

“The Emperors new clothes”

or

The fallacies of Fiber to the Premise (FFTP)

In the push to install FTTP, by the Telco's, in order to play catch up with the Cable companies, the Private Cable industry and Private developers have been blinded by the hype and mislead into believing that Fiber to the home (FTTH) is the “in-all-to-end-all” and without it, you can not offer competitive services, enhanced performances and/or the abundance of extras such as : VOIP, VOD, PPV, IPTV, Higher Speed Internet at break neck speeds, security, hundreds of TV channels, analog and digital, etc.

Fiber-to-the-Premise or as some call it Fiber-to-the-home can deliver superb quality, lasting performance and over-all great reception; but then so can Fiber to the Curb (FTTC) when handled correctly.

Story Time:

For those of us who can't quite remember the story or are Fairy Tale challenged, the Emperors new clothes goes something like this.

There once was a king who had to have the latest and greatest. In all of his realm, he eat the finest food, drank the best wines, and in general lived the good life. Two charlatans, hoping to cash in on the emperors vanity, decided to make a visit to the king and propose a new wardrobe. They really weren't great tailors, only great salesmen.

The clothes they recommended were in reality thin air. They told the king that the material they were going to use was the finest in all the land and only royalty or those of proper up-bringing would be able to see all of the colors and the composition of the material. The king, in his vanity, could not say he could not see the material, or else everyone would know that he was not royalty, so he pretended to see the material. After the clothes were made, not really, the king proudly showed off his finest and everyone in his court had to say it was great or else they too would give away the fact that they were not of proper up-bringing.

One day while the king was in a parade of sorts, showing off his new clothes, all of the crowd did the same as the king's court and made believe they also saw the advantages and beauty of the clothes. It wasn't until one young person in the crowd spoke up and said that the king was naked, that the reality of the situation became apparent. It seems that I am that person.

Pushing your button:

What or who is promoting FTTP? In order to compete with the conventional Private Cable Operators (PCO) and Franchise Cable companies (CATV), the regional Bell operating companies (RBOC) and Independent Telco's needed a better medium or method than what they already had. The copper infrastructure could not supply what customers needed. In order to keep up or surpass the Cable Industry, the Telco's had no choice but to rebuild with fiber. Cable was quickly capturing subscribers away from the Telco's with High Speed Internet and now telephone services. The Telco's choices of ADSL, DSL, ISDN, XDSL, SDSL, HDSL, and the list goes on to HFPL and HFPSL, etc and other services have limiting features or distance requirements making competition difficult.

Some PCOs and developers have been sold a bill-of-goods, and believed the fairy tale, that without FTTP, a developer would be left behind in a cloud of "under capacity and obsolescence"; while also believing that the CATV and Telco's would eat their lunch (take subscriber away). Not really ready to make the investment but dammed if you do and dammed if you don't, several groups embraced the technology and are pouring 10's of thousands of dollars into the ground in hopes of future proofing their developments, capturing a great audience, offering great services, garnering a better price per subscriber if they ever want to sell to a CATV and retaining happy customers. Developers believed the spin, as-much-as the PCO that install the systems.

Research groups, and we all can name them, need to make money to feed their employees also. So they send out their employees to write about what seems to be at the top of the heap. If you have ever read any of these 200, 400, 600+ page reports, it's a lot like the government paying an independent firm to do a test on how long it takes to cook a two minute egg, or the town that pays \$200,000+ to a consulting firm to advise the town on whether they should have a library or not. The hype never stops. Since these firms need more money, they just produce more reports in order to

keep their doors open. We all agree that you can make several different assumptions, all different from the same data, or the news agency that pounds a story day after day because there is nothing else new to report on in their estimation. Don't believe everything you read in the news papers or so called unbiased reports.

This reminds me of my good friend Glen Jones, Co-founder with me of Jones Spacelink. As a franchise and PCO operator, he was once invited to speak at the Private Cable convention. The topic they wanted him to speak on was "can Private Cable and Franchise cable co-exist". He slowly walked up to the speakers table, after a long introduction of his many accomplishments by the moderator and quoted his subject; "Can Private Cable and Franchise Cable co-exist". He then said "Yes", are there any questions and waited for a moment before he continued. You could have heard a pin drop along with the jaws of many in the room when they thought that was it. The obvious became obvious, without all the fanfare. Do we really need a \$5,210 six hundred page report to know the answer? Do we truly believe we need an analyst report to figure out the answer? These are not leading indicators of what is about to happen, they are just someone's opinion, the same as yours or mine.

Once, while I was a consultant with a leading lightning surge protector company, I was given a copy of a 100+ page report they had paid over \$3,000. As I read the report which dealt with surge protectors, it soon became obvious that it was nothing more than a booklet of spec sheets and graphs. They had compiled all the known protectors by category and created charts to show how they each protected. Something a secretary could have done given a couple of days. It was the GM who handed me the report for my review and before I could give my opinion, he quickly added that he "would never spend another dollar on these reports which was someone's weekend endeavor".

Before you try to use the technology, you had better make sure you understand the technology; before you join the parade, you had better make sure your not just one of the clowns on the street.

Developers, historically slow-to-spend money on Cable TV systems, are now jumping in with both feet. As a long time Cable TV consultant and senior member of the Society of Cable TV Engineers (SCTE), I found that developers wanted to believe the hype even though it can be shown that deep

Fiber-to-the-Curb (FTTC) could perform the same functions, cheaper in the Outside Plant (OSP) and with less cost at the home.

Historically:

In 2002 I set out to learn all I could about FTTP. I attended all the trade shows and made visits to manufacturers in order to gain a better, in depth, knowledge and to help myself consult on FTTP. Each manufacturer had a specific way to handle FTTP; some offered, PON, BPON ⁽¹⁾, EPON, etc.; and some were offering GPON. Each offered different service levels of support but most fell short of CATV requirements and had little or no answer for many of the questions being asked by the industry. One manufacturer in Texas stood out as the one I would expect to win out over the rest. They had a great product and were willing to make changes or additions; customize their product for the customer (PCO) and had developed an MDU model. They had a good understanding of Radio Frequency (RF), while others had no clue and were only concerned about light transporting from point A to point B. Most manufacturers felt that once the light left the Headend and arrived at the premise, and was converted, their mission was accomplished.

Some had provisioning for expanding from one telephone line to two; some had two telephone lines already. Some were fixed on the number of telephone lines and some could go up to 4 or 6 lines out of the Network Interface Device (NID) on the side of the premise. All required a switch if you wanted multiple Ethernet-Internet output locations, only supplying one RJ45 and none had a simple matrix switch (Diode) to turn on-or-off the RF or even believed it was important. Some didn't even know how to offer the feature and would have to prescribe a Blonder Tongue or Eagle type solution as an add-on; thus there would be another box on the side-of-the-house and another device to be powered by the home owner. For a while it seemed that the power companies should be behind this push for FTTP due to all the powering requirements.

Called in to evaluate a FTTP problem at a Private golf development in Florida, I came face-to-face with my worst fears. The manufacturer was in their third generation of changes and updates and the home owners were still not getting what was promised. The manufacturer was literally camping out in the Headend and still the problems persisted. They had originally designed the system to have six (6) fibers to the home, two for RF, two for

the telephone and two for Internet. One of the telephony fibers would be used for limited trouble shooting and control. They had since reduced the need down to four fibers, whereby the developer had to pay to have the fiber configuration changed at the house and a new box added, and then finally I heard the manufacturer reduced the need down to only two fibers. Again the developer had to make a change, but still had the six fibers going to the old home and the developer left with thousands of feet of three pair fiber. Speeds or through-put promises were not met and performances were non-existent.

Marconi, which had the best system (product) I had seen to date, dropped out of the FTTP race, deciding not to take on anymore customers, even though RBOC's were purchasing their equipment, mainly due, I heard, to the bad name FTTP was getting and the fact that FTTC could accomplish the same performance cheaper.

Background:

While I was at Microdyne as the CIO in the 90's, it was my privilege to work with one of my mentors, Jim Grabenstein. He and I had been friends since the early 70's and he had taught me a great deal. I was proud to call him my friend. He was the one person most responsible for me becoming a Senior member of the SCTE and I joined the organization in its second year of conception, over 35 years ago. His friends became my friends and Jim introduced me to many. Lyn Eckert of General Instruments (now Motorola) was also a good friend since the early 70's; and he and Jim were together a great deal of the time. The three of us spent hundreds of hours together, testing equipment, discussing standards and performances, evaluating technologies, etc. If I started to name names at this time, of the people who helped me along the way, the list would become very long, but these two men definitely were good friends, great engineers and comrades. When I once asked Jim why he hadn't written for magazines such as the one you are reading now, he was quick to respond that "you can say almost anything and defend your position, but when you write it down in a limited space, everyone will take a shot at you". He would add; "even if they really weren't sure what it was you were talking about or what they were talking about".

Viva La Difference:

Some people, when asked, what are the advantages of FTTP, can maybe quote a manufacturers idiom/comment, but most have no clue, except to say that “it must be better, after all, the fiber runs all the way to the home”. Just what is it a developer or Cable company hopes to gain by going FTTP?

Both Cable and Telco companies have demarcation points when they enter a property. The FCC has specified what that point is and what it is not. Telco’s and Cable systems have had to allow competitors to use their drop when faced with competition. First, because FTTP is an attempt by the Telco’s to catch up, they hope to secure the drop for themselves and not have to share with competitors. Telco’s have had to allow competing local exchange carriers (CLEC) to use their drop or last mile copper. By going to all fiber they can, according to new regulations, refuse to have to share the use of their fiber and in some cases charge very large access fees, severely reducing competition. It may be that by going to all fiber, developers and Cable companies would expect the same protection.

Fiber Optic network prices continue to fall mainly because of the bandwidth glut and there is no hint that the glut will stop anytime soon. Even with the heavy use of the Internet, prices for international fiber usage, has come down. Fiber itself has continued to cost less and although Global Crossing said in 2004 that only 10% of the international fiber had been utilized, that surplus is now nearly exhausted.

Florida Power and Light has a fiber backbone throughout Florida that extends far beyond Florida. They lease dark fiber from points A to B at a flat rate regardless of the miles. Many Power Utilities have fibered all their town they are in and lease dark fiber to whoever needs the connectivity. These prices continue to come down. One company has even installed fiber from VA down to Miami and is interconnected with all the in betweens. Leasing fiber has become the name of the game.

SBC, one of the main pushers of FTTP, has stated publicly in its annual reports and news comments that this is their main reason for FTTP and at last report were spending between 4 to 6 billion in 5 years on FTTP. Verizon spent 1 billion in 2004 and 2 billion more in 2005. Bell South has yet to announce their plans for total fiber and yet still continues to add fiber

everywhere. Monetarily, RBOC's hope they can retain subscribers, reduce operating expenses and plant maintenance while all the time offering expanded services (such as hundreds of TV channels) to compete with the Cable companies that are taking High Speed and phone subscribers from them. The FCC has exempted phone companies from franchise regulations when they ruled on Open Video Systems and now offer state wide franchises to anyone. It has been said that the RBOC's hope to operate as a business and not as a utility. The FCC ruling on Oct 14th, 2004, "deep fiber" networks are exempt from unbundling requirements. Verizon, in order to get to market quickly, has opted to apply for some local franchises to avoid added delays for Video delivery.

In 2003 there were about 120 million homes in the United States. Cable had about 65% of these homes and satellite had about 23%. The other 12% either only has off-the-air service, haven't bothered to get a TV or they only watched videos. Verizon hopes to capture this 12% and more from the other two groups. There are about 30,000 franchising authorities in the US. By going FTTP, Verizon hoped to avoid multiple franchises. Some states had expressly stated that RBOCs must secure a franchise.

Secondly is the future-proofing the plant. After all, fiber can do more than coax, right? Jim use to always remind me that a "flat 300 ohm wire would carry 1 GHz". The problem wasn't the medium; it was distance, performance and radiation. Thus Unshielded Twisted Pair (UTP) cables, such as Cat 3 or Cat5 and 5e, 6, 6A, 7 and so on, all have a distance limitation, and if RF is applied, a radiation and performance problem develops. RBOCs hoped to overcome some of these problems with HPNA and DSL with all of its variations. While at CISCO for a five day training / consulting trip in 2002, one of the engineers in the home environment lab had a plywood board on the wall. Attached to this board was a tin can, attached to a measuring tape, attached to a barbed wire, attached to another piece of metal and so on and so forth. CISCO had added HPNA to this mess and at the other end of nearly 20 feet of the various metal parts came out HS Internet and TV channels. The engineer also mentioned they had x10 devices hooked up and could open and close ports, perform security functions, turn lights on and off, etc. I wish now that I had taken a picture of that board. CISCO shared with those with me in the group how HPNA technology would allow not only these technologies to flow but more. In a sales call to one of my clients, the local Cisco business office actually laid

out 300 feet of barbed wire, used in fencing, in the parking lot and performed a similar test with good results.

I might add that CISCO had a complete CATV Headend in another building. An engineer there showed us a room with 1000's of modems attached to the Headend, all working online for testing purposes. CISCO had purchased these from distributors and added them to the Headend and plant installed inside this building to test the performance of their CMTS and other equipment while also testing through-put, specs, distortion characteristic, noise and SNMP software. The building had around 10,000 modems attached and many large screen TV's. But no fiber.

Thirdly, a developer or Telco hopes to offer higher speeds of Internet. 56K use to be the normal published speed of dial up even though most people were lucky to get 33K. Example: When I once spoke before a Bellcore group, a friendly Bell South Technical Representative informed me, in great detail, how that the occasional 43 or 33K I was showing on my computer was really the speed just to the POP or NOC, not the CO, so that the real speed was no greater than 12.5 to 20K. With HS Internet, offered by Cable companies, 256K became the norm. T1's use to cost \$2000 a month and now are down to around \$400 a month. Some wireless providers offer an Ethernet connection of 3 to 4.5 Megs or more, point-to-point for around \$300 a month. The price of the CMTS has come down and the interface software has been improved from DOS type screens to GUI window type although some prefer command line. Cable Modem Termination Server (CMTS) for the uninformed is the device that allows Internet access to be placed onto the cable plant. The CMTS contacts the modems in the home or office and talks to it. It is this device that tells the modem to allow greater speeds or to go slower depending on pricing and other considerations programmed by the technician. There may be no typical cable modem speeds today. Some allow 128K both up and down, some 256K down, 128K back, 586K down and 128K back, 800K+, 1M, 1.5Mbps and now some Cable systems are offering 3 to 6 Mbps. Even higher speeds are available, still over coax into the home or office, and some cable companies are experimenting with 27 Megs down, 1-10 back ⁽²⁾. Some manufacturer's specifications show between 30 to 43 Mbps, depending on whether the cable company is using 64 or 256 QAM. Speed and performance is not the problem with coax; distance, may be. The FCC classifies High Speed as over 200K. One of the main problems is, where is this speed going to be utilized and just how fast do you think your computer can operate? Just as

digital developments have increased the number of programs that can be put in a 6 megahertz spectrum, who knows what development may reduce or change the way we even deliver Internet today.

Cable companies are delivering commercial services using a variety of options including Ethernet over coax. They are leveraging the modem to compete with DS-0 and DS-1 levels of 100 Mbps. Ultimately the DOCSIS methodology may eventually disappear and the idea of the Black-Box theory will come to the surface. Coax in and RJ45 out and what's in the middle is not as important as the performance, security, etc. Most Cable companies are counting on DOCSIS 3 as the answer to all their bandwidth needs. Only a few are looking at active Ethernet for a solution

If a home is Structurally Wired, the coax entering the home is first placed into a walled box cabinet (enclosure). Also attached in the enclosure is the modem, switch or router, splitters, alarm panel, etc. and this is where the phone and Internet terminals are placed. It is from here that the modem and coax become king; putting out HS Internet speeds, telephony to POTS or VOIP phones. RF is distributed to multiple rooms and the alarm panel is installed. What more could a developer ask for? Even with FTTH, the fiber is converted outside in the ONT or NID box. Only one company is presently experimenting with fiber to the inside, into the walled cabinet with coax and cat5e.

Fourthly is the issue of IPTV, Video and Digital services. It is true that fiber can carry the 870 MHz RF signal to the home and it can be converted to RF for analog TV, digital channels, HS Internet (VOIP included) and all other sorts of capacity. It is true that the fiber itself can actually carry 1 GHz or 2 or 3 and can carry multiple light-waves for even greater capacity. But with the exception of the light-waves, so can coax. Distance still remains a problem, with attenuation as the main factor, for coax; but if a FTTC system is designed properly, those signals are a piece-of-cake to deliver. SBC, AT&T and BellSouth are looking into FTTC and in some cases are offering this method. In my FTTC system, I have designed to where there are no actives other than the nodes themselves and a maximum of 65 homes per node; Node plus zero (0). This system can compete with a FTTP system and cost thousands if not hundred of thousands of dollars less, depending on the size of the system. In most cases, I am less than 50 homes per node with 65 being the maximum.

IPTV, the technology of choice for BellSouth and SBC, basically, for the non-technical reader, requires at this time a set-top box or computer. The signals do not reside on the fiber but are in the NOC or Headend. When you press channel 33, a signal races back to the Headend, or NOC, and tells the server to deliver out channel 33 to that box. Thus, if you have 4 TV's in a home, you will need 4 set-tops. Not only is FTTP more expensive than FTTC but this technology will require more money in-the-home as well as on-the-home. I was going to add more to this section but I believe you get the picture, no pun intended. IPTV is also available today to be delivered by a FTTC system. And with new companies every year creating newer forms of digital delivery, such as QBIT, HDTV may only require 6 to 9 Mbps instead of 12 to 18 Mbps thus reducing the need for FTTH even more. And if you decide to go with MPEG-4 today, good luck finding a set-top converter and get out your money. IPTV also has delay problems, especially when you change channels, sometimes up to 3.5 second delay, with 2.5 being the norm. If you have 4 set-tops and all are on the same channel, the sound will be different out of each TV due to the different delay at each TV.

RF delivery, now being experimented by Verizon, allows the LEC to offer TV in more-or-less the same methods as Cable TV companies, some using Wave Division Multiplex (WDM). With this method, the ONT, on the side of the house, has even more equipment to be powered and more to go wrong. Verizon will still depend on the use of existing in-home wiring, coax, to service multiple TV sets, and still allowing plenty of bandwidth, some with up to 2 – 5 Gbits/sec supporting HDTV. Verizon is also looking at Switched Digital Networks.

Fifthly is a lack of standards. FTTP is trying to get a handle on just what is the best technology. While most opt for open platform, others rely on proprietary devices, ATM designs verses Ethernet or Frame Relay designs. Some FTTP manufacturers choose to go with all passives in the plant while others choose to install active equipment in the plant. Most Telco's would like the conversion to take place at the home's NID box or ONT (optical networking terminal) while some want fiber directly to the back of the set-top. Developers like the idea of Analog RF to the customers set because it does not require set-tops while Cable companies prefer the set-top converters, with and without memory, such as a DVR. All Cable companies agree that FTTP is an over kill. Most say it's too much money for the technology right now, but some say why not prepare for the "just-in-case issues." With Analog, over-the-air, disappearing as of February 2009, every

existing Analog TV will then require a set-top to view these channels. By offering a basic Analog tier, Cable TV companies are allowing customers to still view all their basic channels without a box rental. Soon, even this will disappear with all channels needing a digital TV or set-top converter to watch all the digital channels.

The lack of standards doesn't end with just PON verses BPON or GPON, or DSL verses ADSL verses ADSL2, nor is it passives in the field verses some actives in the plant. The whole idea of FTTP is up in flux. How much bandwidth is enough? If you want to allow 100 homes the option of 40 Megs, what does that say about the size of pipe you need coming into the optical splitter in the field? What does it mean for the size pipe coming into the Headend, CO and NOC when you have thousands of units? Who can pay for pipes that big? The only ones I can think of today are the RBOC's. And since they have the money, the control and the bandwidth, they are the ones needing and pushing FTTP. I read an article recently where a system was designed where there was a 4-way optical splitter, feeding four 8-ways, feeding eight 16-way splitters, so that in the end, the FTTP was an over 200 homes per single fiber from the NOC. Most Telco's advocate 32 homes per fiber splitter and design for 64, but there is no norm or standard. The congestion on the return and the switching requirements has to be monumental.

Telco's have in the past used mechanical splices instead of fusion splices. Even today, many major RBOC's only use mechanical splices and overcome the excessive losses by using higher output lasers. If a 12 dBmV will work in a FTTC configuration, RBOC's use a 16 dBmV to overcome the mechanical losses. Example: While I was a consultant at Disney in Orlando, I noticed Disney had to keep upgrading and adding higher output lasers. The manager there informed me in 2003 that the Sprint partner only used mechanical splices and the losses were killing them. When I asked why doesn't Disney itself just volunteer to replace the splices and pay for fusion, they informed me that they have tried for years but that it was the policy of the phone company to not adopt fusion technology. There again, no set standard. How does a developer really know what he is getting when he does FTTH?

One article recently written on splicing mentions the Vendors are touting Fusion splicing to the home instead of mechanical; trying to convince RBOCs and others to rethink their old methods and technology.

Can Fiber to the Curb compete?

Coax, compared to fiber, is very forgiving. Fiber, in the vaults, in the northern regions has been known to freeze and crack. Water enters the vault, and even with good drainage, freezing takes place. One fiber splicer informed me that he worked on a fiber system in New York for ten years with the telephone company and freezing was their biggest issue. They would withhold splitting or adding splices until the temperature was higher either by natural means or by heaters.

Fiber, with its micro-bends, even in the Headend is a constant complaint of technicians. Finding these kinds of problems, in the field, in the dead of winter, is a nightmare.

FTTH is one of the only networks that is driven, or has evolved, NOT because of consumer demand for services but because of the Telco's needed it to compete.

Just why developers have come aboard is a mystery when you consider that FTTC will do everything FTTH offers, at a lower cost. FTTC offers quicker installation time, with less equipment on the side of the house and you should design for around 50 to 75 homes per node, with no actives other than the node itself and the power supply.

Outside Plant Solutions magazine reported in the October 2004 issue that the average FTTH capital cost per home served...aerial or buried plant was \$1,377 and cost per home passed was \$1,113. They also mentioned that the average cost of FTTC was \$500.

Xchange magazine, January 2005 issue, quotes Moody's Investors Service; saying that Verizon had earmarked 7 billion to rebuild their wireline network and so spending the same on FTTH was a logical conclusion.

It's the PCOs and Developers that have read into the 7 billion more than what it really is; money spent on serving their existing subscribers instead of losing them to Cable. The same article also quotes the senior policy director for telecommunications and technology with Medley Global Advisors as saying, when he compares FTTN (neighborhood) and FTTH it is unclear which is the better technology.

FTTC offers fiber from the Headend all the way to the home site (curb or neighborhood). Some use optical splitters in the field while others use splitters in the Headend. Once the fiber reaches the area of interest, a node is installed to convert the fiber to 75 ohm coax cable. The cable is then run directly into the home from the taps. The only design I use today is nodes only, no amplifiers. Some have used Node + one amplifier which is still good, I prefer the N+0.

Let's assume a typical scenario where you have a house with a set-top converter. The coax leaves the TV/set-top area and runs back to the splitter either on the outside of the home or in a structured wired box or garage / attic location. Let's assume that length is 85' of coax and let's assume that there is a 4-way splitter. Putting your thinking caps on tight, what is the difference whether fiber is 10' away from the splitter or 100' from the splitter? Except for the normal attenuation loss of the coax, there is no difference, even with FTTH systems today, fiber is converted to coax. What if you run coax not 100' back to the fiber, but 300' back to the fiber or even 500' back to the fiber? What if fiber could not be run directly to the outside of a home, but due to its size, shape and landscape, the fiber was run to a detached garage, then converted to coax and then run 100' into the guest home and then 200 more feet into the main house, amplified, and split to several areas and TV's. Is this still FTTH? Just how far back can fiber run and still be called FTTH? Is this now called FTTG (Garage)? No wonder everyone is pushing for the terminology FTTP (Premise). Is a Garage classified as a premise?

What if a developer wanted the conversion, from fiber to coax, to take place in a pedestal near the home but not on the home and wanted the pedestal to support 2 homes and be powered by a common street light in his development; would this be FTTH? Since the conversion to coax took place in the pedestal and not at the home, wouldn't this be fiber-to-the-pedestal (FTTPed)? Just how far away can a fiber cable be before it is no longer considered FTTP or X?

If the argument centers on Internet and phone and not just TV, then the structured wired box would settle that problem and it works with either FTTH or FTTC (3). It is in this box that the conversion takes place and the coax is split to handle the HS modem and the adaptor to handle the phone, etc. If Ethernet is the medium of choice than switches are in the Structured Wired enclosure. In this box, phone lines and Internet lines merge from all

the locations in the home as well as the coax. Once cables are punched down, all locations in the home, in each room, can enjoy TV, Internet and Phone at each outlet. This box is also where the alarm panel can be mounted and managed. In larger homes, larger boxes can be installed to handle x10 and other control functions. Just what are the advantages to FTTH anyway?

“Verizon’s chief argument for the necessity of FTTH is that no amount of stretching and stuffing of copper loops will give them the bandwidth necessary to ultimately trump the cable industry. Long term, Verizon says, FTTP will allow big bandwidth applications that perhaps haven’t been invented yet⁽⁴⁾.”

Matt Davis, director of broadband access technologies for the Yankee Group agrees that if it weren’t for Cable TV companies getting into telephony and VOIP, Telco companies wouldn’t be getting in Video. They had tried and failed several times before.

A quick review of the FTTH Council website reveals a great deal about the organization. Its membership is made up almost entirely of manufacturers, construction companies, and others who want to sell to the developers and Telco’s. It was interesting to see some Cable TV companies on the list. They probably thought it was better to be an insider instead of having to hear about it second hand.

In conclusion, as a consultant to many developers, I have to advise them constantly about technology, ROI, cost considerations and increases, new apparatuses and devices, as well as techniques and distribution methods. FTTH is not a viable consideration for developers or Cable TV companies at this time, but it is the only distribution method for a Telco who wants to compete, even though many have opted out fiber in favor of copper wire technology. Comcast CEO Brian Roberts has been quoted as saying that he hasn’t “seen a business model that says FTTH is the great return on investment” everyone thinks it is.

A developer has more of a chance to garner a return on his investment than a Cable company since the developer has a captive audience and can hide much of the expense of the construction in the development cost and not in a ROI for communications. A developer can adjust rates to make a return ROI work, but FTTC is still the better play taking all things into

consideration. Technology should be used to reduce cost and not necessarily just to increase bandwidth.

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- (1) "About half the homes currently passed by FTTP networks in the U.S. - including both private and municipal networks - are passed by broadband passive optical networking (BPON), which is based on ATM technology; according to research firm Render Vanderslice & Associates. The other half are passed by Ethernet-based technology." Telephony Magazine, January 17th, 2005 pg 31
- (2) "Cable modem speeds vary widely, depending on the cable modem system, cable network architecture, and traffic load. In the downstream direction (from the network to the computer), network speeds can be anywhere up to 27 Mbps, an aggregate amount of bandwidth that is shared by users. Few computers will be capable of connecting at such high speeds, so a more realistic number is 1 to 3 Mbps. In the upstream direction (from computer to network), speeds can be up to 10 Mbps. However, most modem producers have selected a more optimum speed between 500 Kbps and 2.5 Mbps. An asymmetric cable modem scheme is the most common. The downstream channel has a much higher bandwidth allocation (faster data rate) than the upstream, primarily because Internet applications tend to be asymmetric in nature. Activities such as World Wide Web (http) navigating and newsgroups reading (nntp) send much more data down to the computer than to the network. Mouse clicks (URL requests) and e-mail messages are not bandwidth intensive in the upstream direction. Image files and streaming media (audio and video) are very bandwidth intensive in the downstream direction." DSL verses Modem, Cable Labs on-line article.

"Cox which offers six levels of high-speed data service to commercial subscribers recently raised its top speeds as high as 6 Mbps downstream and 1.5 Mbps upstream without raising prices". Telecommunications Magazine, March 2205, page 35
- (3) See authors article on "Structured Wiring".
- (4) Telephony Magazine, November 8th, 2004, page 45