Cost Optimizing Triple Play Roll Out:
The Advantages of Broadband Amplifiers vs. DSLAM Extension

The Problem

Worldwide, the investment in DSL technologies is huge….and operators understandably would like to keep using those assets wherever possible. But that is becoming more of a challenge as residential broadband users demand and more fully utilize triple play services. More bandwidth is required, and not just for those customers that are easiest to reach…because high speed broadband access is also quickly becoming recognized by governments for its value in terms of economic competitiveness and national strategic importance.

Potential Solutions

One strategy for getting more bandwidth out to residential customers is fiber to the home (FTTH). But deployment of FTTH solutions has not widely gained the very strong momentum that had once been expected for it by now for one simple reason. The cost of running fiber all the way to the residence is simply too high. As a result, FTTH deployments have been most successful in countries where they were driven primarily by government investment. By contrast, in countries where these builds had to be justified by commercial success, the roll outs often have not lived up to expectations due to cost and capital limitations, and because this strategy has proven most applicable in only more dense areas of population.

Fiber to the Curb (FTTC) alleviates part of this problem. By running fiber almost to the residence and placing smaller, less expensive mini DSLAMs out closer to the customer, the distance over which the DSL signal must be propagated is greatly reduced and bandwidth is increased.

But this strategy of using smaller "low cost" DSLAMs is not really very inexpensive at all! The fully loaded costs of those mini DSLAM ports in DSLAMs that are to be located very close to neighborhoods can actually be high. This is particularly true when you consider that mini DSLAM ports are somewhat more expensive, and that there are also costs due to site acquisition, for a new cabinet (or possibly vault or pole), for that cabinet or other housing, to trench fiber for backhaul, and for all the engineering required. From a total cost of ownership perspective, the CapEx and OpEx can add up quickly…. and the business case can go from long ROI to suboptimal to completely nonexistent when trying to use this strategy to cover sparsely populated areas with mini DSLAMs. In fact, due to the high total cost of ownership and very long ROI many operators do not even try to utilize very small 24-port DSLAMs

The Promise of VDSL and Vectoring

Many service operators have been looking to migrate from ADSLx to VDSL2 technologies to gain additional bandwidth for a) offering triple play services to more customers and b) to meet universal coverage objectives. That may help customers within 1600 meters or so of the DSLAM. But the distance limitations of VDSL2 make it only a partial solution for a fraction of customers.

Nonetheless, being able to reuse part of the huge installed base of DSLAMs and all the copper plant is extremely attractive. And that is why VDSL2 with vectoring has gained so much attention, and why many operators (including those operators in many countries in Europe that were more typically CO-based) have been contemplating the desirability of rolling out cabinets and pushing DSLAMs out much closer to customers.

The fraction of customers that can be served definitely gets a bit larger if you use vectoring to enhance VDSL2's performance. But even with vectoring, VDSL2's distance limitations still mandate that operators will frequently have to deploy many more DSLAMs of a smaller size relatively close to customers if they are to successfully use VDSL2 for a significant portion of the population.

But operators deploying VDSL2 with vectoring will still have to bear the high costs associated with placing new mini DSLAMs out closer to the many customers that will still be too far away to get VDSL2-based triple play services. And this strategy still suffers from the inefficiencies of using mini DSLAMs, and does absolutely nothing to create a strong business case for serving customers that reside in less densely populated areas.

A Better Way

What service operators really wish they had was a larger Customer Serving Area (CSA). If VDSL2 could provide significantly more bandwidth and go farther, there would be important cost efficiencies that would result and fewer new DSLAMs would be needed – result in in some key benefits.

- Fewer DSLAMs required and more distance capabilities, DSLAMs do not have to be placed so very close to customers….allowing the use of somewhat larger DSLAMs that offer a lower cost per port.
- You reduce the number of new DSLAMs that must be deployed, which also means you no longer have to run expensive fiber backhaul to so many places, and do not need to incur as much of the other costs of building out additional DSLAMs
- With a bigger CSA, more efficient port utilization per DSLAM can be achieved
- With that greater reach, you can serve customers in less populated areas much more efficiently from greater distances than you can by trying to place smaller DSLAMs closer to them
- The objective of offering higher speed broadband services, providing universal coverage, and getting triple play services out to more customers is achieved more efficiently.

The Quest For That Better Solution

Alternatives to proliferating mini DSLAMs so very close to residential neighborhoods are available. If you can find a way to cost effectively amplify the DSL signal so that more information and bandwidth can be recovered at the far end, that would give you the bigger CSA that really operators need to increase the size of their CSA and cost optimize their VDSL2 roll outs.

There are several vendors exploring such an approach, typically using digital amplification. This sounds interesting initially, but digital amplifiers are characteristically not compatible with vectoring. So these solutions take away the primary option for VDSL2 performance enhancement that operators clearly want...then substitute other performance benefit in its place to create a rather disappointing “zero sum” game.

The Best Approach

Actelis Networks believes that operators can best maximize the revenue and profit potential with VDSL2 if they can both leverage vectoring AND gain even greater bandwidth and distance benefits to minimize the number of new mini DSLAMs that must be deployed. By doing so, they can significantly reduce their CapEx outlay and have a more efficient OpEx model.

That is exactly what Actelis Networks’ Broadband Amplifiers are all about. The Actelis VDSL2 Broadband Amplifier (VBA) is a simple and reliable line-powered, analog in-line device that can be flexibly deployed at a convenient splice point between the DSLAM and residential customer. The VBA is line-powered and offers simple “plug-n-play” installation. Fully compatible with vectoring, the VBA enables operators to enjoy both the performance gains of vectoring and broadband amplification to significantly enhance and add to the performance available with vectoring alone. And Actelis has been working in trials with major operators to perfect the most efficient form factor and OpEx features.

Despite its simplicity, the VBA used with vectoring will approximately double the effective reach or rate of VDSL2 alone – allowing operators to increase the size of the CSA and offer higher speed broadband and triple play services to many more customers from existing DSLAMs, deploy a smaller number of new DSLAMs that do not have to be quite so close to customers, and reduces the total cost of building out new DSLAMs while increasing their size and decreasing their fully loaded cost per port.

The objective of offering higher speed broadband services, provi

Only by using the VBA can operators fully exploit VDSL2 opportunities cost effectively and maximize VDSL2’s business case. On an “apples to apples” basis, the fully loaded cost of the VBA is well below the fully loaded cost of pushing new DSLAM ports out much closer to the customer.

Actelis has been working closely with service operators on developing and refining the VBA, having leveraged trials to establish its value and enhance its performance and reliability while incorporating feedback into development to ensure it will have the right form factor and features to enable efficient deployment. Actelis also has an ADSL2 Broadband Amplifier (ABA) that offers similar benefits to those operators trying to get more reach and performance out of their ADSL installed base.

Conclusion

The performance of VDSL2 must be enhanced with vectoring to maximize its commercial viability. But rather than doing this and building mini DSLAMs out extremely close to the customer and backhauling them with fiber, there is a better way to maximize both performance and cost. Actelis Networks has the solution to further enhancing the performance of VDSL2 and vectoring, adding additional performance to this already strong combination to further expand the size of the CSA. The result is a much more efficient way to build residential broadband access networks, achieve higher profitability, and standardize on a solution that work well both in more and less densely populated areas.