

Next Generation Network Architecture (NGNA)

NGNA LLC, was formed by Comcast, Cox, and Time Warner Cable, to define a next generation network architecture for future cable industry market and business requirements.

In August 2004, an *NGNA Plan* for an *Integrated Multimedia Architecture* was distributed to project participants including numerous cable industry technology suppliers as well as future prospective suppliers of cable-related components, equipment, consumer electronics, and systems. This report represented the culmination of a year-long project that involved more than 40 senior technology specialists from the three MSOs and from CableLabs.

The *NGNA Plan* provides a reference model that cable operators and equipment suppliers may elect to follow in making network and product investment decisions. A copy of this document may be obtained from CableLabs under non-disclosure agreement (NDA). CableLabs now has responsibility for NGNA-related specification activities. Anyone seeking current information about the project is invited to contact CableLabs, c/o ngna-info@cablelabs.com.

PDS Consulting in collaboration with IP Action Partners were retained by NGNA LLC to manage the NGNA project. Dr. Peter Shapiro, principal at PDS Consulting, and Stuart Lipoff, partner at IP Action Partners, have collaborated on this important cable industry initiative.

Following are selected recent trade press articles that refer to NGNA:

- Technology's Creative Master – Mike LaJoie Gives a Peek Inside His Laboratory, *Multichannel News*, 27 September 2004
- Bargain Boxes, *CED Magazine*, September 2004
- Next Generation Network Architecture (NGNA) Primer, *Cable Datacom News*, August 2004
- 2004 EXPO Hot inside and out, *CED Magazine*, July 2004
- A Sneak Peek at Cable's Battle Plan for the Future, *CED Magazine*, May 2004
- Top 3 Cable MSOs Push All-Digital Design Agenda, *ScreenPlays*, Spring 2004



Technology's Creative Master

Mike LaJoie Gives a Peek Inside His Laboratory

Q&A With Matt Stump -- Multichannel News, 9/27/2004

Time Warner Cable chief technology officer Mike LaJoie is a longtime veteran of the MSO, and he's currently responsible for providing the underlying technology to launch video-on-demand, HDTV, digital video recorders and the new voice-over-Internet protocol telephony service. In this Q&A with *Broadband Week* editor Matt Stump, LaJoie looks at how the stepping stones of the past have led to the path on which Time Warner treads today. An edited transcript follows.

The Next Tech Generation

MCN: What do you hope to get out of next-generation network architecture development?

LaJOIE: One of them that is very interesting is downloadable conditional access, downloadable security.

That provides us a better degree of security than we have today. But it will also give us lots of flexibility, so we'll have multiple choices for conditional access.

It will also benefit the consumer-electronics industry in that they can more readily build devices that can connect to our network. I'd like to be the easiest network for people to provide products to and also to connect products to. In that perspective, downloadable security gives us a big advantage.

We're agreeing on the types of devices that we would like to see built to connect to our networks. Multiple kinds of CPE [customer-premises equipment] that were defined in NGNA [Next Generation Network Architecture specifications] that give a road map to vendors and third parties on what kinds of products they could build. We call them subscriber video devices. Those will be included as profiles in the OCAP [OpenCable Applications Platform] specification.

NGNA was designed to have the three major MSOs collaborate on a focused effort to push a lot of these specifications out the door and inform the vendor community, CableLabs and the other MSOs what we're thinking.

Bargain boxes



Is the cable industry within reach of the \$50, all-digital set-top?

By Jeff Baumgartner, Editor

Although the cable industry would never want to be associated with the word “cheap,” the word certainly applies to the price some operators are willing to pay for bare-bones boxes that will spur the migration to a more bandwidth-efficient, all-digital environment.

The first price to be bandied about was \$50. Then it was \$35. Then, once it was decided that those boxes would need to support things like DOCSIS signaling, a second tuner and advanced codecs, it was back to \$50 again.

When such a box might show its face was cleared up somewhat this summer at the CTAM Summit in Boston. There, Comcast Cable Executive Vice President and Chief Technology Officer David Fellows estimated that chipsets could appear by mid-2005, with the first products showing up by the end of that year. He acknowledged that the first set of boxes would likely carry a sub-\$100 price, and then creep down as volumes ramp up.

Those thin-clients are also a component of the Next Generation Network Architecture (NGNA), a project originally drawn up by Cox Communications, Comcast Cable and Time Warner Cable, and about to come under the auspices of CableLabs. NGNA, at least in its initial request for information, also sought data on all-digital boxes supporting advanced elements such as digital video recording (DVR), as well as a whole-home device called the Video Network Interface Unit (VNIU).

While Fellows hopes to have a low-cost, all-digital product in Comcast’s hands by the second half of 2005, others could decide to wait a bit longer—anywhere from one to four years—as MSO/programmer agreements are redrawn to address the digital age. But others, like Charter Communications, are on an even faster track.



Cable Datacom News

Next-Generation Network Architecture

Next-Generation Network Architecture (NGNA) Primer

Last Updated: August 5, 2004

Despite all the talk about cable convergence and service bundling over a single pipe, today multi-system operators (MSOs) still deliver these services separately, albeit over a common physical infrastructure. Building separate "silos" for video, data and voice services has accelerated deployment for MSOs, but led to inevitable equipment, operational, bandwidth and back-office inefficiencies. Through the Next-Generation Network Architecture (NGNA) project, top North American cable operators are exploring options to unify their IP and MPEG video infrastructure, a move they hope will drive down equipment costs, reclaim valuable HFC spectrum and enable high-value digital services.

The pitfalls of cable's current service and infrastructure silos are not unlike the inefficiencies experienced by incumbent telcos with their legacy circuit-switched voice networks. In a circuit-switched network, any connection, such as a telephone, fax or dial-up modem call, is allocated a fixed link for the duration of the session, whether or not any data is actually being transmitted. It is no wonder that telecom players have been moving as quickly as possible to a packet switched architecture where data streams are carried over a common pipe, consuming bandwidth only when bits are actually transmitted. This creates bandwidth and equipment savings through the statistical multiplexing of traffic.

Similarly, in cable, today's analog and digital television signals are typically allocated fixed "broadcast circuits," where video channels each occupy dedicated QAM modulator and spectrum capacity, regardless of whether or not the content is actually viewed. Through NGNA, cable operators are exploring options to create a multimedia packet switching architecture to maximize efficiencies in the transport of IP and MPEG traffic.

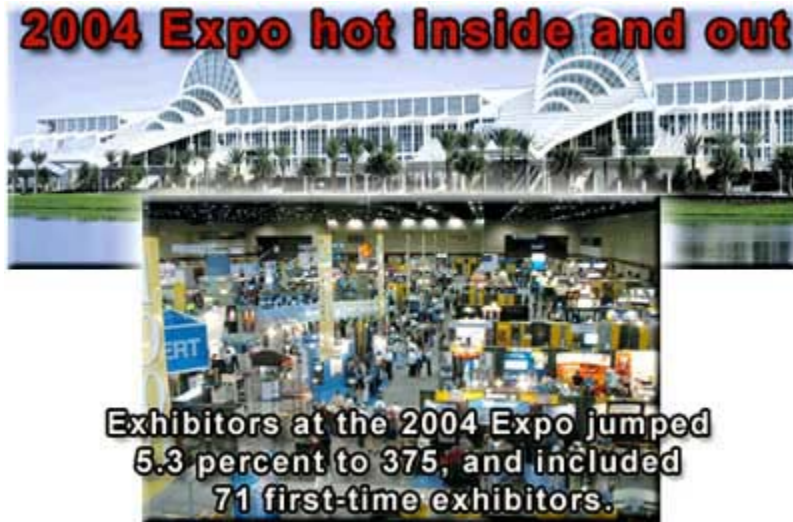
Fulfilling the NGNA vision requires a new class of Digital IP Cable Edge device that integrates the functionality of a high-density edge QAM modulator platform, DOCSIS cable modem termination system (CMTS), and video processing. The idea is that IP traffic (data, voice and video) and MPEG traffic (broadcast and on-demand standard and high-definition video) flow over a common Gigabit Ethernet backbone to the cable network edge. Then, this NGNA edge platform dynamically routes the service to the appropriate customer premises device, whether it's an MPEG set-top, IP set-top, cable modem or PacketCable E-MTA.

What kinds of services and applications may evolve through NGNA? At the top of the list is delivering niche broadcast, on-demand and high-definition video content via IP to DOCSIS-enabled set-tops using bandwidth-saving codecs, not to mention interactive television applications.

A number of vendors are lining up to attack the NGNA product opportunity. See [NGNA Vendors](#) for more information.

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2004 EXPO Hot inside and out



Bandwidth conservation, bustling floor activity highlight annual confab

By Karen Brown, Senior Editor; and Jeff Baumgartner, Editor

The Society of Cable Telecommunications Engineers' (SCTE) Cable-Tec Expo in Orlando, Fla. was a lot like the weather there—aside from the threat of a few technical thunderstorms looming for the industry, attendees came away with a mostly sunny forecast.

The show floor looked bigger and more active than last year's affair as exhibitors apparently took the 2004 show slogan to heart and maximized their exposure. Although attendance was basically flat at 10,300 (compared to 10,600 in 2003), the number of exhibitors jumped 5.3 percent (375 versus 356 last year), and the Expo welcomed 71 first-timers.

Most vendors we contacted said they were seeing some strong interest and driving business on the show floor. In fact, at least one Expo newcomer went home with fewer demo units than it came with. Next-gen encoder startup EGT Inc. arrived with 14 encoding units to power its demonstrations, but ended the show with just 12—the other two were sold right off the rack.

Bandwidth issues still buzzing

The buzz around the all-digital future for cable services continued to be loud, particularly focusing on the details of the Next Generation Network Architecture (NGNA) scheme that Cox Communications, Comcast Corp. and Time Warner Cable have been quietly assembling.

The idea is to develop some kind of common reference architecture for an all-digital, multi-service network running on an HFC plant, just as CableLabs initially did with DOCSIS for high-speed data services (please see the May 2004 issue of CED for a more detailed look at NGNA).

Chris Bowick, Cox's senior vice president of engineering and chief technology officer, said in a CTO roundtable discussion at the show that NGNA is still a work in progress. He said the MSOs were working with CableLabs to define a reference architecture "and it's not concrete by any stretch of the imagination. That will evolve and hopefully that will leverage what we have put in place today."

But one thing NGNA is not aiming to do is solve a supposed bandwidth drought among cable operators, Bowick said. Contrary to some reports, cable operators have tools ranging from 256 QAM modulation to statistical multiplexing to supply more than adequate bandwidth for the range of voice, video and data services they are now fielding.

Bowick noted that in the Cox network, only about 18 percent of its video QAMs are operating at the higher-capacity 256 QAM level, and it also can recoup significant bandwidth by converting bandwidth absorbing analog channels to digital.

“The tools to optimize bandwidth are there; we’ve just got to get on with it,” he said. “It’s a matter of timing, and when we want to start migrating the bandwidth, we have to [have] something that is much more efficient.”

Marwan Fawaz, CTO and senior vice president of engineering and technology at Adelphia Communications, said his company has not been participating in the development up to now, but likely will get involved going forward.

“I think NGNA has some great ideas for us to migrate in an elegant way from analog to a digital standard,” Fawaz said. “So we’re glad it’s happening. We would have preferred to be there in the beginning, but I’m confident...we will be more involved in the next six months.”

Every now and then new ideas came to light, including talk of bringing cellular wireless technology within cable’s reach. During the CTO panel session, Fawaz of Adelphia noted there has been talk about integrating a mobile play, particularly in creating a handoff scheme allowing cell phones to switch from a cellular tower connection to a DOCSIS connection if the user were making the call while at home.

Kenneth Wright, CTO of C-COR, followed up on that, noting that from the technology side, C-COR is in talks to look at developing a roaming technology to do just that, automatically handing traffic from a cellular tower to a home network.



The all-digital migration highlighted the CEO panel: (from left) Chris Bowick (Cox), William Check (NCTA), Wayne Davis (Charter), Leslie Ellis (moderator), Marwan Fawaz (Adelphia), and Ken Wright (C-COR).

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NEXT GENERATION NETWORK ARCHITECTURE

NGNA: A sneak-peek at cable's battle plan for the future



A clandestine project spearheaded by Comcast, Cox and Time Warner Cable provides a glimpse of how the industry might embark on an all-digital migration and create a common platform for a range of new IP-based services

By Jeff Baumgartner, Editor

One doesn't wage a war of innovation without weighing all of the strategies and tactics available. Based on the resources in hand, is it better to fight a war of attrition or annihilation? Is it possible to flank the enemy without getting outflanked?

Cable operators, clearly at war with DBS and the telcos, have been asking these questions...and getting plenty of answers from the vendor community when it comes to how the industry might embark on an analog-to-digital migration. The challenge, however, has been sifting through those answers and determining which ones are the right ones and which ones should be discarded.

There's a lot at stake in those decisions. How much? Just the industry's future, that's all. And operators will probably get only one chance to get it right. Once the troops are deployed, it's hard to call them back quickly if a mistake is made.

If more capacity is required to handle high-definition television, multiplayer gaming and other bandwidth-intensive services, rebuilding again is not an option. Wall Street simply won't stand for it.

So, what to do? For one, you get some of the industry's largest MSOs and brightest minds on the case.

Enter Next Generation Network Architecture LLC (NGNA), a project being helmed by Comcast Cable, Cox Communications and Time Warner Cable, which collectively serve about 40 million subscribers. Call it cable's loudest secret. Everyone worth their technical salt knows something about it, yet the MSOs behind it aren't in the mood to discuss it publicly.

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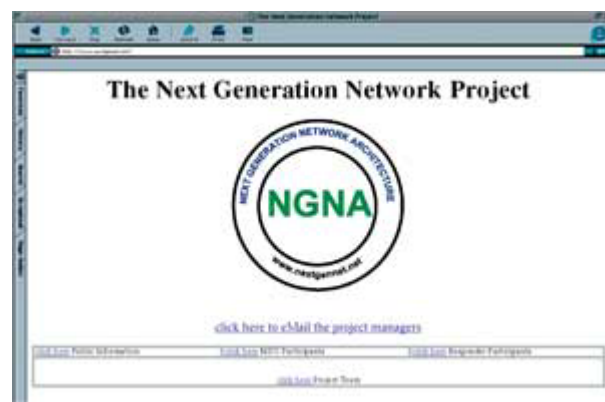
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Still, information is out there. NGNA released a Request for Information (RFI) earlier this year. The 100-plus-page document reveals how MSOs might approach the all-digital transition. The deadline for vendor RFI responses was March 26.

Although the RFI cites an architecture designed to meet the needs of the industry five years out, it's understood that Cox, Comcast and Time Warner Cable plan to get things rolling much sooner than that. Some sources indicate that they want to have NGNA in the hands of CableLabs by June and have the project spec'd out by this fall.

One of the primary goals of NGNA is to fuel the transition to all-digital, a move that will enable operators to reclaim valuable analog bandwidth without undergoing another expensive rebuild. Another goal is to do away with proprietary systems in favor of open ones. Yet another is to nourish innovation, particularly at the CPE level.



It's not much to look at, but vendors became well acquainted with the NGNA Web site during the RFI process.

NGNA is not being billed as a one-size-fits-all solution for the industry, but rather the narrowing of a vision on how cable's next-generation architecture will take shape, and allowing for as much flexibility in that process as possible.

The way it's being drawn up, NGNA is not looking to "flash-cut" everyone to digital all at once, but to move in that direction by gradually reclaiming analog spectrum and installing "transitional" CPE devices in (or on) analog-only homes.

DBS competition is clearly a key driver of the NGNA initiative. Cable operators are growing increasingly frustrated as EchoStar Communications and DirecTV widely deploy DVRs, leaving cable to play catch-up with a small batch of set-top vendors. MSOs hope to level the playing field by adding some new, innovative blood to the mix.

But to do that, the current conditional access (CA) duopoly must be corrected. Today, nearly every U.S. cable system relies on at least one of just two CA providers: Motorola Broadband or Scientific-Atlanta. Although Motorola's MediaCipher and S-A's PowerKEY CAs haven't been hacked by pirates to this point, operators are increasingly of the opinion that Motorola's and S-A's grip on the technology has stifled set-top and "cable-ready" CE innovations. With that in mind, NGNA is calling for the CA to be separated from the network.

But NGNA is digging much deeper than that.

The project also is seeking information on advanced codecs. The RFI references MPEG-4/Part 10 Advanced Video Coding (AVC) and Microsoft Windows Media 9, but notes that "additional approaches will also be considered." On the audio side, the document says NGNA will also evaluate advanced audio

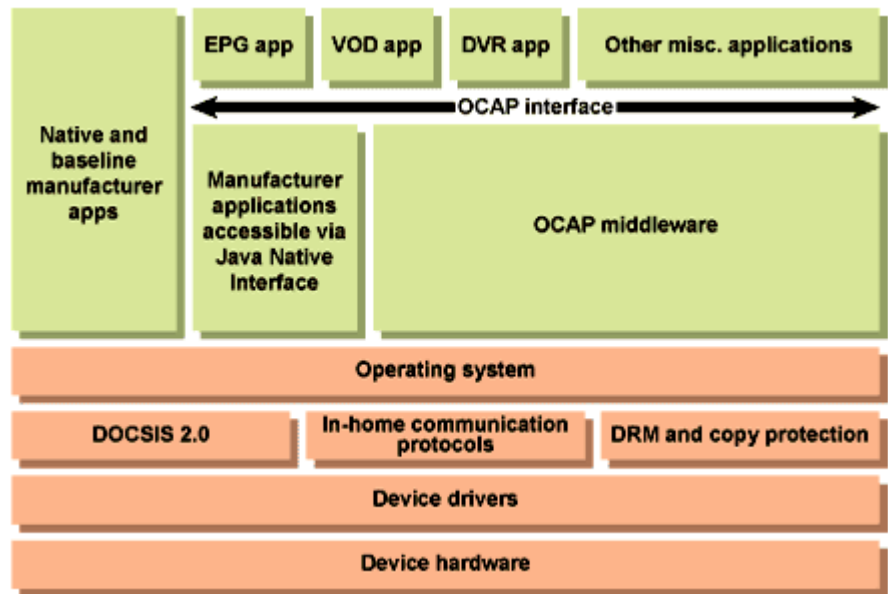
coding schemes that claim improvement over Dolby's AC-3.

Migrating analog signals to digital is just part of the plan. NGNA's backers also make it crystal clear in the RFI that this is not a science project. It will look at bleeding edge technology, as long as it doesn't bleed too much money.

With that in mind, NGNA also is giving weight to technologies that support legacy CAs and out-of-band (OOB) signaling. But how this next-gen architecture will address all of these things is still very much up in the air.

As one cable insider puts it, the industry has found itself in a forest full of ideas and methods, but needs to find the right tree for the job. The RFI is just a first step, meaning the architecture could change, based on vendor feedback.

At the technology layer, NGNA addresses "major" network segments such as the back office, headends and servers, outside plant and consumer premise equipment. It does not address regional and national data networking systems (i.e. transport) because the parties behind NGNA believe that area already "benefits from innovative, competitive market forces and will not represent a bottleneck" to the project's objectives.



Source: NGNA RFI

Figure 1: NGNA's video CPE software architecture reference model.

Like DOCSIS

Despite being in the formative stages, NGNA's evolution will likely follow the path DOCSIS traveled back in the early 1990s. Before DOCSIS became a household name, the project, much like NGNA, started as a consortium called Multimedia Cable Network System (MCNS), which was later handed off to CableLabs and renamed. MCNS was funded by four top MSOs:

Tele-Communications Inc., Time Warner Cable, Comcast and Cox. Rogers Cable and what was Continental Cable also supplied early input.

CableLabs could take the reins of NGNA as early as this summer. But the role CableLabs will take has yet to be determined. It might weave elements of NGNA into CableHome, OpenCable or other projects, or it could use it to build an entirely new initiative. That will be decided later this year after operators, CableLabs and other "subject matter experts" get a chance to sift through the RFI responses.

And why not duplicate many of the elements that made DOCSIS go? After all, DOCSIS has been a huge success story for cable operators. Centering on an industrywide specification has driven the price of the cable modem from thousands of dollars to less than \$50. The uniform technical approach has also helped cable establish a healthy lead over DSL.

But it hasn't been as kind to the vendors. Although there were literally dozens of cable modem vendors a few years ago, thinning margins drove many of them out of the cable modem business or out of business altogether. The CMTS side of the DOCSIS equation has also seen its share of consolidation.

Despite those similarities, there are some key differences. In the days of MCNS, cable operators were working with a high-speed greenfield. MCNS also focused on one specific service. By contrast, NGNA covers aspects of video, voice, data and everything in between.

Breaking down the duopoly

But to obtain the control cable desires and to foster more innovation at the set-top level, operators will have to separate conditional access from the network. There's also federal pressure to consider, too. Remember that U.S. MSOs are required to stop the deployment of set-tops with integrated CAs by July 2006.

Because of those factors, the S-A/Motorola duopoly will dissolve over time, industry insiders predict.

"NGNA will certainly accelerate the operators' ability to regain control of that [CA] platform," says one source familiar with the project.

"S-A and Motorola will lose that control in the next 10 years, maybe five," the source adds.

The RFI proposes that the NGNA Conditional Access System (NCAS) supports the decryption of at least five types of secure transport streams: Motorola's MediaCipher, S-A's PowerKEY, Triple DES, DVB-CSA and AES. The document also references two other CA vendors that could be given hardware support: NDS Group and Nagravision.

NGNA also is putting the microscope to software-renewable conditional access systems.

Though the idea is to separate the CA, operators are keenly aware that they must continue to support millions of deployed digital boxes during the transition. They aren't about to replace them just for the sake of a new CA platform. Instead, they will be looking for solutions that enable them to migrate to an alternative CA while supporting the legacy.

That will certainly open up opportunities for Sony Passage, a system that has already undergone testing with Comcast and Charter Communications. Another possibility, ironically, is Scientific-Atlanta, which is developing a "digital overlay" system that enables operators to put PowerKEY-based set-tops, such as S-A's DVR-capable Explorer 8000 and Explorer 8000HD, on systems that use Motorola's MediaCipher CA. Time Warner Cable has been testing the system in Beaumont, Texas, according to CED sources.

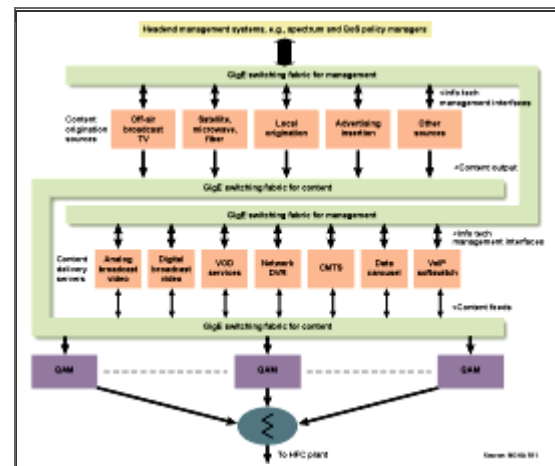


Figure 2: Under the NGNA headend server architecture model, the control and RF aspects of the headend servers are separate so common third-party resource management and network operations apps can manage the headend as an integrated system.
[\[click here to enlarge \]](#)

Network element	CA	In-home networking	DVR	OCAP	2-way apps support	CableCARD slot	Transition device	Target cost to MSO
ODA–full function	4			4	4		4	<\$50
ODA–all-DOCSIS	4			4	4		4	<\$35
Video NIU	4						4	<\$150
SVD–low end	4	4		4	4			<\$150
SVD–high end	4	4	4	4	4	4		<\$250
SVD–2-way TV	4	4		4	4	4		N/A

ODA = Outlet digital adapter
 NIU = Network interface unit
 CA = Conditional Access
 SVD = Subscriber video device

Source: NGNA RFI

Figure 3: The NGNA initiative seeks information on a wide range of CPE, including several models that could aid operators with a transparent transition to an all-digital environment.

NGNA: On the network and at the CPE

NGNA makes some general assumptions about the headend. Cable modem termination systems are to be upgraded to DOCSIS 1.1 and support the DOCSIS Set-Top Gateway (DSG) specification. DSG, much beefier than legacy (and proprietary) out-of-band signaling, will likely be used to handle secure software downloads and configuration management of set-tops and other CPE devices. DSG could also be used to stream video to the set-top box.

NGNA marks a clear shift in how some operators will treat the consumer side of the network in the future.

“Traditionally, [cable operators] have been very passive,” says one cable insider. “It’s been the manufacturers and developers who have had to proactively shake the tree to get things going. Now the operators are taking the initiative.”

That’s a good news/bad news story for the vendors. It’s good in the sense that there will be much more consensus on what the MSOs want, instead of predicting, or worse, assuming what they want and then hoping for the best. Some vendors also fear a potential downside to NGNA: they might have to give up some valuable intellectual property just to be part of it.

By the same token, operators also don’t want to get caught up in patent traps and proprietary cages. Or, if they end up locked in to something, they want to make sure they are “locked in to the right answers that allow future flexibility and the ability to be innovative on that platform to launch new services and products,” says one industry insider.

The NGNA RFI gives plenty of attention to what it calls the “Subscriber Video Device” (SVD), a new suite of low-end and high-end all-digital devices. Higher-end, “next-gen” boxes under NGNA will likely support DOCSIS 2.0 and a minimum of OCAP 1.0 middleware if the devices are capable of handling downloadable applications.

In an apparent nod to technologies being spearheaded by vendors such as Digeo Inc., S-A and Ucentric Systems, the document also points to the virtue of whole-home digital video recording products whereby a high-end set-top shares content and applications over a home’s coax network with cheaper, thin-client devices. NGNA is also exploring how cable SVDs could access content from the PC via a home network. A home-side network capable of supporting at least four high-definition streams is also under consideration.

The most obvious candidate there is the technology under development by the Multimedia over Coax Alliance (MoCA), an initiative that already has the support of Comcast. HomePlug AV, which plans to

handle multiple HD streams, is likely to be another “no new wires” networking technology candidate for the NGNA project.

All-digital migration devices

NGNA, a new acronym in its own right, could add at least two more to cable’s customer premises lexicon: ODA, for Outlet Digital Adapter, and VNIU, for Video Network Interface Unit. Both might be used to ease the transition to all-digital, and provide a transparent means to send and convert digital signals to analog customers who do not use set-tops.

Under the first model, operators would install ODAs at each cable outlet to convert digital signals to analog. The RFI references two types of digital adapters: a full-function, two-way ODA and an all-DOCSIS two-way ODA. Both would support MPEG-2 and an advanced video codec. Still another possible variant might support native applications such as electronic program guides and video-on-demand.

Because it’s a small device that would reside behind the TV set, the ODA might be better defined as a “set-back” device rather than a set-top. Pace Micro Technology’s Digital Cable Adapter (DCA), showcased at the 2003 National Show in Chicago, was the first device to show some of the ODA features referenced in the NGNA RFI.

Because the ODA does not support OCAP, operators, not retailers, would likely supply the device. NGNA’s target for the two-way ODA is less than \$50 per unit, and about \$35 per unit for the all-DOCSIS device.

One of the more interesting (and certainly least intrusive) concepts on the table is the VNIU, another digital-to-analog device targeted to analog subs without set-tops. But it’s designed to be even more transparent to the customer than the ODA. Instead of installing one at every cable outlet in the home, just one VNIU, when affixed to the side of the customer’s house, would handle the digital-to-analog conversion for every outlet in the home.

The VNIU’s initial specs will likely be different than the ODA. For one, the RFI calls for it to support only MPEG-2 and, because it would sit outside, it would have to operate under extreme temperatures. Because it won’t support EPGs and other applications, OCAP also won’t apply to the VNIU. NGNA is forecasting a cost target of less than \$150 per device, in high volume.

NGNA also is taking into account millions of digital televisions that are not capable of decoding anything beyond MPEG-2. If an operator moves to MPEG-4, they can’t just leave those TV owners in the lurch. To solve that problem, the project is seeking information on what’s being called an “advanced codec transcoder.” That device, which will cost less than \$10 in high volume, could accept streams based on advanced codecs and then convert them into MPEG-2 format.

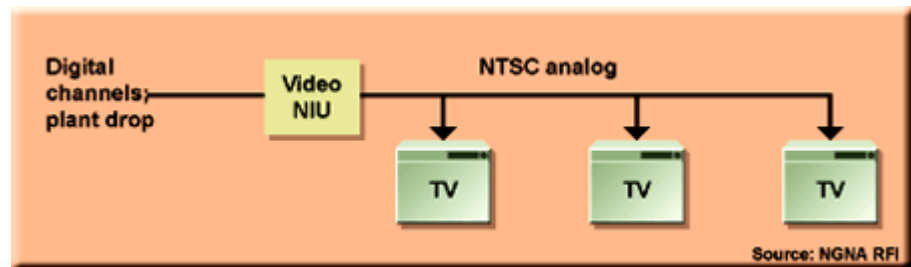


Figure 4: Under the VNIU approach, existing digital signals would be passed through a VNIU to extant digital boxes or “digital cable-ready” TVs.

those questions were cleared up at an NGNA probate meeting, where vendors were assured that the creation of NGNA would not stop them from having product conversations with MSOs in isolation, and that the project is there to help them better direct their R&D efforts.

For the record, NGNA will not require vendors to give up their intellectual property, but vendors that “allow royalty-free use will be evaluated most favorably in the next-generation network,” according to the RFI.

CableLabs has established a royalty-free pool for most of its projects, the exception being OCAP (OpenCable Application Platform). OCAP started out as a royalty-free project, but that all changed in late 2001 when the industry decided to incorporate the bulk of Europe’s Multimedia Home Platform (MHP), which uses a royalty-bearing model.

Sources familiar with the project believe the project is above board and not subject to any antitrust concerns. Still, it makes one wonder why the MSOs behind NGNA have been developing it in a shroud of secrecy.

For one, vendors tend to be much more honest and able to “advance the ball” if every move they make with the project is not being scrutinized by the stock market and analysts.

“This way, it can move in a more accelerated way to create traction and get something done,” says an industry source, noting that things will open up once the project is handed off to CableLabs and the implementation process begins.

Then, the real shooting can begin.

E-Mail: [Jeff Baumgartner](#)

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STRATEGIC INFORMATION FOR THE BROADBAND MARKETPLACE

Top 3 Cable MSOs Push All-Digital Design Agenda

Issue RFI for Next-Generation Network

The three largest cable companies have just issued a request for information as a major step in what they're referring to as the Next Generation Network Architecture initiative. It's a move fraught with implications not only for the way cable networks will operate in the future but also for the business models cable will pursue in efforts to avoid evolving into a commoditized transport business.

The voluminous RFI was sent to approximately 120 companies, kicking off what the participants hope will be a process leading to agreement on the best approach to transitioning from today's hybrid analog/digital network to an all-digital platform. But it won't be easy. When the NGNA initiative was first conceived a year ago, the companies anticipated they'd be well on their way to completing their work by now. However, just getting to the RFI stage proved far more difficult than they expected. At this point, sources say, the parties will be happy if they can put a consensus blueprint on the table for the rest of the industry to review by the end of this year.

The highly secretive project was organized to speed resolution of a host of interlocking issues which were deemed too complicated and controversial to resolve through the usual specification-setting process at Cable Television Laboratories. But the three companies, Comcast, Time Warner Cable and Cox Communications, and the consultants they've retained to run the RFI process are working closely with CableLabs in the hope that, ultimately, the NGNA specifications can be turned over for adoption by the CableLabs membership as a whole.

Stuart Lipoff, a consulting engineer who is helping spearhead the effort with Peter Shapiro, another industry tech expert, says the process is analogous to the MCNS (Multimedia Cable Network System) project that major MSOs pursued as a precursor to today's DOCSIS (Data over Cable Service Interface Specifications) standard. "This isn't a CableLabs project," Lipoff says, adding that the NGNA initiative goes beyond the work being done at CableLabs to explore the possible parameters of an all-IP (Internet Protocol) network (see July issue, p. 1). Lipoff says he is not at liberty to discuss details.

But CableLabs is definitely participating in the effort, says another source, noting that key members of the organization's engineering committee have the lead roles as their companies' technical point men in the initiative. These individuals include Mike LaJoie, executive vice president, advanced technology, Time Warner Cable; Dallas Clement, senior vice president, strategy and development, Cox Communications; and Mark Coblitz, senior vice president, strategy planning, Comcast.

It was clear that the RFI marked an important milestone in what has been a difficult effort to even agree on the parameters that will be used to shape the requirements for a cable NGNA. "If you stand back and look at the plethora of options for conversion to an all-digital network, it gets mind boggling," notes one industry executive, speaking on background. "And it gets worse when you put a commercial overlay on top of that."

The reference was to the cost and marketing issues that surround conversion to an all-digital network, which, when the topic was first broached by Comcast engineers a year ago, tended to be discussed in terms of the threshold set-top box cost that would justify going to an all-digital format. That number has been pegged at anywhere from \$35 to \$50.

"First of all, people with analog service and cable-ready TVs tend to hate boxes," the executive says. "So you have to sell them on the idea. And then someone has to install it, which, if it isn't the customer, translates into another \$35 cost increment to cover the truck roll."

Moreover, there are headend costs that are likely to add another \$15 or more per subscriber, he notes. After spending \$70 billion to upgrade their networks, cable operators might have trouble going back to Wall Street to explain that they need to spend another few billion to "make it really neat," he adds. "So there's a need to make the case that we can make a business out of this."

The upshot is that the transition to an all-digital network could be several years away, notwithstanding the growing urgency operators feel as they contend with such issues as the need for more transmission capacity to accommodate ever more high definition programming and the headaches of delivering multiple services in multiple formats to an increasing number of devices in the home.

And, as they address these needs, they want to future-proof themselves against commoditization. In other words, they want to ensure that the benefits they bring to the market with regard to seamless integration of services, intelligent broadband network capacity and efficiency, cost-effective distribution of content in the home and marketing and billing connectivity to the residential marketplace are duly rewarded as end users exploit non-traditional sources of entertainment, applications and communications services that are emerging in the Internet domain.

Several ideas have been discussed publicly, including the all-IP network, which would have the advantage of universality and scale economics but would raise issues about the ability of cable operators to ensure they are compensated for content flowing over their networks to viewers' TV screens. While Comcast executives have spoken favorably about the all-IP possibility, sources at Time Warner continue to raise questions about the practicality of the concept from a business perspective.

But there are many ways to approach the design of an all-IP network. As originally broached, the concept suggested elimination of today's channelization scheme, possibly using a big Ethernet stream to pump all services to homes arrayed in LAN mode as node points on the network.

But delivery of all-IP service over the DOCSIS infrastructure using the traditional 6 megaHertz channelization also makes a lot of sense, given the low costs of cable modems and the fact that the DOCSIS infrastructure is already in place with the mechanisms for tightly securing access to content and controlling quality of service on a per-service-flow basis. Alternatively, there's also support for using the 188-byte framing mechanism of MPEG-2 rather than IP in conjunction with transport over DOCSIS infrastructure, an option which is already incorporated into the DOCSIS standard.

Some engineers appear to favor simply using the MPEG-2 protocol stack possibly with some MPEG-4 variant as the primary digital delivery and management system. And then there are a number of proprietary schemes on offer from vendors, many of which apparently haven't yet been publicized.

As these various options suggest, there's disagreement over how far-reaching the digital platform architecture should be. Some cable companies prefer to focus on the basic question of how to free up bandwidth for HDTV. Given the power of digital compression to accommodate delivery of multiple program streams within a single 6 MHz channel versus one analog TV program per 6 MHz, an all-digital network will make it possible for operators to deliver programming simultaneously in HDTV and standard definition format as virtually all programming sources move to the two-format mode of offering services in a market divided between people who have and don't have HDTV sets. The faster HDTV sets penetrate the market, the sooner operators are going to have to make a choice on digital migration, which is an easier choice to make if it's merely about freeing up capacity for TV programming.

But the majority of the engineering community and, by all appearances, all of the players in the NGNA initiative look at a move to all-digital as an opportunity to create a means of seamlessly integrating services to avoid having to transmit each service stream be in a different format. Not only does this multi-layered approach create operational headaches; more importantly, it creates barriers against the seamless integration of voice, video and data content and applications. With the networking of ever more digital devices in the home, cable operators want to be able to deliver service that can be optimized for any device without having to map the service to a different format for each type of device.

But just how uniform does everything have to be with regard to such things as the types of digital rights management, compression and conditional access processes that are to be used? To what extent will the applications program interfaces that allow electronic guides and other programs to run on the devices in the home be opened for universal access, which is a question now on the table in the two-way phase of the negotiations on digital protection between the cable industry and other interests, including the consumer electronics industry, the computer industry and the motion picture studios? And how will the NGNA accommodate different operators' perspectives on the placement of intelligence in the network as a function of how they want to structure their service offerings?

The questions are virtually endless, and all come back to the cost issue and the ability of the industry to persuade not only end users but also Wall Street and regulators that the course chosen is in everyone's best interests. As

time continues to pass and incremental decisions are forced on individual MSOs the challenge for the NGNA group will be whether they can arrive at a single-platform consensus before the market-driven choices they and other cable companies have to make begin locking different companies into different directions as they proceed down the digital migration path. Getting the job done before the year is out would seem to be an absolute imperative if NGNA is to succeed as a template for cable's future.

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<http://www.screenplays.bz/Screenplays-2004/sp204d.html>