Some of Our Fears:* When Structured Wiring Isn't Enough

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CHAPTER 1: HORROR STORIES

Dallas, Texas - September 14

The e-mail message seemed innocuous at first. Tom** was sitting at his desktop computer reading the occupancy stats. Two weeks into the opening, and everything was looking right on target! The new property was gorgeous—lush landscaping and an award-winning architectural design. Complete with the latest appliances and a state-of-the-art Communications system on which no expense had been spared. Well maybe that wasn't quite true, thought Tom, but it was way beyond what they had ever committed to before, and his electrical contractor had assured him it was the best stuff money could buy. As if Ken had ever given a second thought about spending our money! So the message was a bit odd—must be some new idiot down at the phone company who hadn't been properly trained. Time to call and kick some butt! We don't have time for this nonsense, Tom thought to himself! We shouldn't be getting complaints about this! How could they possibly be unable to provide service?

Phoenix, Arizona - July 17

Struggling with the heavy tool, Aziz wiped away the stinging mixture of fine concrete dust and sweat that all but covered his face. Only a few more inches to go and he could take a much-needed break! Aziz worked quickly, and as inconspicuously as he could. Once he was through, only a trained eye could detect that he had been here at all. He was proud of his work—he was one of his employer's best technicians. But at the moment it was hard to tell—what had been a beautiful new home only a couple of hours earlier was now littered with wires, drywall, and dust. What fools these people were to not have thought of this earlier! Still, he was well paid, even though his employer had been grumbling lately about all of the overtime, it wasn't Aziz's fault that the meticulous blueprints he had been given bore little resemblance to what he was finding inside those concrete walls!

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Baton Rouge, Louisiana - February 5

Staci was at the end of her patience. The whole world was slowing down, coming to a complete standstill, and she was powerless to stop it! Only a few hours left, but the hours seemed to be stretching into days, and she didn't have any days left. She wanted to rip that silly hourglass right out of the screen—how dare they keep her waiting like this. This research should've only taken a few minutes and was crucial to her thesis, but the damn thing just refused to download! And she was paying through the nose for what that always-smiling Leasing Agent had the nerve to call "high-speed." She had even passed on that much nicer place with the granite kitchen counter and vaulted bedroom ceilings because her entire future was dependent on getting this research finished tonight, and that was dependent on having a high-speed connection, and now that was not dependable at all! At least her father was an attorney, she consoled herself, and he'd see to it that these people paid through the nose for failing to deliver on their promises!

Here and Now

Wake up! It's just a story, isn't it? Your project is running fine. You remembered to ask your contractor to put in plenty of "Cat Five" wire and coax everywhere, so you've got this

* with apologies to Tom Clancy . . .
** the names and places have been changed to protect the victims.

"structured wiring" thing under control. Besides, the guy from the Cable Company assured you that he could give you all the Internet you want, and so did that nice lady from the phone company, so you've got it covered twice, don't you? Besides, it's their job to make it work, isn't it? How did you get stuck with this anyway? You're a builder, not a computer geek. What happened to the "Good Ol' Days" when your foreman just called 611 and told them you needed phones and gave them the new address?

Still, you picked up those brochures at the Builders' Show about "Structured Wiring", and passed them along to your GC. How hard can a little extra wiring be? Could he possibly get it wrong?

He could. In the rush to bring the latest technologies to new MDU projects, many developers and builders have blindly assumed that someone else on the project actually knew how to properly design and install a structured wiring system or that just improving the wire that was installed would be enough. Some assumed that the Telephone Company or cable provider would provide everything they needed or that the Electrical Inspector would make sure the wiring was proper.

Who is responsible?

In 1997, The FCC released new rules intended to foster competition among telephone service providers, and to specifically define the demarcation points between public carriers and customers as defined in the FCC Part 68 Rules. These new rules moved the responsibility for some of the on-site wiring in many cases from the carriers to the property owners. Additional rules released in 1999 created minimum standards for such wiring for all new installations, conforming to the ANSI/TIA/EIA Building Wiring Standards (TIA-570-A).

While the carriers or service providers may still install this wiring, the responsibility for proper wiring rests with the property owners. Although this ruling established certain safety requirements for the wiring, it is not related in any way to the National Electric Code, which is set by the NFPA and enforced by Electrical Inspectors. Thus the Inspectors have no jurisdiction to enforce compliance of cabling with the FCC rules- only with the NEC requirements.

Most of the service providers who do provide installation services will install infrastructure that at least meets the minimum FCC requirements, but service-provider-designed systems tend to be service-provider-specific at best, and often preclude later options on the part of the property owner. For example,

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one system recently designed and installed by a Cable TV provider allowed for high-speed Internet service using cable modems, but was arranged in a way so that networking of computers within a residence was not possible. Every computer would require a separate cable modem, and a separate Internet account. To further complicate matters, the cable modem service they offered was marginal at best. When the property was converted to college housing, the cable modem service was of unacceptable quality. To provide the students with an acceptable quality of service, the developer had to install an entirely new Category 5e cable network, with new data outlets in every bedroom.

The Code-Breakers

There has also been a disturbing tendency for service providers to install cable in MDU properties that does not meet National Electrical Code requirements. NEC Article 800.53 requires that any low-voltage cables that penetrate more than one floor must be riser-rated at minimum (Type CMR or CATVR). Many Cable TV providers use CATV-rated cable, which is generally acceptable in single-family homes, but does not meet the fire retardancy requirements for multi-story buildings. These violations often get missed by the Fire Inspectors, but could result in serious consequences in the event of a fire—and serious cost overruns and project delays if an Inspector does red-tag the cable after it is installed.

Creating a Functional Design

Even if the wiring does meet NEC and FCC requirements, it may not actually provide a functional system. Many property developers have been told that they were getting "Category 5 cable" or "high-speed Internet-ready" wiring, only to find out later that the cabling would not work as it had been designed or installed.

One developer had his Electrical Contractor install Category 5 cable, but the Electrical Contractor ran all of it into the outside telephone pedestal, so it could not be used for data at all. On another recently completed site, the cabling was installed by the Security contractor, who installed a mixture of Telephone and Data jacks, all on Category 5e cable, then punched down all of the cables on the Telephone Connecting Block in the distribution cabinet, so that all of the Phone and Data jacks were connected in parallel.

At yet another site in Arizona, all of the Category 5 data wiring was run to a small metal box on the outside wall of the building. This was clearly not an acceptable place to install the Data switching electronics—in the summer the inside of that box was over 150°F! In addition, there was no cabling between buildings for the backbone, and no AC power provided for the switching equipment.

Standards

There are now ANSI-approved Standards for Building Communications Wiring. The ANSI/EIA/TIA-570-A Residential Telecommunications Cabling Standard was released in October of 1999, and defines minimum cabling needs for telecommunications and data communications cabling. It also contains some information regarding coaxial video cabling. TIA is in the process of creating the 570-B Revision, which will include some cabling specifications for other systems as well, such as Security, Audio, Lighting and HVAC.

Companies such as Leviton, OnQ and many others manufacture Structured Wiring components that are standards-compliant. However, just using those components does not guarantee that the completed system will meet the specifications. Furthermore, meeting the specifications in the Standards still does not ensure that the finished system will meet all of the users' needs.

While these standards are useful to provide some consistent design, the interpretation of the Standards is not an easy process. Most of the present Standard is based on the TIA-568-B Commercial Building Telecommunications Standard, which applies to larger commercial properties. Just as in the 568 Standard, the 570-A Standard is for overall performance of each link between two data communications devices. It requires the use of Category-rated components, but also requires the finished system to meet specific test parameters.

The 568 Standard was written as a guide for building wiring professionals, called Registered Communications Distribution Designers, or RCDD's (also known as "Real Cool Data Dudes"). These designers specialize in network designs for large commercial networks, and are certified by BICSI, an association of Building Industry telephone industry consultants. RCDD designs are usually very specific for a particular corporate network or building.

There is no direct equivalent to an RCDD on the 570-A Residential side-it is a relatively new industry, and is made up of mostly general-purpose networks designed for Internet access rather than corporate data traffic. However, the 570-A Standard still requires skilled interpretation to create a specific design for a particular property. While BICSI is beginning to develop training for Residential Systems Design, most RCDD's are not familiar or specifically trained in MDU issues or design.

Specialists

There are a few companies that do specialize in multifamily communi-

cations systems design. One of the earliest, and a current market leader, is InfiniSys, based in Daytona Beach, Florida. InfiniSys created some of the first high-speed Internet networks for MDU properties, and today specializes in fully-integrated low-voltage architecture for vice, video and data systems, as well as security, energy management, access control and home theater. InfiniSys also has been involved in creating the TIA-570-A and 570-B Standards, and is a consultant to BICSI.

Systems designs involve determining the specific needs of the Community, then creating detailed specifications and scope-of-work documents, architectural drawings, and component specifications, and negotiating Service Provider contracts. Additional services include site inspections, project management, marketing collateral, and training.

By utilizing a professional electronic architecture design firm, property developers are assured that the finished project will meet the needs of its residents, as well as meeting all relevant Codes and Standards, and be installed at a predictable and reasonable cost. By any measure, the cost of a properly designed and installed infrastructure is far less than the cost of fixing a property that was not properly wired in the first place.

Daytona Beach, Florida - May 17

The building sits near the back of a sun-drenched nondescript business park, where most passers-by wouldn't notice it, and if they did, would have no idea of what lay beyond the dark-tinted windows and unlabeled doors. Even if they became curious, they would quickly find that there was no way to penetrate the building's state-of-the-art security sensors. The small sign on the front door reads, "InfiniSys", but the name is as nondescript as the rest of the building. From the outside, the building betrays none of the critical work being carried on within its walls.

Inside, however, there is a buzz of activity, as the high-security network of computers send images of minute construction details to project managers and installation contractors like Aziz, distributed all over the country.

From his secure office, Richard Holtz surveys the activity with a sense of satisfaction. So far, this morning, things are going well! ■

About the Author

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