



How Broadband Products Get Stifled By Standards

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For several years, broadband service providers have supported the notion of shifting the responsibility for purchasing DSL/Cable modems, set-top-boxes, and other equipment to their subscribers. These “retail initiatives” have significant backing due to the multi-faceted cost savings they evoke. But the initiatives have yet to flourish. The reality is that the forces working against such changes must be overcome before hungry consumer electronics companies can seize a profitable new market.

The promise of prosperity yet to materialize

One good example of a struggling retail initiative is the Data Over Cable Service Interface Specification (DOCSIS) cable modem. In 1999, more than 200 DOCSIS cable modem products were actively pursuing certification from CableLabs. Many of these products were being developed by startup companies looking to go well beyond the “minimum specification.” These firms were out to create unique, innovative features to differentiate themselves from the competition and entice consumers and service providers to buy them. At that time, with the emerging worldwide cable modem market around 100 million units and the current pricing of legacy modems in the \$200-300 range, any piece of that market seemed like a gold mine. This was one of the most exciting times ever to have been associated with the Cable industry. Nearly anything seemed possible, and in looking through these lenses, the competition didn’t stand a chance.

Startups were purchasing nascent DOCSIS frameworks (also called reference platforms) from chip vendors

such as Broadcom and hardware vendors such as Cisco that could be used to jump-start their product development activities. However, the realities were that these reference platforms were only a framework for DOCSIS development. Quite a number of things would still need to be developed including additional firmware and even some hardware that had to be designed and added in order to produce a product that would certify. One of the first burnouts in the pursuit of DOCSIS certification was not a startup but one of the largest consumer electronics companies in the world Sony. The company easily had the sleekest, most promising looking cable modem among all the vendors pursuing their first DOCSIS certification. Sony even had salespeople pounding the pavement trying to line up large orders for these gorgeous devices. Perhaps the problem was that they spent more time on the design of the case than ever making the product compliant and ended up dropping out of the cable modem business early. Unfortunately, the other startups and cable modem companies still diligently working towards certification looked at this event as a positive sign rather than an omen.

The original intent of DOCSIS was to create a standards-based architecture for certifying vendors supplying hardware to the cable industry. Although vendors participated in the development of this standard, the preferences and directives given by cable operators placed an array of restrictions on how cable modems could operate and get provisioned, thus limiting the scope of creativity and innovation possible by any one vendor. For example, the initial DOCSIS specification only briefly covers an area called “vendor

extensions.” Of great potential significance, vendor extensions never got the attention it deserved. As a result, all the cable modem vendors with wide aspirations of being unique were forced to comply with narrow specifications that restricted modems to a single purpose data services. The only differentials were that some cable modem vendors offered multiple connection options to the subscriber’s personal computer for example; Universal Serial Bus (USB) along with 10bT Ethernet while others offered varied enclosures.

Today, only a small fraction of the original 200+ cable modem products remain on the market. Interestingly, while these products have noticeably improved, the core functionality remains the same. The specification for DOCSIS cable modems essentially prohibits these devices from being much more than greatly simplified connectivity mechanisms for cable’s data service. This functionality is a far cry from the expectations and promises vendors originally sought in obtaining DOCSIS certification. From a retail and competitive perspective, why would a hardware vendor want to build a device under such strict operational guidelines and severe limitations? What happened to the innovation and creativity of the late 90s along with the promise of the dominating future? The answer lies within two key deficiencies of the DOCSIS offering: vendor extensions and OSS.

Vendor extensions as an afterthought

Unlike vendor-driven open specifications submitted to the Internet Engineering Task Force (IETF), the DOCSIS specification was developed “in-house” by cable companies with

the “assistance” of interested vendors at CableLabs. An organization nearly 100 percent funded by cable companies, CableLabs represents the industry’s privately controlled standards body. The initial goal of DOCSIS was to develop a specification that would allow cable operators to mix and match cable modem products that they deploy. But the retail implications of this approach were dismissed as a side-benefit rather than anything the cable operators or the participating vendors specifically were tasked to engineer into the original specification. Clearly, had the broadband modem been designed primarily by the consumer electronics industry, there would have been little operational difference between the DSL modem and the cable modem, at least from a provisioning and OSS perspective.

My personal preference as a consumer would be to obtain a broadband modem capable of receiving service

from DSL, Cable, or any combination of providers with nothing required from a service provider besides a smart card, a username/password, or some similar feature to enable my service. Today, enormous time and effort has gone into over-engineering the electronics, security, and other areas of broadband modems. The resulting device is too expensive for the broadband service providers to deploy, the margins on the devices are too low to justify the added functionality, or there just is no room within the specification for vendors to innovate or be unique. That is one of the major limitations between in house-developed specifications and those developed more openly. There is something to be said about the slower speed at which more open specifications evolved, as compared to those championed by stakeholders. Collaboration gives rise to a more diverse functionality that goes beyond the minimum requirements. Again,

the consumer electronics industry is all about innovation, customer convenience, and volume sales.

OSS that only speaks common language

In developing hardware that must be activated in the field, a top priority is that it first be compliant with the relevant standards and specifications. Closely behind this requirement is the ability for remote software activation, followed by support for automatic provisioning (or auto provisioning). Having a product that complies with standards is useless if the service provider (or consumer) looking to purchase this equipment cannot easily provision it. Provisioning dissimilar Customer Premise Equipment (CPE) devices has generally followed a “least common denominator” approach. Using the Least Common Denominator (LCD) approach, OSS vendors survey the list of CPEs used by service providers

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and determine the minimum required communication set (provisioning commands, functions, capabilities, etc.) that would enable all CPEs to be activated. A generic command set is then built from this minimized LCD communications set. Note that in using this method an OSS vendor

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builds a knowledge base of the CPEs with which it has integrated. Thus any new deployment generally only has to worry about new CPEs. Another way of saying this is that OSS seeks to simplify the task of provisioning all the different types of CPEs, and to do this it only uses the command set common to all CPEs rather than treating each CPE separately. If OSS could treat each CPE uniquely, it would allow the service provider, the consumer electronics industry, and the consumer to exploit the complete functionality set of the CPE. While this is what the consumer electronics industry has been waiting for, a number of factors stand in the way of any OSS vendor achieving this anytime soon.

Service provider must push standards bodies

One of the most common methods of achieving multi-vendor CPE interoperability among OSS companies is the use of an adapter (also called “a wrapper” or “an abstraction layer”). An adapter allows OSS vendors to mask their minimized LCD communications set by exposing only those functions required to interface with a specific type of CPE. Within the adapter at least two things happen. First, each required CPE-specific command is mapped to its associated OSS-minimized LCD communications set. Second, the communications with the CPE are programmed, so whether the CPE uses SSH, SNMP, Telnet, etc. the adapter can perform the neces-

sary communications to facilitate the required commands. This technology has been around for quite a number of years so it is proven, reliable, and well accepted. So what is wrong with using an adapter you ask? The answer lies within the use of a minimized LCD communications set.

The minimized LCD communications set only contains the minimal commands needed to accomplish provisioning of the specific services that the OSS is geared to support. Meaning, that if the OSS did not support the setup of VPN the minimized LCD communications set would not contain those features and neither would the adapter. When OSS is designed around using a minimized LCD communications set it is pretty much limited from the start and from a retail or consumer electronics industry perspective, this is the last nail in the coffin.

Reversing this direction is a mammoth task for the OSS vendor as the minimized LCD communications set forms the basis around which the software is built. If you change this to allow each CPE to be defined uniquely, or better yet, discovered and built dynamically, the resulting minimized LCD communications set must be completely abandoned in favor of a massive hybrid communications set. Such a hybrid communications set must be capable of permitting service providers to exploit all CPE uniqueness without manually building, testing, and deploying new adapters each time a new CPE becomes available at retail. This goes against the grain of how today’s OSS products have been developed. OSS only supports the services currently being offered by service providers, so unless a service provider has thought of it and expressed a need for such functionality, it pretty much will not exist within the OSS feature

set. It is pretty tough for CPE vendors to avoid playing inside this sand box and still keep their products selling into service providers. Clearly the way this model works is, service providers define the services, CPE vendors support the functionality, and OSS does its best to make it all work. In reality, all three parties should be free to innovate independently with the necessary assumption that OSS must still make everything plug-n-play once it all comes together. The key here is that the OSS vendor must not be the gating factor to support new services. While they may be the platform that drives these services, development should not be required in all cases. The need to always go back to development to support new equipment, features, or business lines is the key design flaw in any OSS vendor’s product today.

Next-generation OSS vendor products must/will rise above these limitations and promote unencumbered service creation. Not the lame service creation we see today where you can merely change different speeds or combine existing components of various services into new packages or offerings, but rather new services comprised of new components that were not part of the original feature set of the OSS system at the time of the purchase. Service providers not achieving this level of OSS capability must champion the drive for better, more open, and more flexible OSS as well as involve an organization outside of privately funded standards organizations to ensure the greatest possible interoperability is achieved. Only then will you see consumer electronics companies start to re-engage with this market and create innovative products that will again capture the imagination of a public that just wants to be dazzled. After eight years, don’t you think we should have more than these simplistic broadband data services? ■

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