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**April 2001 Issue
Pulse**
Provisioning's Key Drivers

By Natalia A. Feduschak, Senior Editor

Cable operators are leaving their comfort zones by seeking third parties to manage their subscriber base. What's driving the growth of these software provisioning companies? Leaders in this new industry list several factors:

- Operational efficiency: "A lot of companies are challenged in trying to figure out how to increase the number of customers by three times, while trying to reduce their operational costs by 30 percent," Alopa Networks Vice President of Business Development Peter Szalay says. A provisioning software that interfaces with present and future voice, video and data platforms helps accomplish those goals.
- Open access: "[In] an open access scenario... there are more organizations to connect a subscriber to a network," Interactive Enterprise Chief Technology Officer Alan Sheehan says. One goal for the provisioning agent is to link potentially hesitant Internet service providers (ISPs) to the cable operator. "The biggest challenge... is how to deal with the scenarios where the legacy environment is supported on a single system," Sheehan says.
- DOCSIS 1.1: "People who got out there first and launched services had legacy equipment, some of which is still in place," Core Networks President Jeff Campbell says. "They've moved to [Data Over Cable Service Interface Specifications] DOCSIS 1.0 for multiple vendors, and now they're looking at how they can easily migrate to DOCSIS 1.1." The challenge is to help operators deploy services on evolving standards.
- Multiple technologies: "We believe service providers are going to become network-independent," says Emperative Vice President of Marketing Randy Fuller. Emperative is working in both the cable modem and digital subscriber line (DSL) space. Fuller says subscribers will eventually want to use multiple technologies supporting a range of options—without having to think about it.

Provisioning should become more important for MSOs as multiple services grow. "There's a chance of additional revenue for the multiple system operators (MSOs) (with provisioning), so therefore it becomes a directive," Paul Kagan Associates analyst Ian Olgeirson says.

Harmonic Promotes Gigabit Ethernet Switch

By [Jonathan Tombes](#), Senior Editor, and [Fred Donovan](#), Editor, Fiber Optic News

Harmonic is charging ahead with plans to launch a new Gigabit Ethernet switch, neutralize greenfield competitors and rename the hybrid fiber/coax (HFC) network.

Eric L. Schweitzer, Harmonic senior director for product management, broadband access networks, says Harmonic's Gigabit Ethernet switch will give cable operators the ability to upgrade their networks to provide fiber-to-the-home (FTTH) connectivity.

The problem with deploying FTTH is the high initial cost, Schweitzer explains, so fiber-to-the-home is the end game. Gigabit Ethernet switch technology could help cable operators win that game. It also creates a new acronym, the hybrid fiber/coax, switched Ethernet network, or HFC/SEN.

"You start off with an HFC network that is eminently deployable and profitable today," Schweitzer says. "As you need to, you put in switched Ethernet, reusing the existing platforms and (you) eventually end up going fiber-to-the-home."

Before reaching the home, however, operators have more immediate and profitable places to drop fiber, Schweitzer says. Businesses, for instance, need 100 megabits per second (Mbps) today and already have data rooms with backup power. Moreover, they have no need for network interface units (NIUs).

A Gigabit Ethernet business solution wins hands down against a T1 line in terms of cost and capability, Schweitzer says. "This might be the killer application we've been looking for."

The company, which shed 100 employees early this year following disappointing net earnings, expects to begin trials of the Ethernet switch later this year.

Kevin Slocum, an analyst with Wit SoundView, says Harmonic's position with cable operators is built around its competence in fiber optics. Harmonic suffers from the vagaries of cable operators' unpredictable capital spending, Slocum says.

"The Gigabit optics side of the business has a cheaper cost profile than some of the telecom optics. So I like the cost profile (of the Gigabit Ethernet switch), but I don't have a sense that HFC operators are going to have great success in the near term with that infrastructure," Slocum says.

Protecting VOD Assets

By [Jonathan Tombes](#), Senior Editor

A vengeful headend technician cracks a video-on-demand (VOD) server and makes off with 500 digital titles.

That's a nightmare scenario for operators, vendors and studios, says Yong Ho Son, a vice president of engineering at Diva Systems. "It's something that could cause the VOD industry to come to a standstill."

But the headend isn't the only point of vulnerability. "Most of the VOD deployments that are taking place are done in the clear, (through) a hidden channel implementation," says Motorola Product Manager Peter Sheedy.

On fiber transport, a title is relatively safe, Sheedy says. "But once it hits the coax, then it becomes a clear MPEG (Moving Pictures Expert Group) stream that a hacker could surf through the cable system and pick off."

How best to secure digital assets is a live issue in the VOD community. At the Emerging Technologies conference, Son and Sheedy pitched pre-encryption, also known as file-based encryption.

"From a business, risk and technology perspective, we believe that it is a better solution to encrypt it once and then keep everything encrypted and protected until it's decrypted just before it's played on the TV,"

Son says.

The solution uses Motorola's Digicipher technology, but is forward-compatible with Harmony, the Motorola/Scientific-Atlanta encryption mode. Harmony is actually a less secure form of Digicipher—employing single digital encryption standard (DES) vs. triple DES, Son says. "But we're still using Digicipher's key management system, which has proven to be very secure."

S-A's approach has been to incorporate encryption into their quadrature amplitude modulation (QAM) modulators.

Motorola has delivered its interface specifications to all the major VOD providers, who are looking at pre-encryption as a solution primarily for Motorola systems, Sheedy says. Each of these vendors, however, is working in various encryption environments.

"We support and prefer a number of approaches," nCUBE's Chief Technology Officer Greg Thompson says. Like S-A, nCUBE has reduced costs by integrating functions; leveraging QAM modulation and multiplexing within its video server, for instance.

Pre-encryption dovetails with that strategy, and Thompson says nCUBE is actively implementing solutions from Motorola, InterTrust (for telco environments) and two other un-named partners.

All pre-encryption, or "pre-scrambling," solutions work similarly, Thompson says. First the title is scrambled; then the scrambling keys are archived. When the subscriber is ready, updated keys, or entitlement control messages (ECMs), arrive through different application programming interfaces (APIs).

The higher demands of VOD have led to the development of APIs that can do what's called session-based encryption, Thompson says. "In other words, getting the rights to decode access to [a] particular QAM channel and program number and title for a given period of time."

Thompson cited two session-based APIs that nCUBE has implemented in its deployment with British cable operator Telewest—one in partnership with Harmonic and the other with Nagravision.

In contrast to such dynamic provisioning of keys, tier-based VOD entitlement schemes rely on set-top box, client-code control access for tuning to the appropriate QAM channel. At issue between these two approaches, Thompson says, is "load and traffic vs. cost."

The larger issue is outfoxing the enemy. Ongoing litigation surrounding the release of an anti-encryption program written by a Norwegian teenager to enable copying of digital video disks (DVDs) has reminded many of the urgency of that task.

Wireless Bridges to Businesses

By Natalia A. Feduschak, Senior Editor

BridgeWave Communications' Signal Code Modulation (SCM) technology should help operators reach business customers outside their traditional service areas.

SCM uses the bandwidth of fixed millimeter-wave (MMW) wireless to convey signals and protocols from existing broadband networks across wireless links.

BridgeWave's system allows multiple system operators (MSOs) to extend their reach by connecting a central SCM-enabled radio to a cable drop at any point on the network. A central radio uses the MMW frequency band to transmit Data Over Cable Service Interface Specification

(DOCSIS) signals to multiple SCM radios. At each premise location, the radio is connected to one or more cable modems.

With SCM, operators may reach the highly lucrative business market using existing infrastructure, says Paul Connolly, vice president of marketing and network architecture at Scientific-Atlanta, which will start testing the technology later this year.

"(BridgeWave's technology) is more efficient. You can put more on the spectrum," Connolly says. S-A, which made an unspecified investment in BridgeWave, hopes to integrate BridgeWave's wireless technologies with its own hybrid fiber/coax (HFC) broadband access products.

How it works

The patent-pending SCM technology works by sampling an incoming signal and dividing it into separate digital and analog components. The digital component is an approximation of the waveform, while the analog component carries the difference of the digital component and the sample.

The detailed analog sample is multiplied to use the full range of the original signal. The multiplication factor strengthens the fine detail, making it tolerant to noise sometimes encountered with wireless transmission.

The modulated digital and analog signals are interleaved and transmitted over an expanded frequency range. Equipment receiving the signal won't know that it left the bounds of wires to travel through the air via MMW radio, according to the company.

Gregg Levin, BridgeWave's vice president of marketing, says his company is trying to complement, rather than beat out, copper. "We can improve the economics," he says.

Jon Cordova, an industry analyst with Infonetics Research, says BridgeWave has solved the transmission problem.

It's "leveraging the existing infrastructure so providers don't have to spend more money," he says. "The [digital subscriber line access multiplexers] DSLAMs are already there, the cable modem termination systems are there. Customers... can go out and purchase whatever [customer premise equipment] CPE that is compatible with providers' base stations and aggregation equipment, then just tack on BridgeWave radios and extend that reach."

AT&T Sheds Weight

By [Arthur Cole](#), Contributing Editor

In preparation for an eventual split into three companies later this year, AT&T is focusing on major metro areas and trimming its mammoth debt by spinning off smaller, rural systems.

In late February, the company sold off more than 20 systems in Georgia, Illinois, Iowa and Missouri to Mediacom Communications. The \$2.2 billion sale brought more than 860,000 subscribers into the Mediacom fold. Just days later, the company sold about 574,000 customers in St. Louis, Alabama, Nevada and California to Charter Communications for \$1.54 billion in cash and stock. AT&T also received about 60,000 Charter subscribers in Florida.

Add to that the company's recent divestiture of its stake in Japan Telecom for \$1.35 billion, and the company is well on its way to trimming the nearly \$46 million debt racked up in the past two years primarily from the purchases of TCI and MediaOne.

AT&T spokesman Steve Lang says while some of the proceeds will go toward debt reduction, the sales were not triggered by a sudden need to shore up the bottom line.

"It has always been our plan to upgrade and invest in properties that would allow us to offer multiple products and services," he says. "We're doing it with sales that are, for us, no longer strategic assets."

Metro upgrades

In the meantime, the company is aggressively upgrading metro systems for broadband service, particularly if the system is likely to be part of a regional network. A case in point is San Jose, Calif. The company already serves nearly half of the San Francisco Bay area homes and has just received permission from San Jose officials to upgrade about a third of the cable footprint in that city, covering about 50,000 homes. AT&T purchased the San Jose system from Pacific Bell in 1998.

Andrew Johnson, spokesman for the Bay area system, says the company will provide high-speed data and cable telephony on a neighborhood-by-neighborhood basis while it waits for city leaders to approve the upgrade plan for the rest of the city.

"We're removing and retrofitting some of the Pacific Bell architecture to fit our standard architecture," he says.

Johnson would not say exactly what the new plant would consist of, other than to say it will be two-way hybrid fiber/coax with nodes of between 300 and 500 homes. The standard AT&T architecture calls for a primary SONET or ATM ring tied to a secondary ring feeding scaleable optical nodes.

Besides the bay area, AT&T has large clusters in Boston and Chicago.

"When you have a significant footprint to a major metro market, you are able to operate systems more efficiently and market more efficiently," Lang says.

According to Paul Kagan Associates, AT&T has upgraded 73 percent of its plant nationwide to 500-MHz service or better, with 76 percent of its plant wired for two-way service.

Charter Moves Modems

By [Monta Monaco Herson](#), Contributing Editor

An operator that increases cable modem installations 84 percent from one quarter to the next is doing something right.

"A lot of it is word of mouth," says John Scheihing, field operations manager for Charter Communications' St. Louis metro group. Charter's fourth quarter installs hit 5,641, vs. 3,060 in the third quarter.

Technicians play a key role in generating positive buzz among Charter's high-speed data subscribers. "We show how the service really works and set realistic expectations," Scheihing says.

Apart from customer education, efficient installation is another key to Charter's success. Scheihing says his group largely hits its goal of installing within three to five days of the customer's order.

The industry average for cable modem installation is 7.5 days, Strategis Group analyst Keith Kennebeck estimates, compared with 16.2 days for digital subscriber line (DSL) service. A shortage of technicians keeps those averages relatively high.

"The labor market is tight," Kennebeck says. "There are not enough people to do installs."

Charter relies on contract labor in certain circumstances, but has increased the number of technicians on its own staff. "Three years ago, we had four people; now in just the St. Louis area alone there are 24 crews," Scheihing says.

Charter uses one and two-man crews for the install itself, which entails certifying the drop as two-way capable, home-running the drop back to the ground, addressing such issues as grounding and sub-standard splitters and testing the return path on the personal computer (PC).

Finding technicians who can handle both the PC and radio frequency (RF) ends of the install is a challenge facing many multiple system operators (MSOs).

"The most efficient installs are those where the installer has two skill sets—RF and data," says Andy Shumway, vice president of engineering at High Speed Access. "These are difficult resources to find."

Charter is a strategic investor in HSA, a broadband services company that focuses on cable modem technology and serves more than 100,000 subscribers nationwide. Both share the Wired World Company culture of Paul Allen, which may be another element of their respective successes.

Charter spokesman Andy Morgan notes that even the company's contract labor undergoes the one-day Wiring Our World (WOW) indoctrination, which focuses heavily on customers.

Other approaches

While Charter believes in leveraging the link between subscriber and installer, labor and financial constraints are leading other MSOs down different paths.

"A lot of MSOs are deep in debt and rethinking long-term capital investment strategy," Kennebeck says, indicating this may affect how quickly cable modem deployment will occur in the future.

One solution may be self-install modems.

"Since modem inventory is the highest capital outlay for the operator, the focus is more on selling the modems to the customer [to] take that cost off the balance sheet," Kennebeck explains.

Cable One already operates this way. Customers must buy modems from a retail outlet before calling and saying they are ready for high-speed data service.

"We do not have to deal with cable modem stock," Cable One Director of New Media Aldo Casartelli says. "Our capital costs are nil from that standpoint for adding customers."

Telecom Employment Outlook Still Good

By [Laura Hamilton](#), Editor, *CT Pipeline*

In spite of all those companies doling out pink slips, the employment outlook for professionals in the telecommunications industry is "extremely strong," according to a recent hiring survey by Management Recruiters International.

In the survey, nearly 75 percent of executives with responsibility for hiring in the telecommunications industry said they plan to increase their staffs in the first half of this year.

On the downside, that's 6.1 points below the estimates for the second half of 2000. Another 21.7 percent plan to maintain current staff sizes, which is up by 5.8 points. About 4 percent plan decreases, which marks a 0.2-point decrease. The report did not break out the information by specific telecom sectors.

In comparison, 58.8 percent of executives polled across all industries projected new-hires for the first half of this year. Another 35.2 percent plan to maintain their current staff sizes and 5.9 percent plan decreases.

Deployment Watch Monthly Update

| Provider/Operator | Service/Feature | Communities | Vendor/Partner | Date |
|------------------------------------|---|--|--------------------------------|----------------|
| Adelphia Communications | Interactive television services to digital cable subscribers | Nationwide | Commerce TV, Inc. | By end of 2001 |
| Convergent | Voice services | 22 metropolitan markets, including New York, Chicago, Philadelphia and Washington, DC | NexTone Communications | February 2001 |
| Insight Communications | Video-on-demand | Indiana, Illinois and Kentucky | Diva | February 2001 |
| Martin Group | Switched digital video for delivery of home entertainment media and high-speed data | Chillicothe, Ohio | Horizon Chillicothe Telephone | February 2001 |
| LecStar Communications | Bundled telecommunications services | Georgia | Lucent Technologies | February 2001 |
| LodgeNet Entertainment Corporation | Digital satellite entertainment | More than 250 Red Roof Inns | DirecTV | January 2001 |
| NetworkIP | High-speed Internet services | Longview, Texas; Vicksburg, Miss.; Hot Springs, Pine Bluff, Forest City and Searcy, Ark. | WEHCO | February 2001 |
| Videotron | Email over broadband cable | Quebec (Canada) | PowerTV and Scientific-Atlanta | February 2001 |