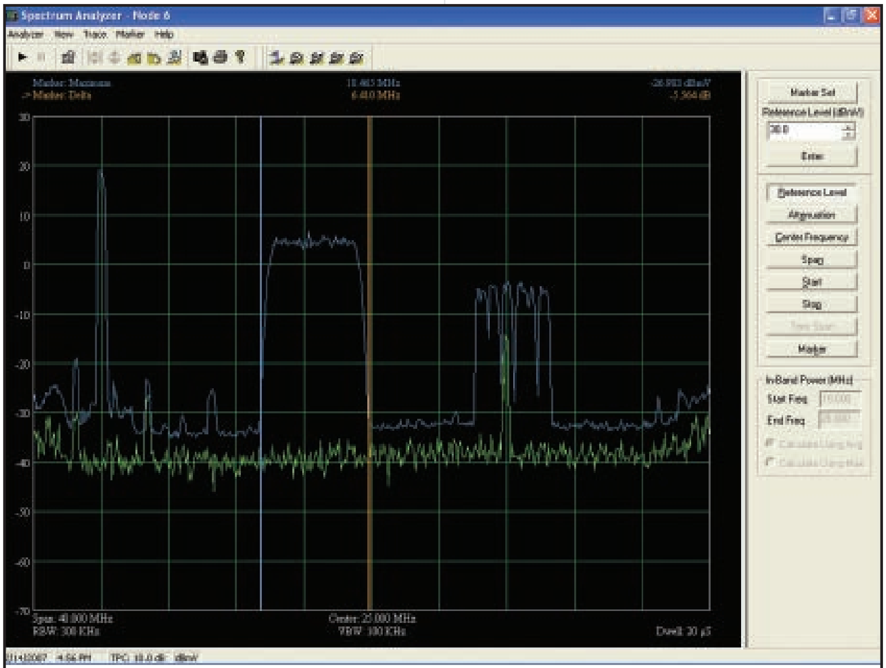

5-45 MHz upstream spectrum screen capture from one of the nodes carrying a 6.4 MHz wide 64-QAM signal. The 21.6 MHz "haystack" is near the center of the display. The tall carrier near 9 MHz is set-top box return, and the group of carriers centered near 33 MHz is for the system's circuit-switched telephony service.

were fixed. The cable modem termination systems (CMTSs)—equipped with DOCSIS 2.0 advanced physical layer (PHY) technology—can report a variety of parameters. These include Flap List, uncorrectable vs. correctable forward error correction (FEC) errors, upstream "SNR" (actually modulation error ratio, or MER), etc., all of which were monitored, problems identified and taken care of.

Back to the present: Downstream 256-QAM and upstream 16-QAM are working well. The occasional gremlin—ingress, crummy carrier-to-noise (CNR), whatever—that crops up is fixed as necessary.

Upstream 64-QAM

What about upstream 64-QAM? Since a substantial amount of work had already been done to make 16-QAM play nice, it didn't take a whole lot of additional effort for 64-QAM. Prior to rolling it out, each of the six nodes was driven out, and leaks greater than about 2 μV/m eliminated. PathTrak was monitored closely and CMTS reported parameters double-checked. All modems in each of the six nodes were verified to be DOCSIS 2.0 versions, and any high transmit level modems, as before, were taken care of. When all seemed ready to go, the switch was flipped, and a 6.4 MHz wide 64-QAM signal centered at 21.6 MHz began transmitting upstream data from subscribers' modems. The screenshot above shows one of the upstreams with the 64-QAM signal. The cable operator's senior RF engineer told me that about 95 percent of the upstreams company-wide are this clean. The CMTSs' reported upstream MER for the six nodes averages 30 dB (unequalized).

To date, upstream 64-QAM operation in the six nodes has been problem-free, and pre-equalization has not been necessary. As of this writing, two additional nodes were pending a move from 16-QAM to 64-QAM.

Ron Hranac is a technical leader, Broadband Network Engineering, for Cisco Systems and senior technology editor for *Communications Technology*. Reach him at rhranac@aol.com.

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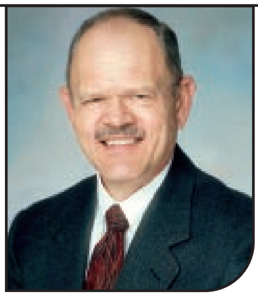
By Justin J. Junkus Telephony Editor



Time to Synch Up

Independent thinking is a big part of the cable telecom mentality. For the most part, the pioneers who started our business didn't fit into corporate molds. Most technicians I know would die in a cookie-cutter job. Even our technology is our own special breed, from the way we modified Ethernet to fit our distribution plant through telephony implemented via PacketCable. But in the world of "any application, any device," there's one dimension where we need to look like everyone else, and that dimension is time.

Telecom timing

The rest of the telecom world runs on a tightly synchronized time standard, specifically Universal Coordinated Time (UTC). Time implies clocks, and the clocks that determine UTC are devices that monitor the rate that specific radioactive isotopes decay (spit off particles) under controlled environmental conditions. The simplest way to explain UTC is that it is a running average of the most accurate atomic clocks in the world, adjusted with leap seconds to align with one rotation of the Earth, within one second per day. Most atomic clocks are built with isotopes of the element Cesium.

> "There's one dimension where we need to look like everyone else, and that dimension is time."

In telecommunications, synchronization is the operation of digital switching and transmission systems at a common clock rate. It comes in two flavors: frequency synchronization and phase synchronization. Frequency synchronization refers to operating two network elements at the same bit rate or frequency. Phase synchronization is the alignment of bits (pulses) such that the beginning and end of a byte (set of bits) can be identified. Without synchronization, repetition or deletion of blocks of bits may occur as information moves between systems, creating what is known as "slips." Depending upon the application and severity of the slip, the result may range from an annoying click in a voice conversation to the "blue screen of death" in a video transmission.

UTC with its underlying atomic clocks provides a basis for the most accurate synchronization among devices in a telecommunications system. The tie between UTC and telecom began, like most digital concepts, with voice telephony. In the digital circuit-switched hierarchy, physically separated Class 5 end office switches needed to be synchronized with each other and with Class 4 toll (long distance) digital switches. UTC did not yet exist, so the **Bell System** synchronized all its switches to its own reference atomic clock, called the Bell System Reference Frequency (BSRF), in Hillsboro, MO. The Hillsboro clock became known as the Stratum One source.

When the Bell System began offering Digital Data Service (DDS), the network elements within DDS also connected to the BSRF, but via paths that were different from those used by digital telephony switches. As data and enterprise networks evolved, they as well linked to the BSRF, resulting in a complex and difficult-to-administer synchronization network. Standards saved the day, when Bellcore defined a synchronization network that did not require physical connectivity to a single Stratum One source, but rather traceability to a clock that operated within the precision of the original BSRF. Today, there are several sources of Stratum One, including the satellites comprising the Global Positioning System (GPS). These Stratum One clocks are the devices mentioned earlier that determine UTC. They are also known as Primary Reference Sources (PRSs).

Impact on cable

Until recently, all this had little impact on cable telecommunications. When cable provided only analog video distribution, there was little need for precision synchronization with other networks. Data and local telephony introduced the need for billing timestamps tied to an external reference, and although these timestamps do not require the precision of Stratum One traceability, they follow UTC within a 200 msec

variation via the Network Timing Protocol (NTP). An NTP server is specified as a requirement in PacketCable 1.5.

Changing technology and new markets have further increased cable's synchronization requirements. Next Generation Network Architecture (NGNA) physically separates the media access control (MAC) and physical layer (PHY) levels of the cable modem termination system (CMTS) to allow quadrature amplitude modulation (QAM) sharing. This means that components that had previously communicated via the CMTS backplane can now be a substantial distance apart. Backward compatibility dictates that outboarded QAM devices and CMTS keep the same time relationship as they do on integrated models, which requires synchronization of QAM and CMTS core clocks within 5 ns. A new, highly precise, timing server with associated clients in the separated CMTS components is the answer. It is a requirement in the DOCSIS Timing Interface (DTI) specification for all systems with a modular CMTS (M-CMTS). (Just in case you can't relate well to measuring 5 ns, it's the time it takes for light to travel about 50 feet).

When M-CMTS components are not co-located, GPS traceability is a DTI requirement. Since GPS is a Stratum One source, this automatically implies Statum One traceability is available to cable systems with M-CMTS and next generation QAM devices at locations separate from the M-CMTS, such as a hub. GPS traceability is added to a DTI server via connection to a GPS receiver and associated antenna.

Even without M-CMTS, however, business network services, Internet protocol (IP) networks and network convergence drive a need for Stratum One traceability in cable networks. When business services include circuit emulation to transport time division multiplexing (TDM) services such as T-1 across a packet network, the slips resulting from insufficient synchronization will cause error performance to degrade to unacceptable levels. As network convergence drives applications across carrier boundaries, Stratum One traceability is vital. In order to meet interface standards, all digital signals between carriers must be under control of a clock or clocks traceable to a Stratum One source. A DTI server with GPS can provide the required link.

Much of the work behind the DTI was contributed by **Symmetricom**, a San Jose, CA, company that has been active in the design, development and delivery of network synchronization systems since 1985. In addition to working the specification, Symmetricom has provided a reference design for DTI clients and has implemented the server in its TimeCreator 1000 product, which is the only implementation of the specification available as of this writing.

For those interested in more information on synchronization and the associated requirements of communications networks, I highly recommend Symmetricom's free distance learning curriculum (22 courses!) at www.syncuniversity.org. (Also see the synchronization feature on page 28.)

Promising market

Before closing, I'd like to shift gears and note an emerging new market being trialed by switch vendor **Cedar Point**.

In late February, that company announced the second trial of the Safari C3 Multimedia Switching System as a vehicle for communications on a university campus. In the associated press release, the company touted Safari's ability to interface with an IP multimedia subsystem (IMS) infrastructure and to leverage existing equipment for new services, such as video telephony and fixed-mobile applications.

Cedar Point personnel carefully avoid the use of the word "PBX," but this is a premises-based application. It will be interesting to watch what follows and consider the possible implications for cable's business services market.

Justin J. Junkus is president of KnowledgeLink and telephony editor for *Communications Technology*. Reach him at jjunkus@knowledgelinkinc.com.

DYNAM
D I S P A T

Is Your Mobile Workforce Running on All Cylinders?

By Tom Gorman and Valerie Hartman, Charter Communications

Balancing workload and workforce, hour by hour and minute to minute. That's what dynamic dispatch is all about. It's the key to streamlining operations and powering a high performance team.

Productivity improvements are a major focus in today's competitive environment. How can a technician be better utilized? How can wasted truck rolls be reduced? What is a good target for cable operators to determine if they are "running on all cylinders?" Dispatch operations can provide data to answer these questions.

Dispatch takes on many forms, from one person with a two-way radio system to sophisticated centralized operations with automation systems installed. What does your dispatch operation look like today? Is it a "dumping ground" for things to be done that no one wants to do? Is it considered to be a "command and control" center? Is service fulfillment the primary mission of your dispatchers? If not, consider how to make this the centerpiece of your customer service delivery. In the dispatch center, quota administration, dynamic routing and assigning of work and accurate closing of work orders are the mission. A productive workforce is a natural occurrence when a good dispatch operation is in place.

What does the transition to a dynamic dispatch environment involve? Dynamic dispatch is the ability to successfully maintain a balance between workload and workforce. It involves taking a detailed minute-by-minute, hour-by-hour look at your current operations and asking what and where the organization can streamline.

Managing the workflow

Let's take a closer look at quota management. (See Figure 1.) Quota is the means to create capacity for handling work orders. The primary method is the point system. A point is a way of measuring time. For example, if one point equals 5 minutes, then 12 points would equal 1 hour of time. Work to be performed is then assigned a point value. Therefore, if a service call is determined to take 45 minutes to complete, it is assigned a point value of nine points. Add 10 minutes to drive to the job, and that service call would have a total point value of 11. Multiply the number of technicians by the number of points in a day (96 points = 8 hours), and a quota administrator will establish how much work can be done daily, based on technician work calendars.

Overbooking is a critical component of quota management. If your goal is to complete a certain number of points, it is imperative to find a way to have enough work available in the event there is a cancellation. Dispatchers must fill the "hole" in the workday with another job if a cancellation occurs. If this doesn't occur, then it will be near impossible to improve productivity. In order to determine how to overbook quota, the cancellation rate must be determined. Customers who call to cancel their appointments make up a small portion of this number. Some operators have adopted an aggressive pre-call program where dispatchers pre-call customers to clear work orders in which a problem no longer exists (possibly a line problem resolved on the previous day). This process results in up to a 15 percent cancellation rate. An additional component of a well-developed pre-call program is to cancel scheduled trouble calls if the customer does not answer during the scheduled window. Systems that follow this plan have been able to reduce unnecessary truck rolls by as much as 40 percent. In order to do this, you'll need to partner with customer care to ensure customer care reps inform the customer about the pre-call program.

The next consideration of quota management is the amount of "must do" work that is scheduled. A customer calling who is completely out of service would fall into this category. Generally, an additional 10 percent of work comes in each day as "must do." This work can be used to counter the 15 percent cancellations and fill gaps in the workday. In order to come up with a proper overbook rate, take the desired productivity, add the cancellation rate and subtract the must do rate:

Desired quota + cancellation - must do.

If the desired productivity is 84 points, it would look like Figure 2 (on page 24) for a group with 10 techs, 20 percent cancellation rate, and a 10 percent must do rate.

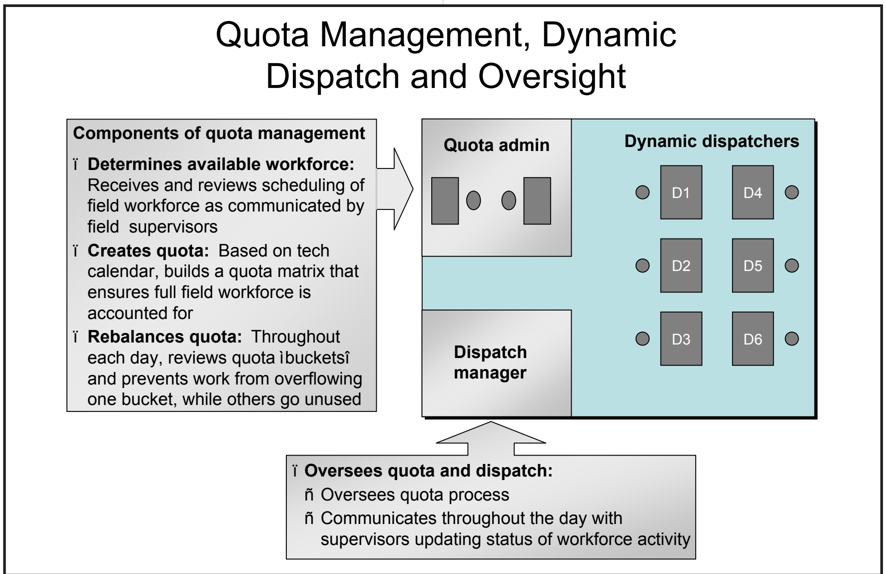


FIGURE 1: Quota Management and Dynamic Dispatch

Managing the workforce

Now that we've taken a closer look at the workload, let's evaluate methods for better utilizing the workforce. In a dynamic environment, jobs are issued in real time as a tech becomes available. As one job is called in as complete, another one in reasonably close proximity is issued. Techs should have two jobs at a time: the one that they are working on and the next one. As job No. 1 is called in as complete, the dispatcher assigns job No. 3 and so on. If a "must do" job comes in, it gets put right in the mix and is not held until the end of the day. This requires some definite changes in operations and expectations; however, it results in a better customer experience.

Dispatch and Workforce Management

BOTTOM LINE

How do you streamline workforce operations and reduce wasted truck rolls? What is a good target for cable operators to determine if they are "running on all cylinders?" Dispatch operations can provide data to answer these questions.

What does your dispatch operation look like today? It should be considered a "command and control" center, with service fulfillment the primary mission of your dispatchers. If not, consider how to make this the centerpiece of your customer service delivery. In the dispatch center, quota administration, dynamic routing and assigning of work and accurate closing of work orders are the mission. A productive workforce is a natural occurrence when a good dispatch operation is in place.

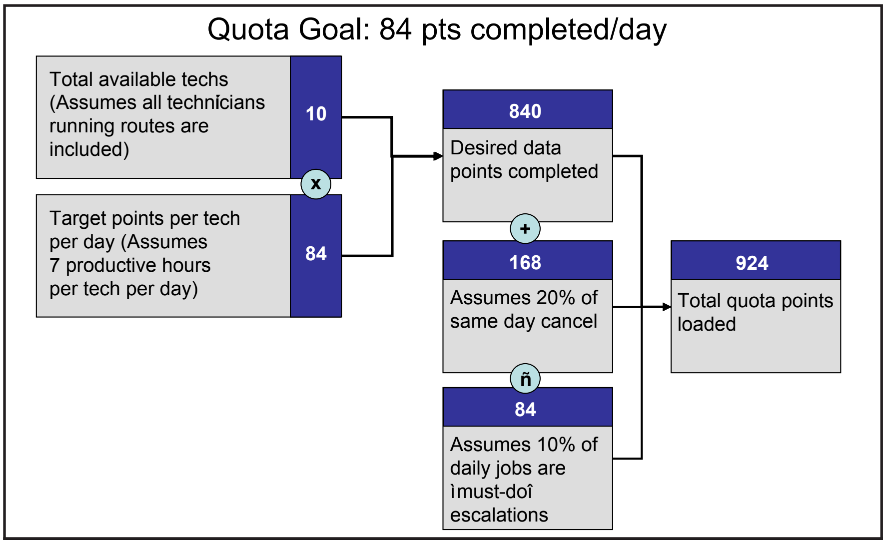


FIGURE 2: How to Hit a 84-Point Productivity Goal

First, use of text messaging is important. Techs can get the first two jobs sent via text messaging the previous night so that they know what is coming their way the following day. Jobs can be text messaged out throughout the day, which limits phone interaction with dispatch, resulting in minimum hold times. Consider a Blackberry type phone that makes texting easier. There are now commercial-grade pocket PCs that run Windows applications. The use of such a device can prepare a market for automated workforce management; most automation vendors can run their applications on these devices.

Second, communications to and from dispatch must be after every job. It is critical that dispatchers know the status of all field techs.

Third, all work must go through dispatch and be on a work order. Field supervisors should route all "special project" work through dispatch. The "verbal work order" is a dangerous way to run a service fulfillment operation. Instead, supervisors will be able to be in the field coaching, training and intervening if there is an issue. They can take their lead from the dispatchers, who know where their field force is and what issues they are having. (See Figure 3 on page 26.)

Routing: where to send them

How can you keep techs from waving at each other as they pass on the same street? How do you keep them routed in a coherent manner?

It is imperative that tech managers or supervisors identify the routing rules for their work force. There are a number of ways to establish routing rules by node, zip code, geography, hub or headend. Once the routing methodology is established, you must provide the dispatch group with the list of the routing boundaries. Then identify the second- and third-best areas to work in, in the event that

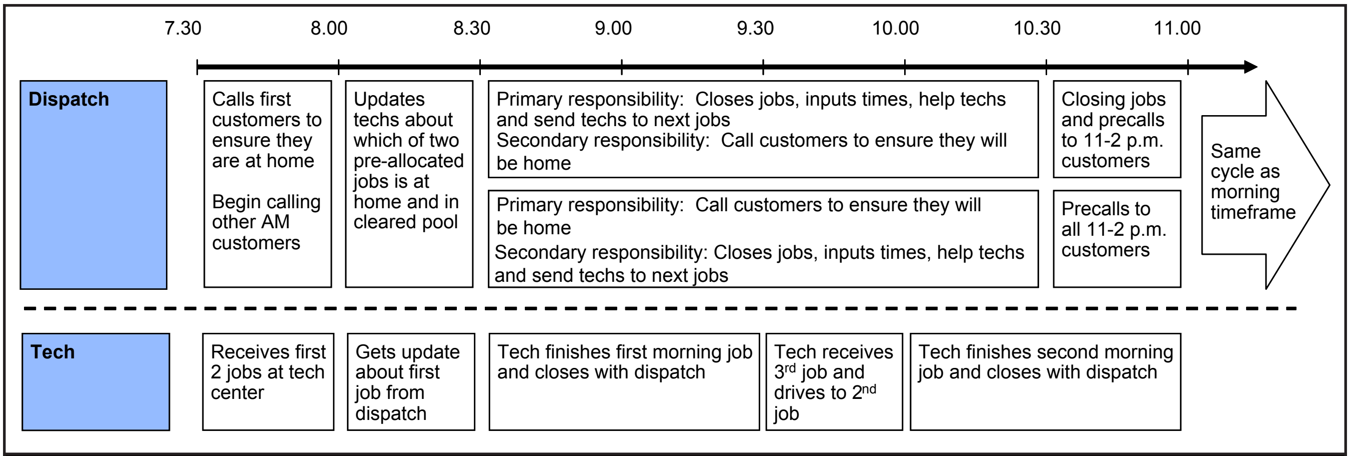


FIGURE 3: Tech and Dispatch Working in Tandem; 7:30 am to 11:00 am Scenario

there is not enough work in the primary schedule area. It is vital you provide this information in language that dispatch understands! If they don't understand node naming, but do understand zip codes, then give them the zip code data. Or educate on the node method.

No more assisting!

Techs throughout the day may decide to "assist" each other, commonly going to the same jobs together. This is not productive. In a dynamic environment, it is the dispatcher's responsibility to determine if one tech should assist another. Assisting should be for the following reasons:

1. A tech is falling behind. The dispatcher provides assistance by re-assigning one of that tech's jobs to another available tech.
2. Safety. A tech needs help with traffic control.
3. Skill. A tech isn't sure how to handle a complex job. A supervisor should be contacted for assistance.

Notice that the dispatcher makes the decision, not the tech.

Closing the jobs

When techs call in to update their work, dispatchers must close the jobs as close to real time as possible. This ensures that billing is current, time stamps are correct, and there will be continuity of service. A job that is not closed leaves opportunity for critical information to be lost. Set-top boxes may time out, billing may be inaccurate, and techs are not awarded the productivity that is reported based on completed jobs.

Dispatch needs to be a "command and control center" for a cable operation. All work flows to and from the field via dispatch. The skills required to be a good dynamic dispatcher are more than a clerk's work. Computer skills, intimate knowledge of your billing platform, provisioning and reporting systems are critical.

Automation is the next step in enhancing dispatch operations. The learning you get from getting dynamic now will make your transition to an automated environment smoother.

Tom Gorman is VP of operations engineering and Valerie Hartman is manager of technical operations development for Charter Communications. Reach them at tgorman@chartercom.com and valerie.hartman@chartercom.com.

Synchronization

Avoid Timing Meltdown

By Jeremy Bennington, Symmetricom

New specifications and convergence of services are making synchronization more critical than ever.

Synchronization of time and frequency has always been crucial to cable networks since the development of DOCSIS, the first and still current cable-modem interface standard.

Synchronization remains essential to cable networks for two reasons. The first reason is that because the physical transmission medium is shared by all cable modems on the network, basic connectivity is likely to cause high levels of transmission interference unless synchronization is precise. As shown in Figure 1 (on page 29), every cable modem within a network connects to the cable modem termination system (CMTS). As a cable modem is turned on, it must first go through a ranging process to synchronize its frequency and timing to the CMTS. This process ensures that all cable modems sharing the HFC plant and the CMTS do not interfere with each other.

In asynchronous time division multiple access (A-TDMA) mode, each cable modem gets a specific timeslot to transmit, and all timeslots are aligned among hundreds of cable modems so that no two modems on a given channel transmit data during the same timeslot (except for contention slots). In synchronous code division multiple access (S-CDMA) mode, cable modems are perfectly aligned to transmit simultaneously on the same RF channel during the same time slot. Perfect alignment is mandatory to ensure that the CMTS correctly demultiplexes the bursts to determine the data transmitted from the various cable modems. In either mode, if cable modems are not properly synchronized, transmissions will be completely lost.

The second and most recent reason that synchronization is essential to cable networks is that new specifications for modular CMTS (M-CMTS) architectures and new services like T-1 or E-1 circuit emulation require extremely precise synchronization in cable networks.

With regard to M-CMTS architectures, the synchronization interface, named DOCSIS timing interface (DTI), ensures that the M-CMTS core, edge QAM modulator and upstream are synchronized to support the existing DOCSIS requirements for frequency and timestamps that existed in the traditional CMTS. In an M-CMTS architecture, shown in Figure 2, a cable modem receives its synchronization from the edge QAM modulator so that it is synchronized to other cable modems to properly transmit to the upstream burst receiver. Additionally, the M-CMTS core is synchronized to the edge QAM modulator to schedule, correct and insert MPEG timestamps for video.

In an M-CMTS topology, a DTI server contains system intelligence; it also controls frequency and time for the headend or distribution hub. Each M-CMTS device (edge QAM modulator, upstream burst receiver and M-CMTS core) contains an integrated DTI client required by the specification. The DTI client is a low-cost digital transceiver of the DTI protocol consisting of a small field programmable gate array (FPGA), inexpensive oscillator and supporting circuitry. The DTI protocol generated at the DTI server replicates the precise time and frequency at each DTI client within 2 ns to support the existing ranging requirements. DTI has a robust feature set including automatic cable delay compensation, early fault detection, path traceability and all the DOCSIS 1.0/2.0/3.0 requirements. If desired, the application also enables time-of-day services, hitless protection switching, redundancy, enhanced management and Stratum 1 traceable commercial services timing. From a synchronization and timing perspective, the M-CMTS devices are on a common, virtual backplane, analogous to the integrated CMTS.

Timing tiers

There are three synchronization tiers in a cable telecommunications system—traceable network timing, M-CMTS and integrated CMTS. (See Figure 3 on page 30.) The business motivation for multiple tiers of synchronization is to achieve economies of scale, conserve capacity and throughput, and offer new services that are competitive with those provided by the telephone companies, especially to business customers.

Historically, cable telecommunications has not synchronized its network timing to Universal Coordinated Universal Time (UTC) or any other standard time source, and thus has been operating at Tier 3. It uses a 10.24 MHz clock internal to an integrated CMTS for symbol generation in its modulation schemes. The DTI TimeStamp (DTS) is a 32-bit counter that increments every 10.24 MHz root clock cycle.

M-CMTS defines a mode of operation at Tier 2. It radically changes how cable systems are synchronized. With modular CMTS, timing information is exchanged between physically separate network elements. Timing information that used to be internally moved over a backplane must now be exchanged among separate equipment units. This information must be synchronized within 5 ns for exchanges between servers and clients in the same building.

Operation at the traceable network timing of Tier 1 synchronization becomes necessary when network elements are geographically separated, such as when the CMTS core is at a headend and QAM modulators are at a hub. Traceable network timing at each location is critical to synchronization within 100 ns of network element communications interfaces between locations.

The consequences of loss of synchronization are dire. Data throughput in high-speed

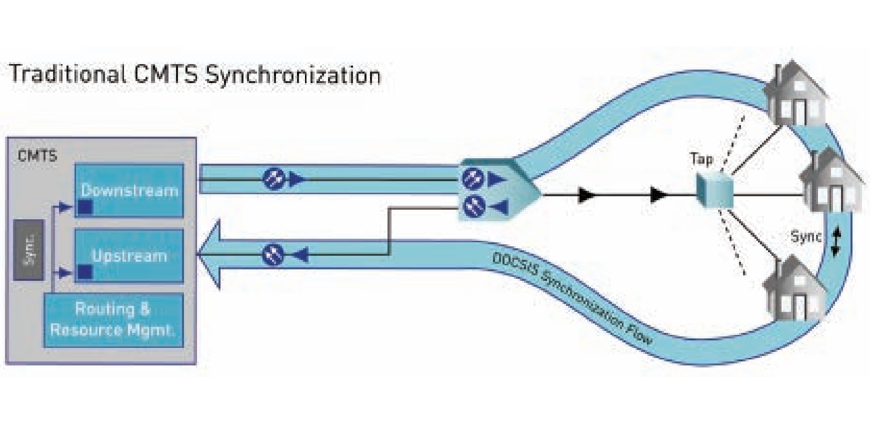


FIGURE 1: CMTS overview

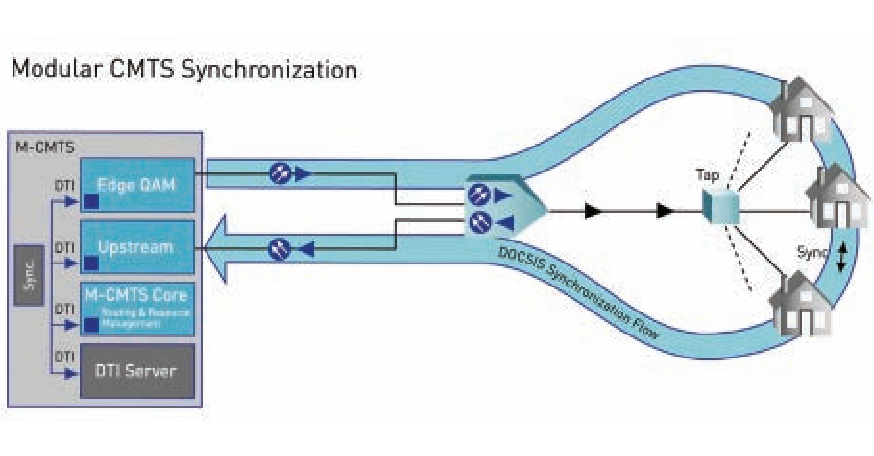


FIGURE 2: M-CMTS system row

Synch Up

BOTTOM LINE

Synchronization is critical. Its loss can increase packet errors, reduce voice quality and make digital video unavailable. New specs raise the stakes. In deploying DOCSIS timing interface (DTI) operators need to consider several issues, including redundancy, cabling, capacity expansion, root/slave server placement and M-CMTS migration plans.

data applications drops radically because of severe increases in packet errors. Worse still, voice quality is lost, and digital video service may not be available.

Having the architecture synchronized to UTC that is accessed through Global Positioning System (GPS) receivers provides the solution that makes precise synchronization possible. UTC is the international time standard that has been

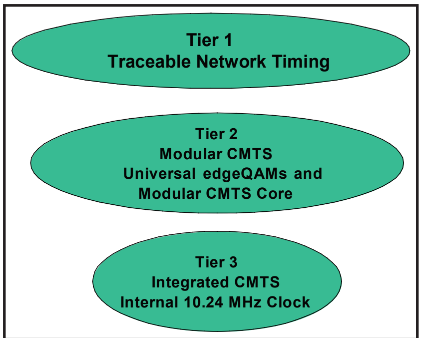


FIGURE 3: Synchronization tiers in a cable system

in effect since 1972. UTC is maintained by the Bureau International de l'Heure (BIH), which forms the basis of a coordinated dissemination of standard frequencies and time signals. UTC is the time and frequency standard that is the source for the Traceable Network Time shown in Figure 3. It is used for all of telecom. GPS (the U.S. military refers to it as NAVSTAR GPS) is a satellite navigation system used for determining one's precise location and providing a highly accurate time reference almost anywhere on Earth or in Earth orbit. The GPS satellites continuously transmit digital radio signals that contain data on the satellites' location and the exact time to the Earth-bound receivers. The satellites are equipped with atomic clocks that are precise to within a billionth of a second.

A DTI server has a GPS receiver that enables the M-CMTS architectures to stay synchronized on UTC and thereby avoid packet errors, poor voice quality and loss of video service. (For more background on UTC, see Telephony column, page 16.)

DTI architecture

DTI is not only a protocol, but also an architecture of interconnected DTI servers and DTI clients. This dedicated synchronization distribution architecture ensures that all the clients and servers together maintain the time and frequency accuracy needed for M-CMTS and DOCSIS. The synchronization is required to ensure that the M-CMTS elements together perform as if they were a single shelf. Through this tight synchronization, both new and existing cable modems can be connected to an M-CMTS. A DTI server has a GPS receiver that enables the M-CMTS architectures to stay synchronized...

maintain synchronization.

A root server, slave server, and all client servers must together maintain 5 ns of synchronization. This 5 ns must be budgeted among root, slave and client. In order to keep client implementation low cost, the client receives 50 percent of the budget. Slave and root together must therefore be within the 2.5 ns remaining window, or 1.25 ns each, with respect to the root server oscillator.

In addition to the 5 ns requirement in a single location, there may also be a requirement to synchronize among multiple locations. This requirement may be attributed to commercial services or DOCSIS Path Verification (DPV). With GPS, DPV measurements can be made to measure the one-way delay across the Internet protocol (IP) network from the headend to the hubs or across the backbone accurate to 100 ns. GPS also provides Stratum 1 frequency traceability. The time budget for DTI is shown in Figure 4.

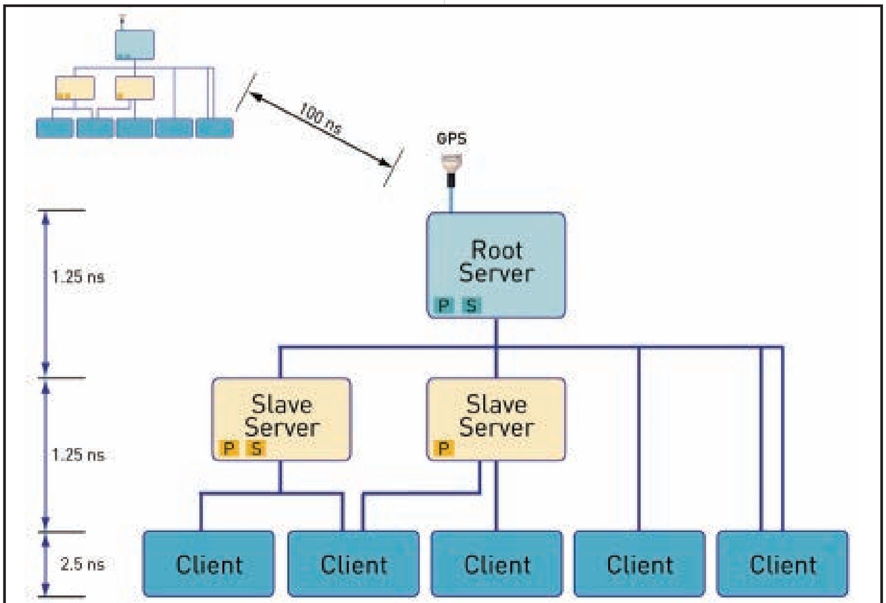


FIGURE 4: DTI time budget

Initially a DTI network is rather simple to deploy. A DTI server is installed, and it contains the root DOCSIS frequency and timestamp. This first DTI server is called a root server and establishes the DOCSIS root frequency and time. Each headend or hub can only have one root DTI server. Any additional servers are slave servers. A slave server contains a DTI client and uses a DTI connection to the root DTI server to

The M-CMTS architecture not only provides the transmission architecture for DOCSIS broadband services; it is also the foundation for voice services and video on demand (VOD) through the converged edge QAM modulator. With a wide variety of services running over the M-CMTS architecture, great care must be taken to ensure that it is reliable. Without DTI, in normal operation the M-CMTS will not

work. Deploying a reliable DTI architecture can be done economically and provide scalability and reliability.

Desirable traits

Choosing a scalable and reliable DTI server is critical. A DTI server should have the option for power and clock card redundancy to provide high availability, but also provide flexibility for low cost. A DTI server should also be able to support both root and slave configurations. This provides an operator flexibility to use the same product for both types of deployment and simplifies training, management and operations. A DTI server should also support GPS as a highly recommended option.

When a root DTI server is configured, the operator must choose how the DOCSIS timestamp is configured by setting the time-of-day mode. The DOCSIS timestamp is used by the M-CMTS elements and cable modems to communicate. Once the DOCSIS timestamp is configured, if it needs to be changed for any reason, it causes the M-CMTS elements and cable modems to reset. GPS mode is the preferred time-of-day setting. A properly designed DTI server may also have NTP server capability since it contains all of the complex synchronization components and in most cases is connected to GPS.

All M-CMTS elements should support two DTI client ports to ensure that a simple disconnection from the DTI server does not cause failure. As the need for DTI capacity increases, slave DTI servers need to be deployed to increase capacity. Figure 5 illustrates options for connecting root servers, slave servers and clients.

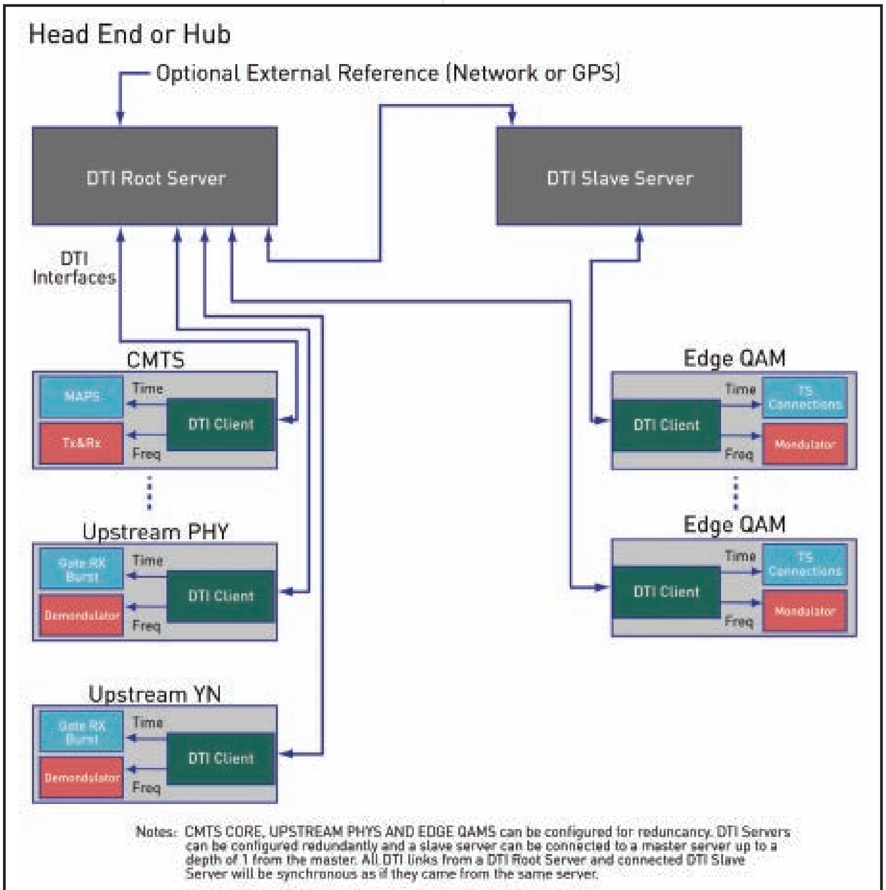


FIGURE 5: DTI connections

Best practice deployment is to install DTI servers with internal power and clock card redundancy; however, if lower capital cost is desired, a fully redundant root DTI server can be deployed, and when additional capacity is needed, a slave DTI server without redundancy can be used. If this is done, the M-CMTS element should connect one DTI client port to the root and one to the slave. This ensures path protection that keeps the M-CMTS elements in sync if the slave server fails.

Management of DTI is critical to ensuring proper operation and deployment. The DTI protocol ensures that the DTI server can monitor the performance of each DTI client and detect changes in DTI client performance. This information is available to report to a management system and can be used by the management system to reroute traffic to other M-CMTS elements before failure occurs.

Deployment options

Reliable and economic synchronization provides cable operators the calculated edge in reducing operating costs while increasing network scalability and flexibility for advanced, next-generation services including DOCSIS 3.0 and commercial services.

DTI lays a foundation for the existing and future network architectures to converge voice, data and video reliably and economically. The DTI server is a shared element among the M-CMTS devices making it economical, however potentially a single point of failure. Deployment schemes for redundancy should include protection of power and the active server elements in the DTI server. Moreover, path protection through dual links from the DTI client embedded in the M-CMTS devices to the DTI server help guard against inadvertent physical disconnection. Dual links can also be configured to originate from redundant DTI server output cards or redundant DTI servers for carrier class applications.

There are several architectural and operation considerations to deploying DTI. Each cable operators or region must decide how they want to support redundancy DTI, sparing, how they want to cable it in the headend/hub, what options they want, like GPS, and they must also plan for expanded capacity and how root/slave servers will be deployed. Lastly, they may also need to consider an overall migration plan for M-CMTS, which may include DTI and other synchronization techniques.

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Intelligent Bandwidth Management

Making Room for Personalized Advertising

Powerful video processing can not only benefit switched and on-demand video, but also enable revenue-generating targeted ads.

Kerry Washington and Jeff Tyre, RGB Networks

Cable operators are facing a significant bandwidth crunch as they transition their networks to all-digital while simultaneously expanding their video offerings in the face of mounting competition. For those in the midst of deploying digital simulcast and switched digital video (SDV) architectures, bandwidth optimization is priority No. 1. However, steps taken now to maximize utilization efficiencies of current bandwidth and per-channel throughput can ease the rollout of personalized video services down the line.

Because of the high stream density requirements, personalized video services place a much greater demand on hardware resources and strain the business model built on legacy equipment and costs. Through intelligent and cost-effective video processing, operators can effectively reduce the stress on their networks while adding new revenue drivers to ease the migration to all-digital. Chief among these drivers is the promise of highly targeted advertising to the subscriber level.

Switched digital video

Migration of current cable networks to partial or fully switched delivery architectures is a significant trend in the cable industry that can help operators to alleviate bandwidth constraints and build a large number of tiered video services and channel lineups. In an SDV environment, operators take a narrowcast approach and send channels selectively only to those homes that actually tune in to them, thus saving precious network bandwidth by not broadcasting signals to all customers all the time.

With the additional bandwidth freed by SDV, operators can build and deliver many tiers of targeted programming without significant bandwidth allocation, allowing them to truly customize and personalize their services to individual subscriber needs. However, deploying services over an SDV architecture is not without its own challenges, leaving room for further enhancements to the delivery architecture.

SDV deployments can realize significant cost benefits from bandwidth sharing and optimization through the use of high density video processing solutions, allowing each node or region to operate with the level of programming complexity once reserved for the main distribution center. SDV moves the complex processing of the channel lineup far closer to the subscriber, placing heavy demands on edge video processing equipment.

Improving SDV and VOD

Though operators may not want to hear this, current first-generation re-multiplexers weren't designed for SDV and video on demand (VOD) environments.

Both SDV and VOD architectures must currently receive constant bit rate (CBR) streams to operate seamlessly and provide a simplified means of filling each available quadrature amplitude modulation (QAM) signal with as much content as possible. In the United States, standard definition (SD) VOD streams are compressed to 3.75 Mbps. With this bit rate, 10 VOD streams fit nicely into the transport of 38.8 Mbps being delivered through a 256-QAM modulator. In an SDV environment, the session resource manager (SRM), the "traffic cop" of the SDV system, keeps track of and calculates the available per-channel capacity when each stream's bit rate is predictable. Many operators tend to set different constant bit rates to different streams based on the video complexity of those streams. In this case, the

SRM need only keep track of how many streams are provisioned, how much total throughput is used, and to which modulator the transport is to be delivered.

But operators pay a price for the simplicity of using CBR video streams throughout the network. While variable bit rate (VBR) compression, used in cable and satellite video broadcasting today, allows for dynamic quantization of video packetized elementary streams (PESs), and therefore provides bit rates that vary according to the complexity of the content, CBR video encoding restricts the total throughput of the video to a maximum bit rate, which is usually set lower than that required for optimal video quality.

When a stream is converted from VBR back to CBR, as is required in today's SDV architectures, the rate clamper or "transrating" device must look at each frame and make re-quantization decisions that always result in an output capped at a certain bit rate. Streams that were originally allowed to occasionally peak beyond 7-9 Mbps when needed become substantially degraded when they must fit into a 3.75 Mbps envelope. Consequently, the best way to deliver the highest video quality is to preserve the original VBR stream rates. Even with the use of multiple, pre-set capped or CBR rates, the streams seldom are allowed to peak to the maximum bit rate at which they were originally encoded in the true VBR form for delivery as part of a statistical multiplex.

This situation presents a difficult question: How can operators deliver the highest quality and widest variety of programming with the limitations of the current architectures and within the available capacity? The answer is to deliver VBR streams as statistically multiplexed transports to the QAM interfaces. Inherent in the stat-muxing of the streams is the high throughput efficiency and high video quality desired. The same 38.8 Mbps can support more streams without any noticeable degradation in video quality. An operator facing throughput limitations can therefore stat-mux 14 programs within a single QAM stream for a 40 percent increase in throughput efficiency. (See Figure 1.)This solution offers the operator the flexibility to add more services gives subscribers more choice and higher video quality.

Status quo stat muxing

Why couldn't early statistical multiplexers provide the same functionality? For closed-loop systems, such an approach would be prohibitively costly to carry out on a large scale. These systems connected the multiplexer directly to the encoders and controlled the individual encoding bit rates through a management feedback loop from the multiplexer to the bank of encoders.

Today, content is delivered to the operator already compressed, and open-loop statistical re-multiplexers have for years taken on the responsibility of re-grooming transports for delivery to the QAM modulator. A key obstacle to deploying these devices in a VOD

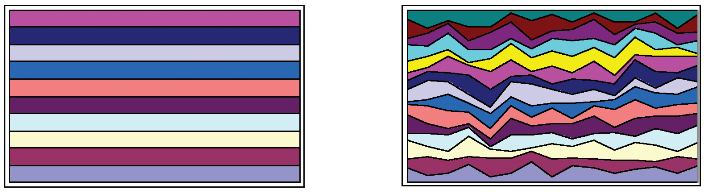

FIGURE 1: CBR vs. VBR VOD distribution

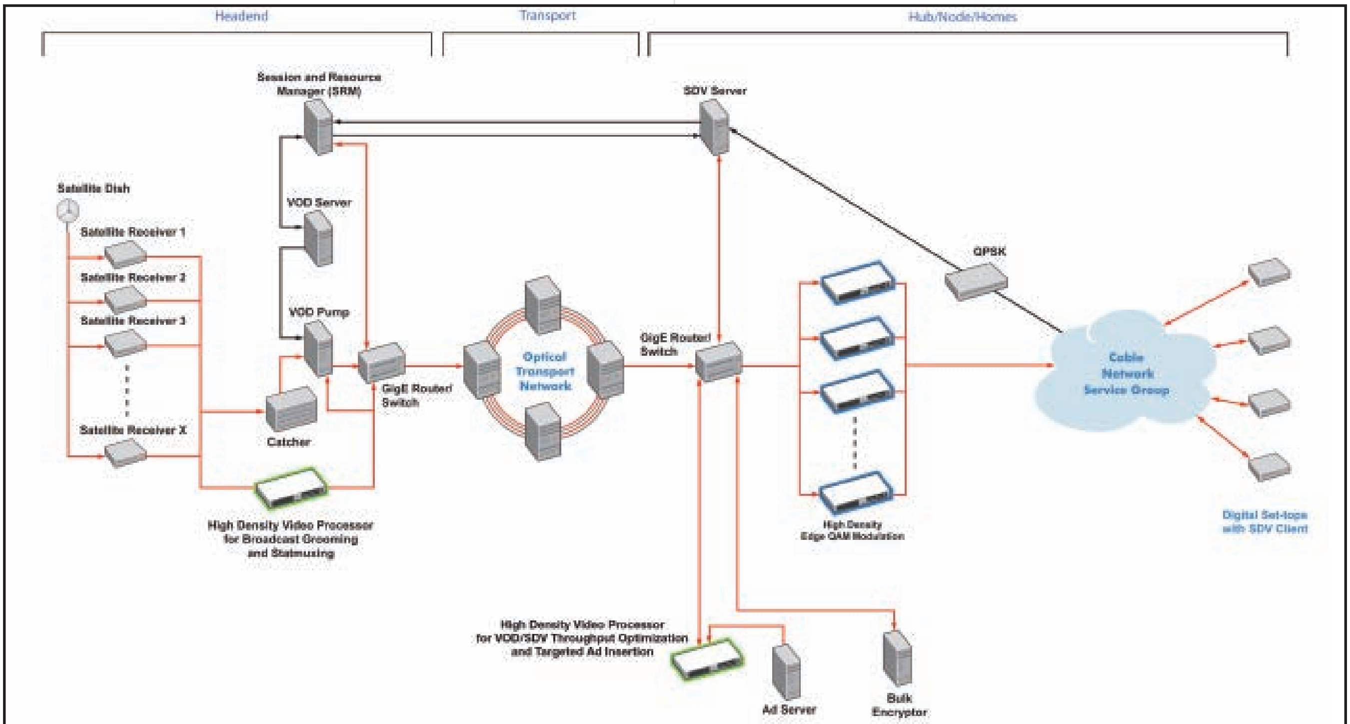

FIGURE 2: Next-generation VOD/SDV architecture offers the opportunity for bandwidth conservation and throughput sharing among multiple services

Video Processing: Demands and Opportunities

BOTTOM LINE

The combination of network bandwidth constraints and consumer demands for a variety of high-quality video call for new approaches, such as the delivery of variable bit rate (VBR) streams as statistically multiplexed transports to QAM interfaces. Switched digital and on-demand architectures impose further demands of low latency and high density. Video processors that meet these demands, however, also can provide operators with a unified interface to an advertising management system and thus enable the kind of addressability that advertisers find valuable.

environment, however, is the recompression process utilizing a high degree of buffering to deliver the promised performance. Latencies of 2 to 4 seconds are not uncommon for these units. Of course, in a typical broadcast environment with a linear delay throughout the network, the subscriber wouldn't notice the delay. However, this type of delay would add unacceptable delay to the round trip time for subscribers' "trick play" commands with VOD or to the channel change time in an SDV environment.

Another issue with the existing open-loop re-multiplexers is their low density. Since the current statistical re-multiplexers were designed to handle a broadcast environment, they do not offer the high stream densities required to serve the needs of personalized architectures such as VOD and SDV. The lower density of the current devices also leads to their high per-stream processing costs, making them unsuitable for these environments.

Low latency, high density

When it comes throughput and video-quality optimization in SDV and VOD environments, first-generation re-multiplexers are simply challenged. Evolving distribution architectures designed for the delivery of enhanced services call for advanced capabilities, such as low-latency response time and high-density video processing.

Without low-latency response times for viewer activity, high-end video services simply don't have the appeal required to draw in a greater number of active users; and without the cost-efficiency delivered by high-density multiplexers, operators cannot afford to deploy the solutions in the first place.

This approach also allows the operators to share the available QAM signal's data capacity among multiple services, such as VOD and SDV, and utilize the same resource management application for all services. (See Figure 2 on page 35.)

Targeted ads

As more content becomes selectable through subscriber on-demand services for movies, TV programs and other services, more opportunities arise for ads that can be targeted or personalized to the viewer. For example, when VOD content selections are made, operators know the specific subscriber (or least the household) that made the request, naturally aligning VOD services and targeted advertising. And of course making commercials more pertinent to the viewer makes them more valued by the advertiser, allowing operators to charge more and to incrementally see greater revenues.

Zoned and targeted ads present new avenues for revenue growth in local cable advertising and will help offset similar offerings by competitors, including highly targeted Internet advertising. Through the use of advanced video processing technology, ads can be zoned by cities, neighborhoods and even specific demographics, as well as eventually being personalized to individuals based on their prior viewing habits and activities. Ad customization can be based on existing local ad insertion splice point availability from national broadcast feeds or the use of dynamic graphics and text insertion to overlay and supplement the national ad.

Such narrowly targeted and personalized ads, enabled by the emergence of new standards and advanced technologies, are expected to broadly motivate advertisers to increase their overall budgets, as well as how much they spend per ad impression. They also promise to create a lucrative market for all parties involved,

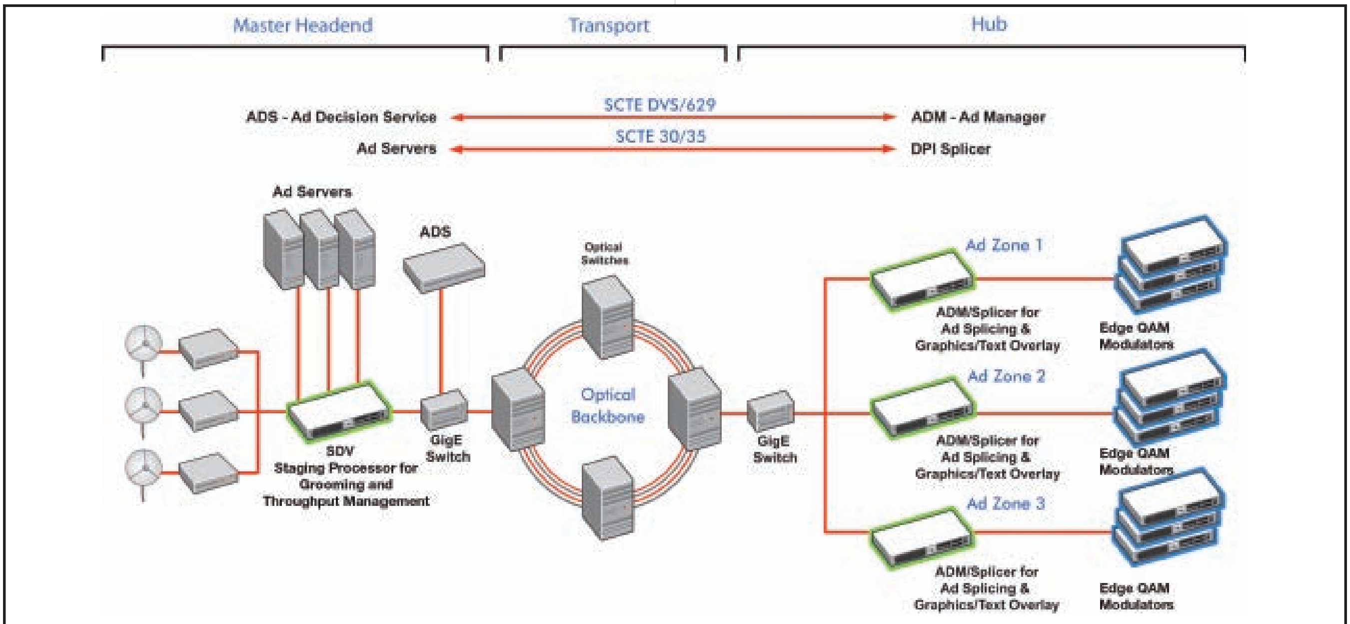

FIGURE 3: SDV targeted ad management architecture

including advertisers, ad agencies and cable programmers, as well as the cable operators themselves.

Intelligent VOD/SDV

Having utilized advanced video processing technologies and techniques to free up available throughput, operators will have sufficient space and an ideal architecture to add new, revenue-generating services. Through high density, multi-service video processing platforms, operators can increase their revenues through more personalized advertising opportunities.

In an SDV network environment, advanced video processing platforms offer the flexibility to be deployed either centrally at the primary video headend or regionally to address localized ad insertion and customization. The deployment of intelligent video processing technology can also effectively supplement today's VOD servers and the current trend toward using baked-in VOD ads or pre-roll/post-roll ad playlists. In addition to providing a cost-effective mechanism for customizing high-quality, centrally produced video commercials for broadcast TV content, a multi-service video processing device can be used to dynamically overlay graphics and text onto the VOD content as well as provide other services, such as branding content with the local operator's ID.

With the advent of more subscriber choice from the rollout of SDV-enhanced channel lineups and expanded VOD title catalogs also comes the opportunity for cable operators to increase revenue from zoned and targeted advertising. The SDV environment naturally lends itself to segmenting subscribers by groups, such as by zip code or neighborhood, and specific individual households or even specific subscribers. As in other parts of the network, the ad management portion has become more complex. Key to successful deployments are well-defined and standardized interfaces among the ad management, ad file storage servers and MPEG video splicing equipment used to enable these enhanced advertising applications, as well as a video processing system that can manage the complexity of information and activities.

Standards and interfacing

The cable industry has defined several key standards and ad management architectures that operators can leverage for increased management and control of ad presentations, such as SCTE 30 and SCTE 35. Compliance with these two standards has helped to ensure interoperability among equipment from vendors specializing in the MPEG video processing and content management areas.

A new ad management architecture being defined by the SCTE Digital Video Subcommittee as DVS/629 will enhance the industry's current ad scheduler and trafficking and billing systems with well-defined functional entities, such as the ad manager (ADM) and the ad decision system (ADS), as well as define standards-based interfaces between devices. The ADM becomes the central point for managing and collecting the targeted insertion opportunities for video content (SDV, VOD, etc.). The ADS decides which ad to insert into each available slot in the video content, based on viewing profiles and habits, targeting information from other sources, and the other guidelines established by advertisers. The DVS/629 messaging protocol enhances the use of SCTE 30 and 35 messaging by standardizing the communication between the ADM and the ADS to coordinate the targeted insertion or personalized selection of ads

"As in other parts of the network, the ad management portion has become more complex."

or ad components, such as graphic or text overlays of the ad video stream. (See Figure 3 on page 36.)

The expected broad array of ad insertion capabilities, graphic and text overlays, content branding, interactive capabilities, or other service extensions argues for a high-performance video processing platform that provides a unified interface to the ad management system. The ability to support multiple ad delivery enhancements from a single, multi-function device simplifies operation, boosts manageability, and reduces capital and operational costs.

The era of addressable, on-demand video poses many challenges to existing architectures, technologies and business models. Multi-function, high-density video processing can help both in the recovery of requisite bandwidth and per-channel capacity and in the wimplementation of new advertising models. Highly targeted advertising services could enable operators to maintain or even increase that revenue stream.

Kerry Washington is technical marketing manager for RGB Networks, and Jeff Tyre is senior product manager for RGB. Reach them at kwashington@rgbnetworks.com and jtyre@rgbnetworks.com.

The Cable OSS CHALLENGE

Better Data, Integration and Apps

Over-reliance on billing systems, lack of integration and neglect of end users continue to characterize today's operations support systems. With consolidation having slowed down, now is a good time for the industry to look toward solutions.

By Ron Ronco, Scientific Atlanta

In a scenario reminiscent of a room filled with agitated, uncooperative negotiators speaking several languages at once, cable operators' varied operations support systems (OSSs) may deliver a solution, but without the efficiency and ease of stakeholders working in harmony.

One reason for this lack of unity is that cable operators rely on billing systems to drive a broad range of disparate functions, from billing, provisioning and rating to workforce management and voice over Internet protocol (VoIP) service. Simply put, the billing system is doing considerably more work than it was designed to do.

To create customer value, operators must employ systems that benefit their customers. That means investing not only in network systems that deliver reliable video, data and voice services, but also in support services that ensure happy, well-served customers. Those are the customers most likely to see value in maintaining their cable service, thus generating revenue and reducing churn.

Growing complexity

As operations and services become more complex, the OSS problem grows exponentially. Add competition from satellite and IPTV from telecoms, and cable operators are faced with requirements for higher levels of customer service than ever before.

The industry recognizes the problem, but has not made a concerted effort to solve it. This may reflect the industry's background and evolution. Not long ago, the country was filled with thousands of small cable providers, but today the top five operators represent a large portion of the total industry. Additionally, it has been less than 10 years since digital video and high-speed data became industry-wide initiatives.

Such changes have led to a disconnect. For the most part, OSSs and business support systems (BSSs) have not consolidated as fast as the industry, and these systems have primarily changed just enough to handle the requirements to support advanced services. While service providers have examined their OSS/BSS challenges individually, they have not yet turned this into an industry initiative.

The reactive habit

Cable operators have evaluated the problem from a technology standpoint, but have focused less on how to build systems that enhance the customer experience, reduce complexity, or improve usability and effectiveness.

In today's cable system, customer service representatives (CSRs) must access multiple applications while performing their jobs—a process that hinders their effectiveness. Critical data is not brought together in one cohesive user experience that allows CSRs to operate effectively and provide a high level of customer satisfaction.

Consider this classic scenario. A customer has an outage and knows there is an outage along his street because he has spoken to his neighbors, and they are experiencing the same problem. The customer calls the cable operator, whose solution is to send a technician to one house even though the problem is more widespread. Another customer calls, resulting in another truck roll, and possibly a third.

The resulting outage "solutions" are purely reactive, and multiple trucks roll before the broader problem is diagnosed. There may be some logic in the billing system that correlates calls from two or more customers on the same or adjacent street, but chances are the system does not alert the CSRs to a pattern of outages in an area. For the most part, the industry has relied—and continues to rely—on customers to report service problems.

The lack of horizontal access to data about network management issues and the absence of solid workforce management tools for dispatchers results in wasted, duplicated efforts that do nothing to resolve a problem.

Beyond billing

Cable operators still rely on the billing system to handle the business and service management layers. Separate network and element management systems often are also in place with no simple way to aggregate, analyze and use the important data contained in these multiple software silos. To further complicate matters, there may be different billing systems and OSS software in use within a single cable company, making it even more difficult to implement standardized, system-wide improvements.

Many operators have recognized the need for next generation OSSs/BSSs and are evaluating the best alternatives for their markets. This is a good first step, but there's more to consider from a broader, industry-wide perspective.

An important part of a long-term strategy involves the creation of incremental value. It is not practical to implement a complete swap-out with a single event, nor is it economically feasible or proven. Cable operators can create incremental value by opening up certain systems or by having standards available that third-party vendors can develop around.

Strategic framework

Here are three more points to consider in approaching this challenge:

Immediacy. Cable operators know the current system is inefficient and want everything automated and integrated immediately. The fact is, many cable systems do not have the infrastructure in place today that will support immediate automation and integration. Again, a long-term strategy that allows flexibility for future expansion is best. Avoid solutions that allow you to do things one way today and a whole new way tomorrow.

Build vs. buy. Some cable operators today are building integrated systems. In attempting to build, cable operators must think through the architecture carefully and consider decisions beyond those regarding the software development costs. Cable operators must look at how the system is built and, once built, how to troubleshoot and support the system. Remember, with a built system, cable operators may be creating a big IT infrastructure to fix, maintain and expand. Evaluate the pros and cons of buying and building options. There can be value in buying, especially when support and integration are considered.

End-user needs. The needs of the CSR, dispatcher, technician and billing representative must be factored into any decision about an OSS. Inefficiencies for any of these end users have potential for leaving money on the floor. Significant revenue leaks can be plugged by delivering an integrated management system.

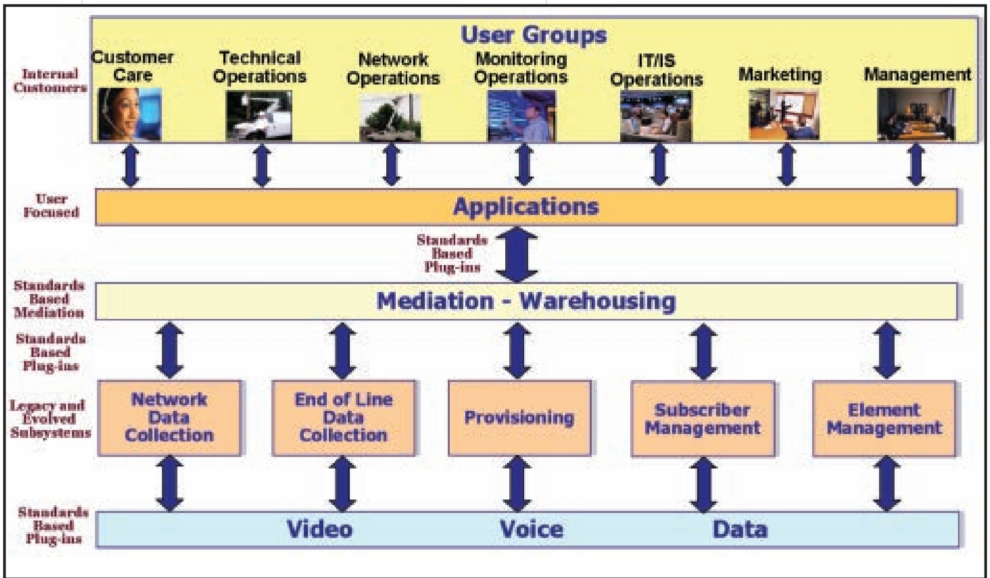

FIGURE 1: Evolved cable OSS/BSS

The near term: integration and user groups

Two main areas should be focused on near term: improved integration capabilities and user-focused applications with analytics.

Powerful applications are available now from numerous vendors that can operate as stand-alone systems, but can provide more value if integrated with legacy systems. For the most part, operators are hesitant to deploy new applications without seamless integration, yet current closed or proprietary systems make this task extremely difficult and expensive. This has created a difficult situation for operators and has slowed the deployment of applications that could create significant value.

Deployment of user-focused applications with analytics may seem simple, but all too often the industry selects or develops applications that do not fit the unique needs of each user group. Neglect of these discrete groups is a root cause of many dysfunctional systems.

Mediation layer

Long-term, there is a need for standards-based mediation. With a mediation layer in place, each point of service would have a common access point to all of the data within the layers of the OSS. A mediation layer could serve as a gateway to critical data that currently resides in proprietary programs that are often not connected. (See Figure 1.)

The cable industry has yet to fully embrace standardized mediation from an OSS perspective. A good first step would be to open up the billing systems. Their persistent, proprietary nature makes it difficult to transfer valuable data into other systems so that data can be accessed efficiently. The status quo is to use a data dump, create a new database and use that database with other applications.

A highly integrated OSS with mediation layer can help cable companies operate more efficiently and address critical customer service issues. In today's highly competitive environment, cable operators must take strides to keep customers happy and operate lean systems. A properly implemented solution requires a long-term

Time to Look at OSS

BOTTOM LINE

Why look toward a highly integrated operations support system? Because it could provide more insight into the home, the network and actual services; enhance customer experience; improve system and workforce efficiencies; and make OSS applications better fit those who use them.

approach and careful consideration of important issues, such as buying or building new systems and analysis of current positions and future expectations. The result is a solution that integrates siloed software, provides visibility into the network, better utilizes human resources, and offers targeted problem solving for subscribers.

Integrated OSS

If that room full of disagreeable negotiators mentioned at the start of this article were able to work in a common language toward a highly integrated OSS, they could reasonably be expected to address the following areas for improved performance:

Network and home performance data. CSRs typically have limited visibility into the performance of a customer's home and must rely instead on the customer's description of a problem. Decisions made without any broader visibility into the network can reduce overall productivity. Case in point: A CSR sends a technician to a house when there may be a larger problem impacting multiple homes. More intelligence into the network equates to more efficient use of people and other resources.

Service assurance data. A service assurance application would provide real-time information for the CSR to use when a customer reports a service problem. This tool allows the CSR to pull information from all devices in the home to diagnose where the problem is (or is not) and can alert the CSR on how to respond. This proactive approach uses software that continually monitors the network and looks at performance minute-by-minute so cable operators can respond before customers call, more accurately analyze a problem, and resolve the problem in one visit.

Customer experience. By providing a better system, cable operators can improve the customer experience. When a customer has a problem, the first point of contact, the CSR, should have access to all of the information needed to address the problem quickly. Also, cable operators should continue to look into the self-service approach many industries have adopted. This could allow customers to handle billing setup or start/add/drop/discontinue service.

System efficiencies. Efficiency is often measured by silo-specific metrics. For example, if a CSR is concerned about meeting a metric of resolving a call in 30 seconds, the CSR has an incentive to schedule a truck roll. This is efficient for the CSR, but not for technicians. In this scenario, no matter how hard the technical operations group works, it will never consistently hit its own metrics. The CSRs look good; the technicians look bad. If we look at what can be done to prevent a problem, we begin to make progress. If the system knows there is a problem and something is done before the customer calls in, productivity increases. Looking at the end-to-end productivity, the CSR would not have to take the call, a dispatcher would not have to schedule a useless technician visit, and overall productivity is improved. But operators today tend to measure results by silo, not by looking at the big picture.

Workforce management. Another tool for greater efficiency is workforce management (WFM). (See related article on "Workforce Dispatch" on page 22.) Using an integrated WFM application lets cable operators schedule workflow to minimize the chances of two technicians being on the same street at the same time.

End-user focus. The system itself does not solve the problem. It has to be "operationalized." This touches on our earlier point about the lack of user-focused applications. To use any system, a cable employee must be able to easily navigate it and have what's needed to do his or her job. Too often, the usability factor is ignored when implementing purchased OSS software, and no efforts are made to embed the software into the business. This is what operationalizing is all about. Value creation takes time and commitment. It is not easy, cheap or fast.

Ron Ronco is service product manager for Scientific Atlanta. Reach him at Ron.Ronco@sciatl.com.

Standards and TMN

Now that industry consolidation has slowed down, perhaps it is time to start focusing on standards for a cable industry OSS/BSS platform. Any standards developed need to consider current systems and future needs. Initially the standards should address user needs, integration and data sharing across legacy systems. With this capability, applications could be more effectively deployed to start improving the customer experience and overall productivity.

The cable industry has already used a model that is included in PacketCable OSS Overview Technical Report. This same model could be used to support expansion into other needs of the industry. That model is the Telecommunications Management Network (TMN) model developed by **Telcordia**. The TMN model can help establish the layers needed to effectively and efficiently design, create, and manage the complex networks cable operators are deploying. The TMN concept is an architectural framework for the interconnection of different types of OSS components and network elements. TMN also describes the standardized interfaces and protocols used for the exchange of information between OSS components and network elements and the total functionality needed for network management.

The five layers of the TMN Model are:

- Business management layer: Performs functions related to business aspects, analyzes trends and quality issues, for example, or to provide a basis for billing and other financial reports
- Service management layer: Performs functions for the handling of services in the network: definition, administration and charging of services
- Network management layer: Performs functions for distribution of network resources: configuration, control and supervision of the network
- Element management layer: Contains functions for the handling of individual network elements, including alarm management, handling of information, backup, logging, and maintenance of hardware and software
- Network Element: Manages switches, transmission and distribution systems


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marketplace

Got a new product? Send it to rhendrickson@accessintel.com for possible inclusion on this page in future issues.

Content Localization

Product name: Overlay and SqueezeBack
Company: Terayon
Features/what it does: Help localize content and create targeted advertising through real-time insertion of programming and sponsor information; operate within the compressed MPEG domain; designed to eliminate converting video back to analog.
For more information: www.terayon.com

VoIP Security

Product name: IPCS 210
Company: Sipera Systems
Features/what it does: Allows for seamless, centralized policy implementations across enterprises with multiple offices; designed to increase flexibility in determining how to best protect VoIP and other IP communications applications; supports secure enterprise deployment of IP phones, soft phones, WiFi/dual-mode phones, SIP trunks and Click-to-Talk or Web phone applications; designed for SMB and branch offices of up to 200 users; offers VoIP Intrusion Prevention and VoIP Anti-Spam capabilities, based on the company's IPCS 310 technology; offers expanded VoIP Firewall/SBC functionality.
For more information: www.sipera.com

DOCSIS 3.0 Tuner

Product name: MicroTuner MT2170
Company: Microtune
Features/what it does: 1 GHz input tuner based on DOCSIS 3.0; engineered to deliver data speeds greater than 160 Mbps 100 MHz bandwidth; offers equivalent functionality of four DOCSIS 2.0 digital tuners in a miniature package; when integrated into cable modems or VoIP set-tops, delivers speeds greater than 160 Mbps; single-chip tuner optimized to receive and tune RF from 50 MHz to 1 GHz; supports the DOCSIS 3.0 channel bonding technology; can accept bonded channels within bandwidths up to 100 MHz when paired with a DOCSIS 3.0-capable demodulator.
For more information: www.microtune.com

Centralized Security

Product name: Network and Security Operations Center
Company: Motorola
Features/what it does: Expanded capabilities to offer managed services such as remote monitoring and diagnostics for private and public wireless networks, including cellular and wireless broadband systems; designed to ensure continuous performance and stability monitoring, immediate event detection and troubleshooting, and technical dispatch services across multiple types of networks; offers a Security Operations Center, providing 24x7 security monitoring services; Motorola's SOC technologists keep a proactive eye on customers' networks to quickly detect and characterize suspicious and malicious activity and respond intelligently.
For more information: www.motorola.com

Session Border Controller

Product name: Net-Net OS Release 5.0
Company: Acme Packet
Features/what it does: 30 new features and enhancements designed to extend control capabilities for interconnecting IP voice (VoIP), video and multimedia networks to one another; designed to enhance precise signaling and media control, security, service reach maximization, SLA assurance, revenue and profit protection, and regulatory compliance.
For more information: www.acmepacket.com

VoIP Service Assurance

Product name: BrixCall
Company: Brix Networks
Features/what it does: Several enhancements to the company's VoIP analysis and correlation application for QoS visibility into subscribers' homes; supports NCS, H.323, H.248 and SIP-T; correlates passive monitoring thresholds and active test results; provides comprehensive visibility and passive monitoring of live VoIP traffic; offers advanced correlation of active test results.
For more information: www.brixnet.com

IMS Billing

Product name: GSX9000 Open Services Switch and GSX4000 Open Services Switch
Company: Sonus Networks
Features/what it does: Includes IMS standards-based support for billing between different service provider's IP voice networks as outlined by the 3GPP; enables operators to track individual calls throughout their own network and when the call is handed off to other network operators; can generate unique identifying information and support seamless integration of Sonus-based networks with other IP-voice networks; allows operators to continue tracking calls for billing purposes as the call crosses network borders.
For more information: www.sonusnet.com

Bend-Resistant Fiber

Product name: FutureGuide SR7.5
Company: Fujikura
Features/what it does: Minimum bend radius of 7.5 mm; available in a MageTsuyo SR7.5 patch cord; when twisted or bent, the fiber returns to its original condition without any deformation or marking on the sheath; can be used to deliver high bandwidth communications directly into the home or office environment; allows smaller closures, including connector plugs and sockets; outer diameter of 4 mm; can withstand tension of up to 68.5N and lateral pressure of up to 1200N/25 mm.
For more information: www.fujikura.com

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Communications TECHNOLOGY

Coming Next Month!

Technical Operations
HDMI and HDCP: High definition on the consumer side

Advanced Engineering
Addressable advertising; WiMAX roundup; and FMC reality check

Case Study
Greenfield Build: Starting from scratch

SCTE Cable-Tec Expo® 2007

Schedule of Events

Tuesday, June 19

7:30 a.m.	Annual Golf Tournament 1st Shotgun Start Falcon's Fire Golf Course
8 a.m.–4:15 p.m.	SCTE Conference on Broadband Learning and Development Separate Registration Required *Sponsored by Jones/NCTI*
8:30 a.m.–5 p.m.	Metro Ethernet Forum Carrier Ethernet Training Day Separate Registration Required
11 a.m.–6 p.m.	Attendee Registration
11 a.m.–6 p.m.	SCTE Member Services Center Open SCTE Bookstore Cyber Café SCTE Membership Services Kiosks
1:30 p.m.	Annual Golf Tournament 2nd Shotgun Start
4:30–6 p.m.	Annual Membership Meeting
6–9 p.m.	Arrival Night Reception *Sponsored by JDSU*

Wednesday, June 20

7–8 a.m.	Company Liaison, Ambassador and International Attendee Breakfast By Invitation Only
7–8 a.m.	SCTE Chapter Breakfast
7–8 a.m.	Pre-Opening General Session Breakfast *Sponsored by C-COR*
7–8:30 a.m.	Christians in Cable Breakfast
7:30 a.m.–5 p.m.	Attendee Registration
7:30 a.m.–5 p.m.	Media Center Open *Sponsored by Scientific Atlanta, A Cisco Company*
8 a.m.–6 p.m.	SCTE Member Services Center Open SCTE Bookstore Cyber Café SCTE Membership Services Kiosks
8:30–11:45 a.m.	Opening General Session Opening Remarks CEO/CTO Panel
Noon–2 p.m.	Annual Awards Luncheon Ticketed Event
2–6 p.m.	Exhibit Hall Open
4:30-6 p.m.	Women in Cable Telecommunications (WICT) Reception
5–6:30 p.m.	Chairmen's Reception By Invitation Only *Sponsored by TANDBERG Television*
6:30–9 p.m.	Expo Evening at Universal Studios City Walk Ticketed Event *Sponsored by ARRIS, C-COR, CommScope, Scientific Atlanta, A Cisco Company and SCTE*

Schedule subject to change

Thursday, June 21

7:30–8:30 a.m.	SCTE Foundation Breakfast
7:30 a.m.–5 p.m.	Attendee Registration
7:30 a.m.–5 p.m.	Media Center Open *Sponsored by Scientific Atlanta, A Cisco Company*
8 a.m.–9:15 a.m.	Expo Workshops
9 a.m.–5:30 p.m.	SCTE Member Services Center Open SCTE Bookstore Cyber Café SCTE Membership Services Kiosks
9:15–9:30 a.m.	Workshop Coffee Break
9:30–10:45 a.m.	Expo Workshops
10:30 a.m.–3 p.m.	SCTE Certification Testing
11 a.m.–12:15 p.m.	Expo Workshops
11 a.m.–5 p.m.	Exhibit Hall Open
1–6 p.m.	The Supplier Diversity Connection *Presented in partnership with the Walter Kaitz Foundation* *Sponsored by Comcast, CommScope, MCR Group, NCO-Corp, Time Warner Cable and Vozzcom*
1–3:15 p.m.	Supplier Diversity Opening Discussion Best Case Presentations for WMBEs Supplier Diversity: Best Practices for Cable Procurement
3:30–4:45 p.m.	Diverse Supplier Exhibit Hall Tour
5–6 p.m.	Supplier Diversity Connection Networking Reception
3–4:30 p.m.	SCTE Standards and Consultation Session
5–6 p.m.	New Member Reception Open to All SCTE Members
5–6 p.m.	Certification Reception Open to All SCTE Members
6–8 p.m.	Circle of Eagles Dinner By Invitation Only
6–8 p.m.	Vendor Hospitality Suites
6–8:45 p.m.	International Cable-Tec Games *Sponsored by CommScope*

Friday, June 22

9 a.m.–1 p.m.	Exhibit Hall Open
9 a.m.–1:30 p.m.	SCTE Member Services Center Open SCTE Bookstore Cyber Café SCTE Membership Services Kiosks
9 a.m.–1 p.m.	Media Center Open *Sponsored by Scientific Atlanta, A Cisco Company*
Noon–1:15 p.m.	Expo Workshops
1-4 p.m.	SCTE Certification Testing
1:15–1:30 p.m.	Expo Workshop Coffee Break
1:30–2:45 p.m.	Expo Workshops
2:45–3 p.m.	Expo Workshop Coffee Break
3-4:30 p.m.	Closing Workshop
6–8 p.m.	Closing Night Reception
6–8 p.m.	Ham Radio Operators Reception
6–8 p.m.	SCTE-List Reception
8–10 p.m.	Loyal Order of the 704 Reception

SCTE Cable-Tec Expo® 2007

Workshops

Advanced RF/IP Troubleshooting for Broadband System Engineers
This session is designed as a follow-up to the sessions on Fundamental RF Quality Metrics for Digital Headend Engineers/IP Principles for RF Engineers and gives both disciplines an understanding of how their problems affect each other. Utilizing RF and IP test equipment and practical/real-world examples helps focus engineers on the root cause of the network problems.

Back-Office Software Unification
With the customer experience as the driver, this roundtable focuses on options for software-based control, monitoring, and management of networks and services. Specifically, the workshop examines the current barriers affecting an operator's ability to meet customer and management expectations.

Delivering HDTV Content Efficiently While Maintaining the Highest Standards of Quality
With U.S. HDTV penetration increasing so rapidly, many experts believe the future of premium video subscribers will revolve around HDTV content quantity and video quality. This session explores technologies and techniques used to efficiently deliver high-quality HDTV content. Discussions detail topics such as end-to-end pre-encoding, VBR/CBR, and statistical multiplexing. Content delivery considerations are evaluated for linear video delivery, VOD, and Switched Digital Video.

DOCSIS® 3.0 Technologies & Services
This panel discusses the emerging DOCSIS® 3.0 suite of specifications, including Modular CMTS, downstream channel bonding, IPv6, and timing synchronization. The primary emphasis is on network readiness and deployment. Additionally, panelists provide their views on services that could be supported by these technologies.

Fundamental DOCSIS® Roadmap—Migrations
This workshop walks through strategies relative to migrations. It does so in areas such as CPE firmware management, possible segregation of devices per feature set offered, SNMP MIB usage (proprietary versus standard), logical versus physical upstream channel usage for DOCSIS® 2.0 migration, and preparation for DOCSIS® 3.0 migration.

Fundamental IP Principles for the RF Engineer
This classroom-style tutorial presents the basics of the Internet Protocol focusing on IP fundamentals and protocols that are especially relevant to the DOCSIS® and STB network. Subnetting basics, IP constructs, SNMP, and MIB Management also are discussed, and attendees will gain an understanding in IP and RF principles and how they relate to each other in the digital headend.

Fundamental RF Quality Metrics for Digital Headend Engineers
This workshop provides a background on several signal quality metrics applicable to CMTS and cable network operation and how they relate to overall performance. Attendees will leave this workshop with the knowledge necessary to understand the practical significance of the various SNR metrics—carrier-to-noise ratio, signal-to-noise ratio, and modulation error ratio.

Innovative Fiber Architectures & Implementation Considerations
This session provides an overview of alternate architectures and innovative construction techniques that may substantially reduce the cost of laying fiber right to the premises.

Installing and Monitoring Switched Digital Video
Several operators are deploying Switched Digital Video, while others currently are trying to determine how and when to begin deployment. Speakers in this workshop present helpful ideas about how to deploy SDV and how to keep it up and running.

July 1, 2007—Cable's "Dependence Day"
It won't be a celebration like the Fourth of July, but July 1, 2007, marks the day that MSOs become dependent on Cablecards. Cablecards will change many parts of an MSO's operations. Come hear how MSOs have prepared for this very significant change.

Making Sense of Home Networking
As with most technical environments in the cable telecommunications industry, the home networking environment is becoming much more complex. The goal of this session is to help sort out how to effectively address the home networking challenge by answering key questions.

Monitoring, Capacity Planning, and Traffic Engineering
A myriad of monitoring utilities is available today. This session's speakers discuss various monitoring approaches and how to use available data for capacity planning and traffic engineering. Various network areas are addressed, including DOCSIS®, VoIP, broadcast video, and VOD.

Moving to the DOCSIS® Set-Top Gateway (DSG)
This tutorial provides the audience with insight into the steps necessary to migrate to a DOCSIS® Set-Top Gateway architecture. We identify potential obstacles encountered and explore possible solutions to the obstacles. In addition, the session details each of the elements impacted by the DSG migration, including network infrastructure, headend configuration, provisioning, and billing. Lessons learned and best practices are also shared.

Switched Digital Broadcast
During this session, MSO Switched Digital Video deployment perspectives are discussed. Operators provide insight into important lessons they learned along the way.

The Job Description for the Technician of Tomorrow
This workshop includes a panel of experts representing field technical operations and professional development disciplines. Panelists discuss the future in a moderated Q&A environment. The goal is to define the knowledge, skills, and abilities needed by technicians in the year 2010. The audience is encouraged to participate in this highly interactive session.

Troubleshooting Across Platforms
This session provides insights into how our industry is looking at the evolving headend, transport network, and end-user premises. It examines how one MSO takes information from multiple sources to determine the root cause of network impairments and ensures the information gets to the correct people in a timely fashion. The workshop includes a panel discussion about the need for interoperability and answers questions from the audience.

Using Fiber to Deliver Reliable Business Services
This workshop presents two different strategies for the use of fiber in delivery of business services such as Ethernet private lines, Internet access, L2/L3 VPN access, storage/mainframe extension, data center backup, and more. Case studies, representing approaches by two different MSOs, are presented.

Using HFC Networks to Deliver Reliable Business Services
This session presents two case studies with real-world examples. The first reviews the CSU/DSU modem functionality commonly used on T1 lines and how this functionality is available to operators using CES over DOCSIS®. The second case looks at how to leverage the existing HFC infrastructure to provide (1) cell tower backhaul; (2) business T1; (3) digital voice; and (4) high-capacity services to increase ARPU and reduce OPEX while meeting ROI metrics.

VoIP Scalability—Tiger by the Tail?
This workshop covers many of the pitfalls and lessons learned through case study of large deployments today and information on the scaling decisions that will confront the voice services providers.

Wireless Technologies for Cable Operators
Please join us as speakers in this session explore today's wireless mesh networks and, in particular, best practices on technologies, design, coverage, plant attachment, provisioning, and seamless mobility.

Full Workshop Desciptions available online.

SCTE Cable-Tec Expo® 2007

Program Subcommittee

The Expo Program Subcommittee, led by Nomi Bergman of Advance/Newhouse Communications, has selected a workshop program that focuses on today's critical technology issues.

Nomi Bergman, Committee Chair
Advance/Newhouse Communications
Executive Vice President, Strategy/Development

Alan Babcock
VP Chief Learning Officer
Jones/NCTI

Curt Champion
VP, Market & Product Strategy
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Chief Technology Officer
Charter Communications

Joe Godas
VP Broadband Technology Integration
Cablevision Systems Corp.

Yvette Gordon-Kanouff
Chief Strategy Officer
SeaChange International

Cameron Gough
Vice President
Comcast Cable Communications

Nicholas Hamilton-Piercy
Senior Technology Advisor
Rogers Communications Inc.

Doug Jones
Chief Cable Architect
BigBand Networks

Christy Martin
Principal
iBox Systems, Inc.

Guy McCormick
Director Operations Engineering
Cox Communications

Marv Nelson
Vice President Professional Development
SCTE

Larry Richards
Senior Director Global Sales Operations
C-COR Incorporated

Jonathan Tombes
Editor
Communications Technology

Joel Welch
Director Certification & Program Development
SCTE

Anthony Werner
CTO
Comcast Cable Communications

Louis Williamson
Vice President Network Architecture
Time Warner Cable

Cable-Tec Expo® 2007 Registration

Pre-registration ends June 8.
On-site registration after June 8 & onsite.

	SCTE Members	Non Members
Full:	$550 Pre-reg. $650 On-site	$695 Pre-reg. $795 On-site
Floor Pass:	$95	$95
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Register Today and Save $100
www.scte.org

Pre-Conference Events

SCTE Conference on Broadband Learning and Development

Tuesday, June 19
8 a.m.- 4:15 p.m.

Sessions include:

- Becoming a Trusted Advisor
- Capturing Your Audience: Powerful Presentations That Engage!
- Changing Workforce Demographics and the Future of Work
- Claiming a Seat at the Table
- Know It on Demand with "M-Learning"
- Luncheon Keynote
- Training Is a Culture, Not an Event

Metro Ethernet Forum Seminar

Tuesday, June 19
8:30 a.m.- 5 p.m.

Sessions include:

- Carrier Ethernet in the MSO Access Network
- Considerations for Inter-Operator Services and DOCSIS® Cable
- Delivering Carrier Ethernet in the MSO Core and Metro
- How and Why MSOs Became MEF Certified
- Introduction to Carrier Ethernet for Cable
- Keynote Address
- MEF Certification: The Theory
- MEF Specifications: Enabling Carrier-Grade Ethernet
- OAM for Carrier Ethernet

Pre-Conference Events Registration

	Pre-Registration: SCTE Members	Pre-Registration: Nonmember	On-site: SCTE Members	On-site: Nonmember
	$209 w/paid Expo reg	$289 w/paid Expo reg	$309 w/paid Expo reg	$409 w/paid Expo reg
	$275 w/out	$389 w/out	$375 w/out	$509 w/out

Separate registration is required for each pre-conference offering.
Full session descriptions available online. Schedules subject to change.

By Joel E. Welch, SCTE Director, Certification & Program Development

CBL&D to Offer New Features in '07

The industry's brightest engineers will shine at **SCTE**'s Cable-Tec Expo, in June. There is, however, another SCTE event where the brightest L&D professionals will shine just as brightly. The event is SCTE Conference on Broadband Learning & Development (CBL&D) 2007, on Tuesday, June 19, in Orlando.

Each year, SCTE's Training Advisory Council (TAC) nominates individuals to serve on the CBL&D Program Subcommittee. These are the dedicated individuals who mold the CBL&D program so it addresses key issues and challenges confronting cable's L&D community. The 2007 CBL&D Program Subcommittee members are:

- Fritz Amt, VP, Business Development, **Pangrac & Associates**
- Allen Bryant, training manager, **Cox**
- Pete Collegio, director of instruction, **Jones/NCTI**
- Bradley Cooke, regional technical trainer, **Suddenlink**
- Doug Daut, director, Technical and Safety Training, **Charter**
- Valerie Hartman, manager, Technical Operations Development, Charter
- Richard LaPat, VP, Learning & Development, **Comcast**
- Pamela Nobles, senior director of CommTech Development, Comcast

> **"I encourage all L&D professionals to attend. It will be well worth their while."**
>
> —Phil Hoffman, Cox

As in the past, CBL&D will provide solutions to critical challenges. The calendar will include several general sessions where discussions will center on ensuring quality training programs when resources are tight; e-Learning, when to use it and when not to use it; and effective post-training follow-up.

This year, however, the program will be different, more focused. Not only will speakers be covering topics of general interest, but the subcommittee has also planned a Trainer's Track and an L&D Management/Leadership Track.

The Trainer's Track will cover topics at the core of the platform trainer's skill set: presentation skills, instructional design and adult learning principles. The L&D Leadership Track will feature experts on strategic L&D planning, employee performance analysis and how to promote the value of L&D.

There is one other very big difference that you will find at the 2007 CBL&D. This year, SCTE will present the first annual SCTE Learning & Development Award to one deserving individual.

The award recognizes learning and development professionals in cable telecommunications who have successfully advanced the careers of others through innovative cable telecommunications technology-centric curricula and learning programs. Each nominee must be an active SCTE member and employed by a cable operator.

With nominations for the 2007 award having closed on March 1, SCTE's L&D Award Subcommittee will select a recipient based on nomination testimonials about the nominee's commitment to helping individuals learn about cable telecommunications technology.

There are lots of reasons to attend the 2007 CBL&D in Orlando. Phil Hoffman, manager, technical training and consulting, National Talent and Development Organization, Cox, had this to say:

"I find great value in attending SCTE's Conference on Broadband Learning & Development. The conference offers trainers within our industry the opportunity to learn the latest techniques for implementing effective training within their organizations, allows for networking and the sharing of best practices among industry peers, and offers an opportunity to just have fun. So I encourage all L&D professionals to attend. It will be well worth their while."

Learn more and register for CBL&D 2007, to be held in conjunction with Expo, at www.scte.org.

Joel E. Welch is director, certification and program development, with SCTE. Reach him at jwelch@scte.org.

Got news, quotes or photos of people in the broadband cable engineering community? Send it to mrobuck@accessintel.com for possible inclusion on this page in future issues.

SNAPSHOTS

Winners in SCTE Badger State Chapter's annual Cable Games, held on Feb. 21 in Fond du Lac, WI, include (l-r) individual winner Erv Lange, Charter Communications, West Bend, WI; first runner up Lukas La-Crosse, Timer Warner, Plymouth, WI; second runner up Kevin Sabel, Charter Communications, West Bend, WI. Erv will represent the chapter at the National SCTE Cable Games at Cable-Tec Expo in Orlando, FL.

The first place team in the overall competition at the Badger State event included (l-r) Paul Flones, Time Warner, Racine, WI; Steven Jander, Time Warner, Racine, WI; Eric Hoffman, Charter, Madison, WI; and Robert Cunningham, Charter, Madison WI.

Winners in SCTE Cactus Chapter annual Cable Games (far left, l-r) included, front row: Joe Smith, Cox Sierra Vista, Steve Charley, NPG, Joe Hlavacek, NPG; center row: Tony Parag, Comcast; Tom Reinbolt, Cox Tucson; Rob Philbrook, Cox Scottsdale; Jim Madrid, Cox Tucson; back row: Frank Gonzalez, Cox Tucson; Paul Wadsworth, Cox Tucson; Randy Altergott, Cox Phoenix.

Top medal winners at the games (near left, l-r) were Tony Parag, Comcast Tucson, third place; Frank Gonzalez, Cox Tucson, second place; Paul Wadsworth, Cox Tucson, first place.

PEOPLE

Heard to BigBand

BigBand Networks appointed David Heard as SVP and GM of product operations. Heard most recently had served as president & CEO of **Somera Communications**, which was acquired by Telmar in 2006. Heard had previously led **Tekelec's** switching division and served in various executive positions at **Lucent Technologies** and **AT&T**..

CMC Expands Teams

Comcast Media Center (CMC) hired affiliate sales veteran Sam Klosterman as director of its Distributor Services sales unit and promoted CMC veteran Mark Gueller as account manager on this team. CMC also promoted Lisa Padillato to director of Content Services and hired industry veteran Ed Nunez to serve as an account director in that unit.

Schweitzer to Comcast

Comcast hired Eric Schweitzer as senior director HFC engineering. He was previously senior director, HFC technical solutions, for **Harmonic** and earlier had worked at **Hoya Optics**, **Hitachi instruments** and **Lockheed**. He holds a Ph.D. from **Massachusetts Institute of Technology**.

Now Playing

CT Associate Editor Mike Robuck talks to Cox Business Services Las Vegas at www.cable360.net/ct.

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