DATA/INTERNET SERVICE PLANNING IN THE SHADOW OF AN ANTICIPATED CABLE MODEM STANDARD

Terry L. Wright
Chief Technology Officer
Convergence Systems Incorporated (CSI)
3800 Holcomb Bridge Road, N.W. Suite 204
Norcross, Georgia 30092-2230
Ph: 770-416-9993 Fax: 770-416-9994
Web: http://www.convergence.com Email: tlwright@convergence.com

ABSTRACT

The anticipated completion of a formal international cable modem technical standard (i.e., IEEE 802.14 or a potential SCTE offering), or the potential "de facto" popularity of an MCNS specification, introduces significant strategic and operational implications for the cable operators contemplating entry into the Internet/Intranet/on-line data services market place.

INTRODUCTION

The emerging cable modem standard/ specification imposes substantial challenges to the cable industry in the areas of

- cable modem selection
- distribution channels,
- alignment (strategic fit) with planned service offerings,
- end-user satisfaction,
- subscriber mobility concerns,
- support and deployment issues,
- capital equipment depreciation considerations, and
- total solution integrity.

What changes to the existing infrastructure, and what impact on the aspects of service deployment mentioned above, can be expected once a cable modem standard/de facto specification is available? What implications do these and other related changes have on strategic planning challenges facing cable operators today? How can cable operators navigate the complex terrain between today's proprietary solutions, and the standards-based solutions expected in the future? What market dynamics and other competitive forces are defining and characterizing the timeframe for the cable industry's window of opportunity in on-line services? Just exactly what will it mean to have a cable modem standard, and how should these expectations shape strategic thinking today?

These and other related questions and issues must be thoroughly addressed if the cable industry is to effectively compete in the Internet/on-line data services marketplace. While viewed as a positive development for the cable industry over the long term, the anticipated completion of cable modem standards presents significant challenges to moving forward in the present. With formal standards-based cable modems not expected before early 1998, what can cable operators do to establish a foothold in the cyberspace market today?

This paper addresses the questions and issues mentioned above, as well as other challenges facing cable operators today, as their industry evolves towards the provisioning of high-performance Internet, IntraNet, and other broadband-based networked data services.

STANDARDS, SPECIFICATIONS & CONSORTIUMS

The primary difference between formal standards, and specifications, lie in the areas of accreditation, legal posture, and contributors. (Participants in accredited standards-making

bodies are typically immune from antitrust statutes for topical work done in committee.) Of course, an informal specification can end up as a "de facto" standard due to its popularity among vendors and users (e.g., the RSA, Microsoft Windows/DOS, Unix). A formal standard is sanctioned ultimately at the United Nations level. There are a variety of standards-making organizations and study groups. Traditional standards groups exist for most communications technologies with universal application. Examples include the International Telegraph and Telephone Committee (CCITT), Institute of Electrical and Electronics Engineers, Inc. (IEEE), International Standards Organization (ISO), International Electrotechnical Commission (IEC), American National Standards Institute (ANSI), European Computer Manufacturers Association (ECMA), Electronic Industries Association (EIA), and the Internet Engineering Task Force (IETF).

There are also telecommunications and information systems industry consortiums such as the ATM Forum, Frame Relay Forum, SMDS Interest Group, MCNS, North American ISDN Users Forum, X/Open, Open Software Foundation, X-Windows Consortium, and Microsoft MAPI. Together with various testing organizations (e.g., NIST-OIW, COS, EOTC) and coordinating bodies (e.g., T1AG, ECSA), the standards-making process is accomplished. Note that there are varying degrees of cooperation and coordination among all these groups These standards-setting groups operate in a wide variety of ways from traditional formal processes (e.g., ISO-IEC, ITU, ITC, ANSI) to more aggressive, less formal, and more accommodating (and rapid) processes like the IETF. Many are also hierarchical in organization (e.g., IEEE is a study group under ANSI).

It should be noted, however, that all these study groups, accredited committees, consortiums, testing entities, and coordinating bodies interact heavily in the development of global technical standards. For example, the IEEE Working Group responsible for developing a cable modem standard has recently incorporated much of a physical layer contribution from the MCNS LP industry group.

Importantly, it should be noted that standards groups focus on primary *requirements* for a particular technology, and avoid implementation-specific issues.

CABLE DATA STANDARD

For the delivery of data services over cable/HFC networks, the ANSI organization has designated the IEEE 802 Working Group to develop an international standard. (A formal Project Authorization (PA) issued by ANSI provides the authority and direction for the Working Group's effort.) This is the same standards body that developed the Ethernet/802.3, Token Ring/802.5, Logical Link Control/802.2, Spanning Tree/802.1d, and a host of other popular world-wide standards. For development of a standard to support cable modems and related head-end equipment required for delivery of high-speed data, voice, and video over cable/HFC networks, the IEEE formed a dedicated Working Group designated as the IEEE 802.14 WG.

The IEEE 802.14 WG is well attended with more than 90 voting members (as of 1-1-97). A variety of industries and disciplines are represented on the 802.14 committee including telecommunications equipment providers, inter-exchange carriers, utilities, academia, software companies, component providers (e.g., silicon chip developers), systems integrators, and consultants. The 802.14 standard has been under development for approximately the past two (2) years.

The IEEE 802.14 WG is focused on defining the Physical componentry (termed the PHY), media access control function (termed the MAC), layer service protocols and interfaces, message formats, management interfaces, relationships to other existing standards and recommendations, security provisions, and a variety of related topography

recommendations and other details required for a formal standard. The Working Group expects to produce a draft document of sufficient quality for external peer review and Letter Ballot in the summer of 1997.

WHY A STANDARD?

A well-defined standard enables a variety of benefits for a variety of entities. The primary benefits of such a standard are

- ubiquitous product application in standards-compliant environments (i.e., product interoperability),
- lower equipment costs due to standards-compliant componentry and volume,
- end-user mobility, and
- expanded product availability through distribution channels.

These benefits can be readily seen in the deployed information infrastructures of most commercial and institutional organizations and end-user environments. For example, there are upwards of a million or so Ethernet LAN implementations deployed globally, millions of Unix-based servers, countless personal computers running some version of Windows and its evolving forms, and millions of Hayes-Command Set compliant modems connecting these PCs to the Internet and other online services and corporate networks. These environments are rich in either formal or de facto standards-compliant equipment and services. It benefits of standardization have been well-demonstrated to date, and it is easy to understand how the IEEE 802.14 standard will benefit the cable/broadband network service provider industry.

Among the primary benefits listed above, however, the last bullet describing *"expanded product availability through distribution channels"*, introduces an interesting complexity into the data/Internet services deployment agenda for the cable/broadband network services industry. It also provides a good segway into the data/Internet services *planning in the shadow of a cable modem standard* thrust of this paper.

IMPLICATIONS OF A CABLE MODEM STANDARD FOR THE CABLE INDUSTRY

As has been the case with other industries deploying standards-based information and telecommunications infrastructure, the cable industry will no doubt enjoy all the benefits of standardization once a cable modem and related equipment standard matures and is supported by product vendors and the cable industry. The extent and timing of when these benefits will be realized is a function of many dynamics including

- manufacturing and volume economics associated with standardized components,
- equipment ramp-up schedules and production capacity of equipment vendors,
- cable operator deployment schedules, and
- market demand for cable's data service offerings.

However, there are at least two aspects of the arrival of a supported cable modem standard that warrant further examination. These are explored below.

THE SERVICE PORTAL PERSPECTIVE

As mentioned above, the expanded product availability benefit (through distribution channels), associated with the emergence of a cable modem standard, warrants further examination. It is not difficult to understand why, until recent years, the telephone industry preferred to "rent" their telephones to customers instead of supporting customer-owned telephones. By controlling the end-user service device, the telephone companies controlled the nature of the service being delivered. That the telephone companies (the old Bell system) held onto this control for so long is understandable. With the FCC's 1982 Carterfone decision and other related legislation (Computer II), this

control was obviated in the spirit of competitive benefits and service evolution.

The cable industry's entry into data/Internet services poses a similar decision with respect to control of the *service portal.* Absent any legislation to the contrary, the cable industry is free to determine the nature of the data services it offers on its systems, including the issue of *cable modem ownership.* It is not a trivial decision in that it impacts

- data service business models,
- data service pricing,
- data service portfolios and service classes,
- and business strategies.

In addition, when one considers the underlying historical factors behind the dominance of television as the entertainment and news medium of choice (e.g., user preference for audio *and video* vs *audio-only* for delivery of news and entertainment), it would appear that cable has an extraordinary opportunity to redefine the service portal for information services (away from telephone modems to cable modems/Internet appliances). This is due to the growing popularity and development of multimedia and multmodal applications (e.g., virtual reality and immersive data visualization enviroments) versus traditional text. The decision of cable modem ownership (e.g., provided by cable operators or user-owned through retail distribution) could significantly impact the cable industry's ability to take advantage of this strategic opportunity.

In a practical sense, the issue of cable modem ownership is further obscured by implications explored below.

BELLS AND WHISTLES

For all the benefits of technology standardization, the nature of competition and capitalism imposes a complex wrinkle into an otherwise straightforward environment.

Once a standard has been developed, formally approved, and is supported by equipment producers and consumers, product vendors nearly always add their own proprietary features to a standards-based product in order to create and enjoy some form of competitive advantage. These whistles and bells, as they are generally referred to, involve functionality generally considered "implementation specific" or are beyond what is considered to be core technical requirements, and hence, are not addressed in formal standards. This creates certain challenges to cable operators deploying data services in several areas. These challenges are best illustrated through examination of deployment scenarios very likely to emerge once a cable modem standard takes root in the industry.

Consider the scenario where CableCo A decides to offer high-speed Internet and other data services to its subscribers. For the sake of example only, let's assume that these services target residential-level subscribers only. This scenario occurs at a time after a cable modem standard has been adopted, and a variety of cable modem vendors offer products compliant with this standard. Let's further assume that each cable modem vendor has also incorporated special (non-standard, proprietary) features and functions it believes will positively differentiate its product offering.

Next, let's assume that CableCo A has opted to support subscriber-owned cable modems. Let's now make the assumption that CableCo A's available spectrum for data services is limited such that all data services will occupy the same forward and return channels.

Finally, let's assume that CableCo A has selected a standards-compliant cable modem preferred platform it believes will facilitate deployment of the highest value, most robust, most manageable, and most appealing data/Internet services. CableCo A expects to leverage certain custom features inherent in its platform choice that are unavailable with any

other cable modem platforms. (Adoption of a preferred cable modem platform by cable operators could be quite commonplace as they are compelled to maintain a service capability posture that will allow them to maintain service parity with, and hopefully, a competitive advantage over, the local telco down the street.) CableCo A has launched a respectable PR and advertising touting all the neat features and functions its service will offer. With this scenario in place, let's examine some of the issues CableCo A might encounter.

Since the local computer retailers distribute only standards-compliant modems, CableCo A is comfortable with its ability to accommodate all service requests regardless of the cable modem acquired by the subscriber. However, Joe Bithead, who didn't read the fine print on the televised ad for the services, enthusiastically subscribes to the data service, expecting to try out all those neat features as soon as possible. Joe Bithead runs right out to Computer City or other local retailer and buys the least expensive cable modem available. (Remember, they are all standards compliant.) CableCo A's first customer service call for its new data services is likely going to be Joe Bithead. Why? Because the virtual reality-oriented service that really caught Joe's eye to begin with, is only available via the preferred cable modem platform adopted by CableCo A.

The second customer service call is again from Joe Bithead. This occurred when Joe tried to connect his cable modem to his new Ethernet hub in order to connect his kid's older PC to the Internet. Joe didn't realize that multiple IP numbers are only available through the preferred platform (support for a single IP might be all the standard required).

So Joe Bithead, disillusioned and frustrated, returns his low-cost cable modem to the retailer, and exchanges it for the CableCo A preferred platform modem.

The third customer service call for the new data services is, again, from Joe Bithead. Joe is just a little irate since he still can't make the gee-whiz virtual environment application work on his PC. Again, Joe didn't read the fine print of the advertisement, and so didn't realize that this service was only available with the standard Client Kit CableCo A offers its customers. Joe assumed, since he'd been on the Internet for years via his dialup modem, that he'd have access to all the services he'd seen advertised. Joe further assumed, since he already had a Freeware copy of "*Gee Whiz*" that he'd been running for years, he could use it for the service. (Joe hadn't realized that, in order to leverage its superior network access capacity, CableCo A has contracted with a commercial software group to tweak the *Gee Whiz* package accordingly.)

As it turns out, Joe needed special TCP/IP stack software anyway that interacted appropriately with CableCo A's custom server stack in order to utilize the gee-whiz virtual reality application due to the need for specialized RSVP support passed on by the headend server due to some peculiar interaction required with the cable modem's headend equipment. Even worse, Joe Bithead hadn't noticed that he needed to acquire the more expensive service class offering as well in order to utilize the gee-whiz application.

The first customer service call for *CableCo B* is from Joe Bithead's friend Bob Supertechie. Bob had recently moved into the area, but into a different franchise area operated by CableCo B. Bob had listened to Joe's story, and went out to the same retailer to get his cable modem. Bob had carefully listed out all the components and service classes he needed from Joe to get the most from his new high-speed Internet service.

As it turns out, CableCo B had selected a different preferred cable modem platform than CableCo A. The ads were very similar, so Bob just assumed the related service environment was the same. After all, they're both cable companies, and support virtually identical programming lineups. So Bob exchanges his modem for the preferred one, and is once again

dismayed because he can't interact with Joe in the *Gee Whiz* virtual reality environment. As it turns out, CableCo A offers this application only as a local service to cable modem users; it did not have a sufficient Internet feed capacity to support the bandwidth requirements of an Internet-based *Gee Whiz* application. Unfortunately, neither Joe nor Bob, nor CableCo A, nor Cable B, realize that even had both subscribers done everything right to begin with (and both CableCo's supported the Internet-based version of "*Gee Whiz* virtual reality") Joe and Bob would still have been ultimately frustrated when Joe discovered that he didn't have enough RAM in his PC to support "*Gee Whiz*", and Bob's Client Kit-provided TCP/IP stack wouldn't support the application until the next release currently scheduled for late summer.

SO WHAT'S THE POINT?

A better question is "what are the points"? One key point is that, although the above scenario is purely hypothetical, it is not beyond the realm of what cable operators can expect to deal with if they intend to be serious data/Internet services players.

A second major point is the coordination among distributors of cable modems, and cable operators providing data services, that will be required to prevent much of the confusion illustrated in our scenario. (Retailers are not accustomed to asking customers what cable franchise they reside in, nor are they used to providing custom Client Kits consistent with customer addresses.

A third crucial point is that the cable modem ownership issue is a key factor in this situation, at least until such time that cable-based data service delivery matures to the point of blending into the background telecom-munications infrastructure. (Cableco-provided cable modems and client kits equate to a more controllable service delivery environment that is more easily managed and supported, and translates into fewer customer surprises.) It may make sense, if supported by service provisioning economics, for cable operators to retain control of the cable modem (at least in the near term).

A fourth critical point is the risk of relying on custom (non-standard) product features as a basis of the service portfolio and related competitive advantages. Competitive dynamics in high-speed data services may leave cable operators little choice but to take his risk. Given solutions to the issues shown in our scenario may lessen this risk significantly.

Finally, it is clear from our hypothetical scenario above that customer expectations need to be very well managed. This requirement is inconsistent with traditional entertainment service models as most subscribers expect and receive television programming; the complexity of what is being delivered has not warranted special attention in this area other than in service packaging.

CONCLUSIONS

This brings us back to the cable modem standard, and the data/Internet service planning occurring as the standard-making effort is progressing. Probably the most critical point to be made from our scenario exercise above is that the emergence and support of a cable modem standard does not eliminate the cable operator's need to be diligent in all the related areas of providing a data/Internet service. (Engaging a reputable, and importantly, *cable-experienced* systems integrator or similar partner may be a wise move to facilitate service planning and deployment.) As market forces now suggest, the only thing riding on the cable industry's data/Internet services agenda is the continued and future viability of the cable industry

So what about the modems available *now*, and the anticipated standard most won't be compatible with in the future? The alternatives are few:

1. Delay entry into the data/Internet services space (while managing market perceptions of your intent, and no doubt missing significant near-term opportunity

2. Limit deployment to selected controllable subscriber areas, and leverage the experience to enhance, acquire, and align internal capabilities as necessary to support these advanced services

3. Acquire "soft" modems that can be upgraded in the field to support the standard (let the author know if you find any where its manufacturer is willing to commit to this on paper)

4. Wait until the standard is approved, and standards-compliant products are available, before deploying.

Alternative 2 above, augmented by a well-conceived and well-managed PR campaign (e.g., tell the market what your doing in order to serve their needs best), seems a viable choice for the moment.

SUMMARY

This paper has tried to illuminate some of the underlying and important issues associated with data/Internet service planning and deployment in the shadow of a cable modem standard. It by no means pretends to offer a definitive assessment of these complexities, but does attempt to identify the nature of those complexities, and potential problems associated with them, as place-holder for further examination and research by cable operators.

The primary message this paper hopes to deliver to the cable community is that the emergence of a cable modem standard represents more of a beginning, than a culmination of something long awaited. While the standard will certainly enable the benefits discussed herein for the industry, this paper has attempted to show that the realization of some of these benefits may have ramifications on business issues and strategies that are not readily apparent to the unsuspecting.

Cable modems are but one aspect of successfully provisioning sophisticated high-speed data/Internet services. Fortunately, there is an emerging cable modem standard that should enable many of the anticipated benefits, and many of the other functions and services required for high-speed data services delivery already abide by various formal and de facto standards. In addition there are specialized resources available that can help cable move forward with its data/Internet services agenda.

However, many of the most exciting aspects of high-speed data/Internet services involve freshly-charted territory the standards process has yet to embrace, and perhaps never will. In addition, much of the market's attraction to the Internet has to do with its constantly changing capabilities and the dynamically-evolving information frontier it represents. A cable modem standard is a significant step forward and should be viewed as such. It will not, however, obviate cable's need to embrace all the other business and technical aspects of high-speed data services. The emerging cable modem standard should be viewed initially for what it truly represents: an acknowledgment by the traditional technical standards-making bodies that cable has arrived on the data/Internet services scene, and is going to be a player.