

Lessons from the Masters: MDU Workshop



Richard Holtz of Infinisys Electronic Architects (standing), answering technical questions from the audience. Also on the panel were (left to right) Steve Sadler, Director of Ancillary Services for Post Properties, Mike Kolb of Cautela Solutions (a contractor specializing in retrofits of older properties), Henry Pye, Assistant VP, Resident Services & Technology, JPI Partners, and Bob Schneider, Director, KCI Technologies.

The Summit's pre-conference workshop featured a table of experts led by Richard Holtz of Infinisys Electronic Architects, answering technical questions from the audience. Also on the panel were Steve Sadler, Director of Ancillary Services for Post Properties, Mike Kolb of Cautela Solutions (a contractor specializing in retrofits of older properties), Bob Schneider, Director, KCI Technologies, and Henry Pye, Assistant VP, Resident Services & Technology, JPI Partners.

Greenfield MDU

Question:

Once we bring the fiber into our headend, how do we get 100 Mbps broadband into our apartments – WiFi, WiMax, Ethernet, or broadband over powerline? The project, in Florida, is mixed student/luxury,

on the coast. There are six buildings, 102 units.

Holtz: BPL looks good at first but it isn't a wise choice. It is an uncharacterized network – any interference – from

halogen lights, baby monitors, whatever – destroys it. I was president of a multinational. We killed a \$150 million BPL project. Admittedly we were early players.

In theory, WiFi could work – 802.11g, going to n - but not in a high-density building, because there aren't enough available channels for many simultaneous users. WiMAX also looks good in theory, but it isn't 100 percent reliable. People have tried doing wireless inside buildings, but they're having to go back and rewire – especially as more people are using cordless phones, which operate in the same [2.4 GHz and 5.8 GHz] spectrum.

Cable modems can get up to 30 Mbps, but with DOCSIS 3.0 and channel bonding, you can get up to 80-100 Mbps. VDSL2 caps out at 88 Mbps.

With good fiber to the building, and no more than 90 meters [from the fiber] to any apartment, you can use Ethernet over Cat5 wiring – but how do you manage to get a reliable 100 Mbps that way?

Sadler: With a new building, I would use fiber [to the building] and maybe copper inside.

Pye: Ethernet is half the price of the other technologies. There's no significant customer premises equipment, no

Holtz: In theory, WiFi could work ... but not in a high-density building, because there aren't enough available channels for many simultaneous users. WiMAX also looks good in theory, but it isn't 100 percent reliable. People have tried doing wireless inside buildings, but they're having to go back and rewire – especially as more people are using cordless phones, which operate in the same [2.4 GHz and 5.8 GHz] spectrum.

set-top box. In other words, it's very truck roll-friendly. Inside the unit, I'd use wireless – it's so cheap it's basically disposable. You can throw away four units for the price of getting someone to come and fix something.

Richard Holtz developed a unit router; they add flash memory to the standard unit, a very robust solution. It can handle a 250-unit property for \$10,000 or a bit more. For bulk video, put in digital STBs. Anyone who is reselling DISH or DIRECTV knows their digital rate cards are good but not as competitive as their analog rate cards; MSOs can beat it out right now.

Question:
What about delivering video?

Holtz: Hardline cable or fiber from the headend [for cable] or the side of the road [for satellite]. Traditionally, video was pushed to the unit and the user selects the channel; all channels are available. With IP, the user pulls the individual channel from the headend. It saves bandwidth, but do you get the same user experience? There's a time lag between flipping the channel and seeing the picture. But the alternative, even today, is getting problematical. The cable companies and satellite dish folks are using switched video product on the STB because they don't have enough bandwidth on their networks to make all channels available instantly.

Kolb: Two dishes, an HD antenna, demodulator and modulator – that's what's standard today. It takes three to four rack spaces. Use a launch amp on

Pye: We get really, really scared if a dish provider wants anything other than single-mode fiber to distribute the video signal.



The audience for this early-morning preconference workshop was large, and appreciative.

Pye: Inside the unit, I'd use wireless – it's so cheap it's basically disposable. You can throw away four units for the price of getting someone to come and fix something.

the headend, then amplify throughout the complex unless you're using fiber.

Holtz: DIRECTV has MFH2 (traditional) or MFH3 (IPTV). MFH2 runs on fiber or coax. It is a 3 GHz plant operating in 500 MHz segments. The headend room has a small rack of equipment. In a garden-style complex use fiber, it has more capacity and lightning protection – especially important in a place like Florida. Limit copper runs to 150 feet. Coax loses 60 db per 100 feet; they say 200+ feet but we need test results to check – and the new TIA 570c standard will also say 150 feet is the limit – 300 with RG11. Copper RG6 loses 6 db for every 100 feet. QAM (Dish network) runs on fiber or copper.

Pye: The MFH 2 and 3 systems are great, but be careful not to distribute them over anything less than single-mode fiber; 95 percent of buildings will be obsolete in February [when digital TV becomes the norm, although analog can continue on cable systems, just not over-the-air]. Besides, single-mode fiber is much cheaper than hardline cable. We

get really, really scared if a dish provider wants anything other than single-mode fiber to distribute the video signal.

Kolb: Single-mode fiber is two-thirds the cost of copper, so even with a bit of extra electronics, it is cheaper overall.

Pye: Mike is the best retrofit contractor in the country.

Holtz: The MFH3 equipment is only half a rack high. Thompson has an IPTV solution, on Ethernet copper or fiber. Can it be shared with data? Yes, but we're afraid of viruses taking down the Superbowl.

Question:
Can you distribute direct broadcast satellite feeds over GPON?

Holtz: There are challenges. It works for GPON, on single-mode fiber, with passive optical split. Verizon FiOS is going to GPON. But how much bandwidth is allocated to the video stream? In BPON the original designs were for traditional cable company frequencies, around 870



Distributor AMT offers a growing FTTx catalog, along with technical support.



Asoka provides powerline broadband technology to other vendors, including Motorola.

BroadbandProperties Summit 07

MHz, and there is not enough spectrum space for HDTV; you need the 3 GHz equivalent.

Comment (from Pat Sims of ADC): You can run MFH2 through GPON or BPON, but on BPON, it is tough. It can take a raw RF feed input to the laser, and the laser converts from analog electrical to analog optical. There are new lasers out today to do it, from Foxcom, for example. You still need a STB. The NID [network interface device] plugs into the STB. The NID does the conversion.

Holtz: It is not an issue in theory, but will DIRECTV and DISH endorse it?

Sadler: In new construction, fiber to Cat5e [done well] is not going to be obsolete, but we buy new buildings and we see things like Cat5 daisy-chained! I think you should take your cue from corporate networks; they do a fiber backbone. The bigger issue is, how much longer before massive retrofits? Here's a clue. I asked AT&T a few weeks ago about one of our properties, and they offered brand-new Cat5 from closet to units. Verizon loves to bring fiber all the way to the unit.

Existing MDUs

Question:

What will it cost to retrofit wiring within the unit?

Sadler: If you've got Cat3 POTS wire daisy-chained in the unit – or even Cat5 wire daisy-chained – you will have to re-wire. You have to think of the inside of the apartment as a network.

Question:

Inside the unit, can you use power line Ethernet?

Kolb: It isn't reliable. BPL will be good at one plug but maybe not where your computer is.

Holtz: The power line starts at the transformer and ends up back there. There are 10 to 50 [dwelling] units on one trans-

Kolb: Single-mode fiber is two-thirds the cost of copper, so even with a bit of extra electronics, it is cheaper overall.

former. The wall outlets may not be on the same electrical phase – if not, there’s no way to get [the signal] there. You need a filter bridge to get the electricity everywhere throughout the unit *and* keep it only in the unit. It takes a licensed electrician. The biggest challenge inside the unit is how long will it take, and how will it look when you’re done?

Kolb: With standard construction it takes about two hours. If it’s not standard construction, it could take months.

Question:

What’s the best way to put a new backbone in a garden development?

Schneider: Directional bore, trenching, sprinkler pipe.

Kolb: Who owns the conduit? You have to be careful.

Holtz: Add video surveillance and sensors to com rooms. You don’t want providers cutting each other’s cables.

Pye: We won’t let providers install, because they won’t install firestops. BellSouth is notorious.

Holtz: Try to understand what was there, first. If there was asbestos, how do

Holtz: Add video surveillance and sensors to com rooms. You don’t want providers cutting each other’s cables.

you handle it? You can’t just drill and cut. This will be one of the biggest challenges for the MDU industry in the next four years. You need to do a sample hallway or unit before approving the method.

Pye: Owners won’t be able to hide their problems much longer. In the last three years, we found safety violations in 70 percent of cases.

Holtz: Do not use sprinkler pipes to hang fiber, do not hang over dryer ducts – they dry out the dielectric.

Sadler: Verizon is about to do an over-build for me and they will be using subcontractors and they can’t really watch them well. So the owner has to.

Pye: Do not go into a stairwell. In wood frame construction, stairwells settle, and staples pull the cable out. In Stillwater, Oklahoma, we had to rewire in a year because of settling.

Holtz: Aesthetics is an issue. You can end up with too many outlets, one for

Pye: We won’t let providers install, because they won’t install firestops. BellSouth is notorious.

each service. You need to coordinate what goes where in the equipment rooms and closets. Otherwise the first guy dominates the center.

Sadler: The communications closet is wasted space – a lot of square footage you can’t rent. I hate to see it turned into a spaghetti factory. You have to keep stuff off the floor. Most com rooms are shared by multiple providers. There’s expensive equipment that needs to be kept secure.

You have to work out policies and procedures for access during off hours.

Pye: Just don’t share cables. It’s a very bad idea. It’s not worth the savings.

Schneider: Early coordination between the trades and the service providers is necessary. Everyone has to see the drawings – and follow them.

Energy Management

Question:

If you use broadband to manage energy demand to the building and the individual units, can you reduce demand for power plants?

Holtz: I’ve done this. It costs between \$300 and \$800 a unit.

Pye: It’s hard to sell, because no owner is honest about what energy costs really



ATCI showed expertise in network engineering for fiber and satellite video.

are. Also, green design is still in its infancy. You have to build in such a way that you can recoup the costs.

Holtz: Often, resident discontent exceeds the value to owners. If the leasing office does it, it may be useful –

Joule (www.consumerpowerline.com/homejoule) shows residents in real time what they are using, and rewards them for conservation.

Pye: Building high performance is in

cally hangs on the outside of an exterior wall].

Pye: Tell Verizon you have what they need [in terms of installed fiber] and will allocate fiber for them. For new construction, an MDU ONT will be sufficient even if they don't want to do it.

Sadler: One thing that gets lost is the issue of long-term owner access to the Verizon wiring. With the SFU ONT, once Verizon installs it Verizon is demarcated inside the unit. If you have an issue with Verizon downstream, you don't have the ability to kick them off. They're there forever. With the MDU ONT, you can exercise access restriction.

Holtz: Verizon prefers the SFU ONT even though it's more expensive to install and maintain. They need a separate truck roll for each problem. And with microduct there's no way to finish the building until they're through. Regional [Verizon staff] get a bonus based on use of the SFU ONT. Local techs are trained on it. The MDU version takes a two-cabinet design, but they are working on a small-cabinet solution for a year from now. The multifamily ONT uses RG6 coax, standard 570C rules, 150-foot runs max, two coax outputs to distribute to wallplates. You or they can put microduct there for future use.

especially with unoccupied units (maintenance people come in, turn on the AC, then leave the place empty and cold). But the leasing staff turns over 60 percent a year, and the computer systems don't talk to each other. A project in Frisco, Texas, has energy control from the leasing office. But they turned it off because the staff turns over, and maintaining the rental database vs. actual is hard. The challenge is operational and business, not technical. You have to design for the longer term.

its infancy. You have to build at good cost, recoup 98-100 percent of the bills, and having a separate party do metering costs you.

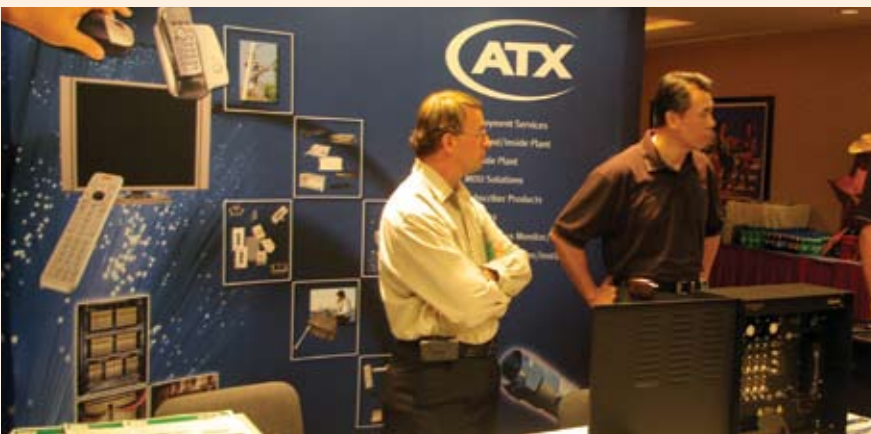
FiOS Impact

Question:

Verizon is telling developers what they require and what they will provide – no flexibility. Verizon is saying its contractors will pull their own microduct, and won't coordinate with anyone else. Do I have to do exactly what they tell me? They are forcing us to use the SFU [single-family-unit] ONT [that typi-

Holtz: To save some money, specify riser-rated cable. Don't overspec plenum cable where it is absolutely not needed.

Comment from Mike Whaling of InfiniSys: A program called Home



ATX is known for network design and deployment services, both inside and outside plant.

Sadler: One thing that gets lost is the issue of long-term owner access to the Verizon wiring. With the SFU ONT, once Verizon installs it Verizon is demarcated inside the unit. If you have an issue with Verizon downstream, you don't have the ability to kick them off. They're there forever. With the MDU ONT, you can exercise access restriction. Owners need to maintain some level of control over providers. With FCC's propensity to start regulating a little more, owners need to take control. Don't deed away ownership rights, the FCC is not going to help you out. You should be able to pick providers that make residents happy.

Pye: Just don't share cables. It's a very bad idea. It's not worth the savings.

Pye: Verizon likes the multifamily ONT, but it requires a special appointment for services, and they contract it out to people. At least when I install micro-product, they can pull fiber through it at any time. Do not share cables!

Holtz: I wish the world were simpler. I wish owners had single infrastructures between com rooms and units. The challenge is economic. Henry Pye is right, the way to do it is not to share. But it is expensive. Most owners other than JPI look to have single infrastructures between com rooms and units, with different cross connects if there are multiple providers. Again, the right way to do it is not to share wires. But most owners think this is too expensive.

Schneider: We value-engineer it right out.

Holtz: By the way, to save some money, specify riser-rated cable. Don't over-spec plenum cable where it is absolutely not needed.

Schneider: Yes, use riser-rated cable. I have yet to see an install that needs plenum-rated unless there is some unique common area, cable in an HVAC duct space perhaps. On the other hand, some installers try to sneak in with non-riser-rated cables; you have got to watch them.

Holtz: Fire inspectors don't always understand the standards. But insurance companies do.

Kolb: The cost difference on a typical job to go all riser-rated is only \$2000 or so.

Pye: The determinant is not the construction cost of the second cable. It's total net cost considering contracts with

service providers. If done correctly, it's cheaper to have separate wiring. When we as an owner cable a building there's a net cost to us, but we believe it is necessary. [FCC chairman] Kevin Martin's

mindset is that AT&T and Verizon are good, cable MSOs are bad, and private cable operators are innocent children. What the FCC is doing will change ownership rules.



Headend and network builder Blankom enjoyed plenty of booth traffic.



Blonder Tongue's digital TV offerings attracted attention; the company also brings fiber nodes to within-MDU video distribution.

Holtz: I wish the world were simpler. I wish owners had single infrastructures between com rooms and units. The challenge is economic. Henry Pye is right, the way to do it is not to share. But it is expensive. Most owners other than JPI look to have single infrastructures between com rooms and units, with different cross connects if there are multiple providers.