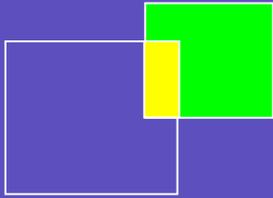


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Enabling Content Services

A Service Provider Perspective

Prepared for: BCD Forum

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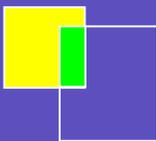
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Introduction

Broadband service providers (BSPs) – particularly telephone companies offering DSL services – are faced with a dilemma. While their broadband (chiefly DSL) services are still gaining new customers, they realize that in order to expand their broadband services to a true “mass market” audience, and to realize the revenues and margins that their business plans require, they must begin to offer a range of attractive-to-consumers value-added services.

Simply providing a “pipe” to the Internet is not enough –particularly when competitors (such as cable MSOs) are offering a wider range of voice, video and data services.

At the same time, these BSPs realize that most of the value-added services that are attractive to their customers are *content-based* services, such as video-on-demand, music services, and online gaming – services that are far from the traditional core competencies of BSPs that have long been focused on building networks and offering voice and data services. Many BSPs are now facing a market requirement to offer services that they have neither the experience nor the expertise to provide.

TeleChoice’s Survey

In order to identify the “pain points” associated with content-based services, TeleChoice conducted a series of interviews with broadband service providers, discussing their plans for and concerns regarding their launch. Among the topics discussed were the following:

- ✓ Plans for content-based services, including market focus and the types of services planned (or already being offered)
- ✓ Reasons for not pursuing these services, if they weren’t currently on the radar screen
- ✓ Technical and business concerns relating to content-based services
 - Bandwidth
 - QoS
 - Emerging access technologies
 - Back office systems
 - Content ownership/management
 - In-home distribution

TeleChoice selected a number of service providers that in total represented the main applications being considered for product introduction by BSPs. TeleChoice wanted to

cover video services, gaming, software services and audio services – the main near-term applications being discussed by BSPs in North America. All the interviews were conducted with North American providers with focus in one or more of these areas, who asked to remain anonymous and therefore are not identified in this white paper.

The goal of this survey was to provide added intelligence to service providers going through the content-based services product launch cycle, and to share some lessons learned from those who have gone through the process themselves. This white paper summarizes this research; more detail is available from TeleChoice.

Plans for Content-Based Services

Most of the BSPs in the market are in the early stages of launching content-based services. All of the BSPs interviewed by TeleChoice stated that they *did* have plans for content-based services during the next twelve months – only two of the BSPs were already offering some of these services (both were offering cable TV replacement video services). The majority of the BSPs interviewed were focused on residential customers for these services, with business services launching as follow-on services from the residential services, and one was developing services predominantly and exclusively for business broadband customers (its primary market segment). Several of the BSPs who were primarily focused on residential services were all planning on also offering these services to businesses, but not as a primary focus – instead they were considering repackaging their consumer services (particularly video services) as businesses offers without any extensive changes in the service.

Specific content-based service offers and plans being pursued by the interviewed providers are detailed below:

✓ **Video Services:**

- One provider is currently offering broadcast and Video on Demand (VoD) services, and is also evaluating IP streaming video solutions to provide services such as retransmission of local broadcast TV content.
- Another provider (also a local cable TV operator) has already launched broadcast TV, VoD, and traditional Pay per View (PPV). Additionally they are in the process of launching portal-based Web services, offering content (for example, Weather.com) specially formatted for viewing/interaction on a TV screen.
- Another provider is also offering broadcast video services and VoD services based upon broadcast content.

- ✓ **Online Games:** Online game services drew some mixed responses from the BSPs interviewed. One provider is currently offering such services, and another has installed game servers in their network to evaluate these services – but has not yet determined a way to monetize them. Another provider has experimented with

game services in the past, but has had limited success and is not currently considering the addition of online games to its services portfolio.

- ✓ **Audio Services:** Several of the providers interviewed are offering some audio services – typically similar to the “digital radio” services offered by cable and satellite TV providers. None are yet offering any kind of on-demand audio services (like those offered by Listen.com or MusicMatch), nor did any express near-term plans for such services.
- ✓ **Software as a Service/Hosted Applications:** The business-focused provider expressed an interest in developing a variety of hosted application services, focused on vertical market segments. One of the regional players also indicated future intentions for software services, and is currently developing internal systems to support this service, but has not yet developed a business plan for such services.

The services are typically offered in bundled pricing packages along with the provider’s broadband access services. In most cases, video services are being offered with a pricing model similar to that used by cable or satellite TV providers – a basic service bundle and then additional tiers of premium channels. VoD services are offered on a pay-as-you go model. At this point the charging models for additional services such as online games and software haven’t been fully worked, although the expectation is that they will be included in monthly subscription type of service package.

Issues Holding Back Deployments

While some providers have launched some content-based services, most had not due to specific issues holding up implementation of their plans.

One provider summed up issues echoed by several providers: its basic broadband services deployment were “its primary focus in the broadband arena today”, and any value-added services “would have to wait until the resolution of more basic issues.” The basic issues still focused on the performance and scalability of simple DSL options. This response echoes a broader issue with content-based and value-added services in general – the fact that a BSP needs to have its baseline broadband services in good order before moving up the food chain. Given the issues that the initial DSL deployments of service providers ran into, it isn’t surprising that these providers are only now – five years later – moving in earnest into the content-based services arena.

Another issue mentioned by BSPs was a simple matter of time and internal focus. For example, one provider is currently performing a network overhaul (moving from an ATM network to a fiber-based IP network), and says that this effort is diverting internal resources away from development of online games and other services. This issue was a common one among the smaller of the providers that TeleChoice interviewed, and may point to a need for vendors to include a range of professional services (e.g. network design, business case development, integration and marketing services) to help these deployments along.

One provider mentioned issues with pricing and tariffs for these services. As a regulated telco, this provider had issues understanding how to tariff its video-only services (offered as an alternative to the standard video and high-speed Internet bundle). Universally, service providers TeleChoice has spoken with have expressed concerns about the regulatory issues relating to their advanced services, particularly in comparison to the regulation faced by cable and other providers. Again, this is an area where more packaged knowledge is required to accelerate the learning and deployment process.

Technical and Business Concerns

TeleChoice asked the BSPs we interviewed to discuss their concerns regarding a number of technical and business-related issues. The results of these answers are summarized in the following sections.

Bandwidth and Bandwidth Policy Management

The conventional wisdom is that copper-dependent telcos, at least in North America (with its longer loop lengths), are always at a disadvantage when it comes to providing sufficient bandwidth to the customer. Our interviewees told us that bandwidth is indeed an issue – for the BSPs offering video services – but that this was not an overwhelming issue.

Comments about bandwidth were quite varied. As an example, two of the BSPs interviewed did not see bandwidth as an issue at all. The business-oriented BSP felt that its current bandwidth was sufficient for any of the hosted application services it is considering offering, and further felt that policy management was not required for its customer base. One regional operator – which is moving many of its customers onto a fiber-to-the-home network, said that its current and planned services would easily fit into its access bandwidth (10 Mbps data connections and separate digital video). This provider said that their network architecture provides “a lot more bandwidth than we need”.

Another provider, with more modest bandwidth availability (typically 1 Mbps), is working to widen the availability of higher bandwidth services over the next five years, and is also implementing systems to provide bandwidth policy management systems that can provide guaranteed bandwidth on a per-application basis.

Other providers shared similar themes to the above. Bandwidth, if it is an issue, is being dealt with in core network design, but in and of themselves bandwidth limitations are not reasons to avoid deploying value-added content-based services.

The satisfaction with current bandwidth availability was not universal, however. One provider is able to reach a large number of its customers with high bandwidth services, but not as many as it would like. Their commitment to video services has this provider currently investigating higher bandwidth solutions – “Bandwidth is like sugar. The more you get the more you want” was the sentiment of this company.

This BSP requires 6.8 Mbps for single set top box installations, and 7.9 Mbps for dual set top box installs, and can currently only provide this higher bandwidth to about 50% of its video customers. Another 25% of potential video customers desire the two set top installation (which can provide two independent simultaneous video streams to the home), but are unable to get it due to insufficient bandwidth. This BSP is actively investigating both enhanced access technologies and improved encoding systems (such as MPEG4) to improve its video footprint, as many households in its serving area (and nationally) will not find a single video stream adequate.

In terms of bandwidth policy management, this same provider currently uses an ATM network core that allows them to adequately assign bandwidth to applications, but is considering a move to an IP-based network platform. This provider is comfortable with the bandwidth policy management that its potential IP platform vendors can offer, but is concerned about the need to upgrade or replace core IP routers that would be required to offer this bandwidth guarantee end-to-end. In the end, this provider will only make this investment if the IP platform also increases its effective bandwidth to the customer.

New Access Technologies

The providers we spoke with were nearly universally interested in new access technologies. Most were not wedded primarily to a fiber-based or a copper based infrastructure in the future, but were examining a range of options including fiber, copper, hybrid and even wireless access solutions.

One large player said that it was actively planning this year for access network upgrades to be conducted next year, and was tending towards a mix of fiber and copper in its network. FSAN (Full Service Access Network) PON (Passive Optical Network) solutions "look promising" to this provider, but this carrier also believes that copper solutions (such as new DSL variants) were also going to mature over time and will continue to meet their needs. Others felt installation of fiber-based solutions were still 3-5 years out.

One regional player we spoke with is actively examining ADSL+/2/2+ technologies (which can provide downstream bandwidths of up to 20 Mbps), mainly for its ability to support video services, but says that access equipment vendors will need to "prove" the case for this new technology before they will adopt it. Another large player found these technologies promising to extend the reach of their existing DSL deployment. This provider also stated that it would only consider adopting this technology if it was a simple upgrade to existing DSL equipment – firmware and line card upgrades, not a "forklift" upgrade of DSL equipment that may not have been fully "paid for" yet. This provider has also already completed a fiber-to-the-neighborhood deployment by upgrading all of its DLCs to fiber fed models.

None of the providers we spoke with were considering VDSL solutions – although it should be stated that none was primarily focused on the dense urban markets where such a solution would make the most sense from an economic deployment viewpoint.

Wireless solutions were still being tested for applicability in the access market. For business applications, there are ample fixed wireless solutions to provide basic voice and data backhaul, providers say. But for video services, not much is out there to compete with fiber or copper solutions. One BSP specifically noted that it was "very interested" in a wireless solution with sufficient bandwidth and low enough latency to provide video

services for customers out of reach of its copper-based services, but has yet to find such a solution on the market.

Quality of Service (QoS)

The ability to ensure QoS is obviously a major concern for content-based services – particularly for video services, but also for less bandwidth-intensive services like online games, where the amount of data being transferred is relatively low, but where network latency can severely degrade the game experience (in other words, the high latency players tend to lose). Each of the providers we spoke with has spent a considerable amount of time and effort developing and implementing QoS mechanisms for their networks.

QoS was not – in any of the providers we spoke with – a major issue or critical path item for their development of content-based services. Some of the providers we spoke with did, however, mention some issues regarding their current QoS implementations.

One large player felt that its current systems gave them a good handle on the issue of QoS in the downstream (towards the customer) direction. Their system can handle the demands of video services and other advanced services in their current and future portfolios. On the upstream side, however, their current systems are inadequate. This provider feels that as more symmetric bandwidth services are deployed, and as more applications require this upstream QoS (for example, the game service mentioned above) it will need to upgrade its system. This upstream QoS will require upgrades at the customer demarcation point, and may be solved by the deployment of more advanced integrated access devices or residential gateways.

As mentioned in the bandwidth section above, another provider – currently evaluating a move from an ATM to an IP core – is facing a capital expenditure issue revolving around QoS. This provider is confident that IP *can* provide the QoS (and bandwidth policy management) that it requires, but feels it will need to make a sufficient upgrade in some of its existing core IP routing equipment to enable true end-to-end QoS.

Back Office Systems

There was a diversity of opinion regarding the ability of current back office systems to support content-based services – perhaps reflecting some of the widely diverse approaches the providers we spoke with have taken in developing their back offices.

For example, one provider actually acquired a smaller competitive provider's assets not only for its customer base and network assets, but also for that provider's home-built back office system which provides automated "no touch" service provisioning, billing and management. This particular provider felt confident with this existing back office system.

Another provider – which does not currently have back office systems in place to support its planned content-based services – said that it was confident that it could quickly support these systems with internal resources.

Still yet another provider felt that its back office support systems were adequate for the services they are providing, but not perfect. This carrier has been working with its video

middleware and billing systems vendors to support a greater degree of integration – as the carrier must currently perform some manual intervention to properly bill video customers each month.

Other providers interviewed filled out all areas of the spectrum. In short, because back office systems are unique to each provider, each one will be in a different position relative to content-based systems. Perhaps not surprisingly, the carriers discussed above (with no major issues concerning their back office) were mainly on the smaller side of the spectrum. The larger the provider, the greater the concern about the scale and scope of its back office systems – mainly revolving around the sheer number of systems that must be utilized in their network. One carrier's current broadcast video back office system requires over 140 separate systems, and as this carrier moves towards a native Layer 3 IP delivery of applications and services, it feels it will need an entirely new Greenfield back office system. This carrier, like other large carriers, would like to find a way to simplify and unify its back office – particularly as the number of potential content provider partners connecting to its network increases. Standardization and simplification of interfaces between the carrier, content providers and customers are a big priority for this carrier.

Content Distribution and Management

None of the BSPs we spoke with expressed interest in "owning" or directly managing most of the content that they offer (or will offer) their customers. While some of the companies we spoke with are pursuing individual licenses (directly with content owners) for small segments of their content, most of the content these companies offer is being provided through 3rd party content aggregators.

In the video and audio arenas, content aggregators are the rule amongst the carriers we spoke with. The biggest issue faced by the smaller providers we interviewed concerned their ability to obtain reasonable pricing of this entertainment content. Even using group buying power (one carrier obtains video through the National Cable Television Cooperative, or NCTC), these smaller carriers feel that their pricing for content is still considerably higher than that offered to the largest television providers. This is a particularly difficult issue when the small BSP is faced with competition from a local cable operator affiliated with a national MSO like Time Warner, Cox or Comcast. Particularly in the video world, content expenses are a very high percentage of overall operating costs, and even a small price disadvantage makes a difference to a small provider trying to gain customers for a newly launched video service.

The BSPs offering video also mentioned the fact that they are often forced into package deals that bundle several channels together – including channels they did not plan on offering. In effect, these providers say that they are required to purchase channels they don't want in order to get ones that they do wish to offer to their customers.

Beyond this problem, surveyed carriers also told us that they have some serious concerns about the rate of price increases in the video content world. One carrier told us that its video content pricing is increasing at a rate of 5% to 7% a year – well above the general rate of inflation.

In the online games arena, the problem is simpler (and perhaps more difficult to the providers) – there simply aren't enough aggregators for game content. The online game

industry is relatively fragmented – there are both console (e.g. PlayStation) and PC-based games, and online game services are offered by many different parties (the console vendors, the game software developers, 3rd party game hosting services). This results in a case of “uncharted waters”; the providers we spoke with are investigating and researching the market, but simply don’t know where to turn to provide a game service that would reach a large number of their customers without requiring the carrier to make multiple deals with multiple content owners.

The business-focused provider we spoke with – which is not currently considering any of the entertainment content discussed above – is taking a “hands off” approach to content. This carrier is researching the needs of the various vertical market segments in its customer base, and will then approach owners of existing content that meets these needs. This carrier will not own or manage content directly.

As an interesting aside, one Canadian telco we spoke with mentioned the CRTC (Canadian Radio-Television and Telecommunications Commission) Content Creation Fund. This fund requires contributions for distribution of programming content to fund local development of Canadian-based programming. What’s interesting about this fund is to see the companies who distribute the content helping the developers to have the means to spend time developing content prior to a specific market request for such content. This will allow the developers to be freer with their creativity and hopefully everyone will win in the end.

One item that can’t be overlooked when discussing content is the topic of Digital Rights Management (DRM). Many of the BSPs expressed concern regarding their legal liabilities related to the distribution of content and not being put in a position of responsibility for the safety of the content they are distributing. Until this is resolved in an industry-wide fashion, we believe you may see some hesitation regarding mass deployment of content-based services.

In-home Distribution

Home networking has been a mantra for many broadband service providers in the past. Many telcos deploying DSL have also partnered with a gateway provider to try to meet the in-home distribution requirements for customers, using technologies like HPNA, HomePlug and wireless distribution. Indeed, one of the providers we spoke with does currently perform installations of broadband routers for its DSL customers (and will also provide in-home wiring for these routers as a standard tariffed service).

Of the providers interviewed who were not actively pursuing in-home (or in-office, in the case of the business-focused provider) distribution systems or home networking services, many were actively planning to do so. What emerged from interviews was a desire for more sophisticated home networking options that expanded the range of services that a carrier can provide – such as monitoring services to each jack. One provider mentioned that home networks were the “greatest unmet demand” of their customer base, and that it was planning on offering both wired and wireless home networking installation services for its customers in the next few months. This provider feels that as its portfolio of IP services expands, a proper in-home distribution system will enhance value to customers and increase service take rates.

Each of the carriers we spoke with that offer video services performs in-home installations of video set top boxes and related wiring. The providers feel that, given current technology, this truck roll is required and provides them an opportunity to ensure quality of service – none felt that self installation of video equipment was in their near term plans.

Other Observations

A few other common concerns were raised by the service providers that TeleChoice interviewed – one technical, and the others relating to the business side of the content services equation.

On the technical side, a concern that was voiced was the current focus of broadband equipment vendors on low cost, low capability products. One carrier believes that today's DSLAM and related equipment vendors are too focused on commodity pricing and are not delivering products that are truly capable of providing more advanced Layer 3 services.

This concern is worthy of consideration by those in the marketplace. Value-added services will require enhanced functionality to ensure a quality user experience. Without a quality user experience, users will continue to utilize Cable TV-based solutions that provide a known experience.

On the business side, a couple of issues were raised:

- ✓ As mentioned in the content management section, pricing for entertainment services is particularly high for the smaller telcos who are, in many cases, leading the way in the content-based services field. Even establishing business relationships with entertainment content owners is difficult for smaller BSPs – the big content owners don't even want to talk to a telco with only 10,000 or so lines. These telcos are actively seeking industry groups, consortiums or other entities that can help them compete with their larger competitors in acquiring and affording entertainment content.
- ✓ Carriers of all sizes are also looking to the vendors that support them for some clarity and assistance in understanding the "big picture" of broadband content. Fitting the pieces together – understanding not only the technical, but also the marketing and organizational issues that content services bring to the table is a need. Carriers are looking to industry organizations and vendor professional services organizations to help them create not just the service infrastructure, but rather the whole soup-to-nuts service (i.e., the infrastructure, the content itself, back office support systems and a marketing and sales plan for getting this content out to customers).

Conclusions

Broadband service providers "get it". They understand that to be competitive and successful they need to offer content-based services to their customers. Many service providers are already well along the way in their transformation from simple "dump pipe"

providers – particularly smaller providers that, by benefit of their relative nimbleness and due to the great threat they face from larger competitors, have moved aggressively into video and other entertainment services.

One of the greatest issues that faces these providers – particularly telephone companies using a legacy copper PSTN architecture – is finding enough bandwidth in their networks to offer bit-heavy services like video. This issue has been by no means totally solved, but the telcos we spoke with have all expressed comfort with their approaches to the issue – whether they are moving to fiber-to-the-home, upgrading their DSL architecture, or even exploring completely different solutions like broadband wireless.

Beyond bandwidth, the biggest technical issues these carriers are facing (and in some cases, comfortably solving) revolve around the delivery of this content in high quality manner. While smaller carriers feel relatively confident of their ability to assure that sufficient QoS metrics are maintained in their networks, larger carriers have concerns about the ability of their existing systems to scale properly and provide a manageable means of assuring QoS for large amounts of content being delivered to many customers from many content owners.

Bigger issues concern the content itself – how carriers obtain and manage it, and how the overall process of content delivery fits into the core competencies and regulatory realities that they face. Small carriers feel that they don't have the presence in the market to obtain good prices for entertainment – or even to get in the door of large content owners and obtain the content at all!

Additionally, the carriers we spoke with need assistance beyond just the technical “how do I do it”, and into the business “how do we profit from and sell it” realm.

Taken as a group, none of these represent real major hurdles to deployment today. Service providers are reliably and competitively deploying content-based services in their networks. The path to greater profitability for them is often a matter of reducing their costs, like acquiring content and avoiding truck rolls where they can, and launching value-added services on top of these content-based services; e.g. by offering with home networking options.