TAYLORED Advisor

STRUCTURED CABLING AHEAD of TECHNOLOGY

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THE FUTURE IS HEADED TOWARD MORE DEVICES, NOT FEWER.

Devices may totally transform your industry — but they come with significant networking requirements.

ADDICTED TO YOUR SMARTPHONE? Well, get ready. By some projections, the number of connected devices will hit 45 billion by 2023. That's over six devices for every person living on Earth today.

But where will all that growth come from? It's due in large part to the proliferation of the internet of things (IoT). The surge of IoT devices predicted for the near future will significantly impact IT infrastructure planning and spending — and dictate how prepared you are to handle the technology challenges of the future.

You may think, "I have Wi-Fi. I'm ready." But the sheer volume of data processed by IoT devices and analytic programming necessitates a more robust network with high-quality cabling and efficiently planned systems.

These smart buildings feature automation systems like lighting, heating and cooling, building security systems, and other controls for improved energy efficiency and high-level security — without time-consuming manual processes.

Smart buildings are the wave of the future; however, many of these nascent technologies are already appearing in offices and industrial sites all over the world. Today, optimized HVAC systems make it possible to not just automate heating and cooling controls, but to passively monitor HVAC to achieve the most efficient energy use without sacrificing occupant comfort.

Similarly, modern businesses like AT&T and the New York Times are currently using smart lighting controls to promote energy savings throughout their offices. These systems are more complex than simple occupancy sensors. Instead, they're made up of advanced networks of automated lighting, motorized blinds, digital ballasts and LED drivers. These building features are all managed using a single online platform, which means that they must be Wi-Fi enabled.

Many businesses have connected devices in an ad-hoc "daisy chain" fashion, adding routers and switches as new networks and devices were added. However, these connections are bulky and cumbersome, and may not provide the flexibility modern businesses will need to adapt to higher bandwidth requirements dictated by Wi-Fi enabled smart devices. Offices will need not just larger overall wireless rollouts, but better cabled infrastructure as well, so that data is not compromised as it travels back and forth between wired and wireless networks.

Of course, automating lighting is just scratching the surface of what smart building technology can do. As proof of that, researchers at the University of Minnesota are currently developing sensored systems that will allow companies to track employee performance to a higher degree of precision. This technology will use mobile sensors and activity trackers to measure various biometric markers, allowing organizations to evaluate employees' actual effectiveness. This is only one potential application of sensored buildings; by all predictions, Wi-Fi enabled sensors will be used for all kind of data collection in the offices of the future.

Although these kinds of big data systems may revolutionize many industries, the drain on your network will be significant, to say the least. Processing huge volumes of data on site depletes network bandwidth, staggering your internet connection. And many smart devices perform better using power over ethernet (PoE) rather than electrical power cords. These type of PoE connections are made possible only with cabled ethernet.

Additionally, moving building controls and business processes to automated IoT systems will call for a great deal of network fidelity. Stable, professionally planned networks have always helped prevent outages and other problems. However, as devices begin to remotely manage more business-critical functions, network issues may be untenable.

In fact, studies have found that poorly planned networks contribute to over 50% of connection problems. Statistics like these highlight just how important networked infrastructure is to your future; businesses need to begin treating cabled networks as an integral part of their office building's structure, similar to heating and ventilation systems and electrical wiring.

All in all, there's one thing you can say for sure: the future will be networked.

FOR MANY INDUSTRIES, THE FUTURE IS NOW

Even if you're not convinced of IoT's significance, your current on-site data processing requirements may be overwhelming your network. In fact, if you work in one of the following industries, data processing requirements may be significant enough to necessitate a network overhaul — sooner rather than later. Here are several use cases where professionally planned and monitored cabled networks can be a serious efficiency boost.

- **Finance Industry** For banking, financial services, and insurance (BFSI) organizations, analytic practices are just part of the job. These groups collect client information — including encrypted data like account numbers — to build impactful data-driven services. They must constantly monitor financial markets and react accordingly, which means huge on-site data processing needs and robust IT infrastructure requirements to handle it.

- **Medical Providers and Healthcare Specialists**
  Similarly, healthcare providers and hospitals deal regularly in high-volume data. Here, teams routinely access medical databases and transfer client data internally and to other providers. This level of data exchange demands a robust, stable network, and high-level security practices to go along with it.

- **CAD Designers** Computer-aided design and manufacturing software platforms typically have huge bandwidth and storage requirements. Large, complicated projects necessitate large databases and top-tier networks to retrieve and send designs easily and quickly.

For these organizations, robust networked infrastructure isn't a distant challenge. It's a basic requirement in order to conduct business.

PREDICTING YOUR FUTURE NEEDS: IT'S NOT AS COMPLICATED AS YOU THINK

When technology is constantly evolving, it's difficult to pinpoint the new tool or product that will stick around for the long haul. That can make investing in technology difficult: Should you spring for the latest solution when a new option may be just around the corner?

However, the value in structured cabling is its ability to future-proof your site. Cabled ethernet already has a long history in the technology sector — it's actually been in existence since 1976. That makes it a mature, time-tested technology, not a flash in the pan.

Regardless of how cables continue to evolve in the future, a planned structured cable network provides a uniform architectural backbone for connecting all future telecommunications systems. Cabled networks are much more than the cables themselves; installations often include organizational adjustments that connect all workstations back to telecommunications rooms and floor-level wiring closets. Think of cabling as your company's highway: with a well-designed infrastructure, you can get where you need to go, regardless of the vehicle you take to get there.

NEW ADVANCES MAKE CABLING A POWERFUL TOOL FOR YOUR BUSINESS.

Business internet and network options are more diverse and more effective than ever.

Structured cabling provides the connective tissue to bring your networks into the future. However, advances in cable standards allow you to support faster, more powerful networks. The type of cable you select impacts your network speed and bandwidth. But it can also affect your network's reliability — certain materials and cabling standards protect your network from electromagnetic interference that can slow down your performance.

Even the way you design your network connections can be streamlined to improve overall performance and efficiency. OneReach fiber optic cables, for instance, can be used not only to transfer data but to power external devices and network links, making them quite powerful indeed.

Of course, that leaves you with a lot to take in. Below, you'll find some quick guides to help you understand your options for your cabled network.

UNTANGLING CABLE STANDARDS

Cable standards can throw you for a loop, especially when you're not sure what you're signing up for. Standards for ethernet cables are set by the Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA), in collaboration with the American National Standards Institute (ANSI). These organizations work together to build standards for commercial building cabling for telecommunications products and services.

Standards are revised and updated as new technology is released. New sets of standards may address many aspects of structured cable networks, including high-level technical guidelines for various products used to cable buildings. However, for our purposes, we're just going to look at the standards that apply to the cables themselves. Cables that conform to one set of standards are given a category name for quick reference. There may be many specifications that a cable must abide by in order to be rated for a certain category; however, the most important ones are the speed and the amount of "crosstalk," meaning the level of electromagnetic interference introduced to the network from the cord interacting with other nearby electrical devices. Below, you'll find a quick summary of those categories, their speeds, and their advantages and disadvantages.

TYPE	SPEED	BENEFITS
Category 5 Enhanced (Cat5E)	Rated for 100 megabits	• Less expensive • More commonly used, making it mainstream
Category 6 (Cat6)	Rated for 100 megabits standard, but will support gigabit	• Thicker sheath limits crosstalk • Improves heat dispensation when used for power over ethernet (PoE)
Category 6 Augmented (Cat6A)	Capable of 10 gigabit speeds from the telecommunications room to workstations	• 10 gigabit speeds supported up to 100 meters • Even more robust sheath eliminates crosstalk • Improved signal-to-noise ratio (SNR)

WHY YOU SHOULD UPDATE YOUR CABLE, IF YOU HAVEN'T ALREADY

We've discussed some possible future applications of structured cabling, such as IoT devices and big data programs. However, the integration of these technologies depends on fast, reliable networks. While most businesses run mission-critical operations online today, the real-time nature of IoT analytics means that any network hiccups could potentially spell disaster. Automated industrial processes, for instance, cannot be interrupted by network outages and limited speeds.

Upgrading cable supports not only better network speeds along cables, but more faithful wireless connections as mobile users travel across your campus. Category 6 cables offer a solution where network speed is of the essence, but augmented Category 6A cables provides additional bandwidth up to 10 gigabit capability. The advanced insulation on 6A cables reduces crosstalk — essentially interference between wires inside the cable. Eliminating that crosstalk boosts 10-gigabit speeds up to 100 meters, making it more appropriate for wireless, as well as allowing support for networked device applications, such as a multi-radiolink antenna.

Of course, cabling advances don't stop there. New standards for Category 8 cable were recently developed by the Telecommunications Industry Association (TIA). Category 8 supports bandwidth of up to 2GHz for 25G and 40Gb Ethernet at distances of up to 30 meters — making it potentially four times as powerful as the best cable today. Category 8 will be mostly deployed in the data center. Leveraging that technology will make it possible to power the corporate on-site data centers necessary to connect the burgeoning world of IoT machine-to-machine interaction.

At some point, technological advances in cable manufacturing should make it possible to develop 100Gb Ethernet, split-second speeds and bandwidth capable of powering massive data exchange. If you're not preparing your building's infrastructure today, your business could be easily left behind.

FIBER OPTIC VERSUS COPPER: MAKING SENSE OF CABLE TYPES

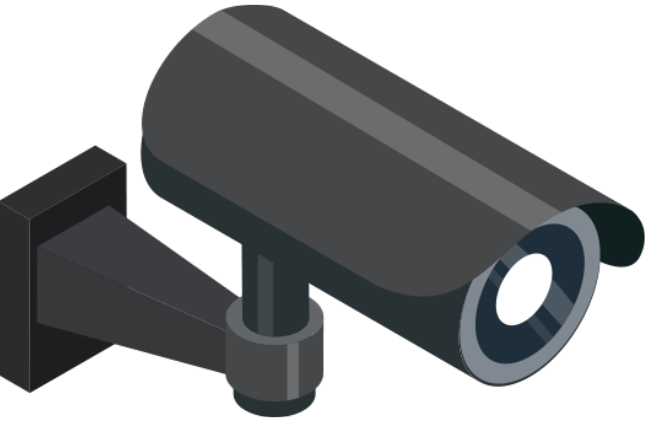
In today's world of networking, ethernet isn't your only choice for planned cabling. Modern businesses can also opt for fiber optic cable instead of copper ethernet. Both have their benefits — copper is more affordable, among other things — but there's more to consider than just the price.

The main difference between copper and fiber optic cable is the power source. Copper relies on electrical signals to deliver internet to your office, whereas fiber optic cables uses modulated light. That difference produces variations in the quality of your internet, as well as in the cost and invasiveness of the installation. Below we list some of the benefits and disadvantages associated with each option.

	ADVANTAGES	DISADVANTAGES
Fiber Optic Cable	• No interference from nearby electrical signals and radio waves; better performance • Not affected by moisture • Transmits data longer distances than any ethernet cable • Improved fidelity of data transmissions when traveling long distances; low power loss • Because fiber doesn't transmit data through signal, it is more difficult to infiltrate • Cables are lighter, making them easier to install in tight spaces	• May require a more extensive installation process. Requires specialized skill sets, making fiber more labor intensive • High cost of electronics; most computers and devices are not equipped to interface with fiber directly
Copper Cable	• More affordable • Power over ethernet (PoE) is widely available in many devices and easy to implement; power over fiber (PoF) is still being perfected • Copper cables are more durable than fiber strands; less susceptible to damage during construction	• Requires signal boosting switches at distances over 100 meters • Prone to electromagnetic interference • Moisture levels may affect copper cable performance • Typically lower overall speeds, bandwidth ability

STRUCTURED CABLING FOR PHYSICAL SECURITY

A planned structured cable network improves surveillance performance and reliability.

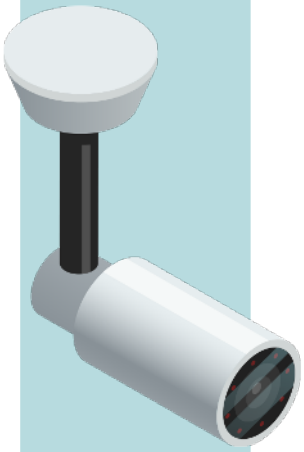


Earlier, we mentioned that one of the distinct advantages of an upgraded cabled system was the ability to power devices directly through the cables themselves, rather than by plugging them into separate electrical sources. Many businesses that have planned and implemented a structured cable network use this technique to power surveillance cameras for their location(s).

For many businesses, a planned network is the gateway from an older CCTV surveillance system to more robust, modern IP camera. By converting to an IP camera, these businesses take advantage of high-resolution picture quality, analytics, and more efficient cabling setups. Again, it's a way to bundle systems together for reduced maintenance and better overall performance.

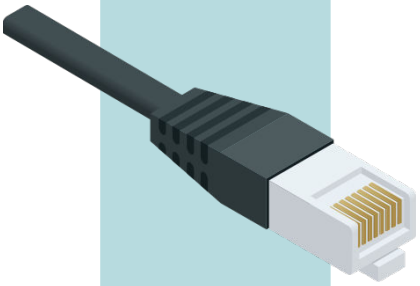
THE BENEFITS OF A DIGITAL IP CAMERA NETWORKED THROUGH A STRUCTURED CABLE DESIGN

We just touched in brief on the benefits of digital camera technology. Now let's explore those advantages more in depth and look at why professionally planned cabling networks are an integral part of any good surveillance upgrade.



The Infrastructure to Handle High-Resolution Cameras. Structured cabling supports IP cameras by delivering higher bandwidth on cabled networks. That added bandwidth can be allocated to video-carrying traffic without impacting the current network. These more robust networks are able to handle the large file sizes associated with high-resolution video files — so businesses can spring for high-resolution 4K cameras without bogging down their network. The ability to zoom in at a high resolution can offer crucial insights during a criminal investigation, making it well worth the technology investment for many organizations.

The Ability to Leverage Video Analytics. Digitally networked cameras have their advantages, and not just when it comes to picture clarity. IP video surveillance systems allow you to program a set of behaviors when an event occurs; for instance, if you have a motion detection feature, you could program your camera to zoom or tilt to better survey the area. These sorts of machine-to-machine sequences are almost certainly where security systems are headed; by adding structured cabling today, you'll be laying the groundwork for future upgrades as well.



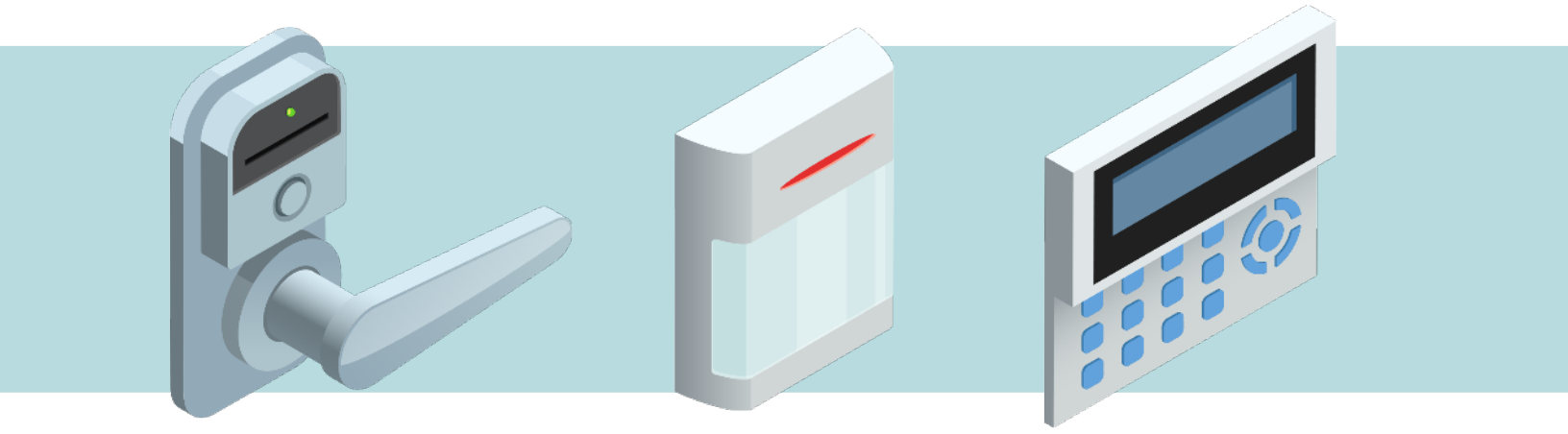
The Support for Power over Ethernet (PoE) The benefits of PoE are well covered throughout this ebook; however, we mention it again here because it represents such a significant development in network capability. IP cameras supported with proper cabling infrastructure are just one device that can be powered directly through ethernet or fiber cables, thus lowering your likelihood of maintenance down the line, while preparing your network for the next generation of remote surveillance products.

STRUCTURED CABLING FOR IP DOOR ACCESS CONTROLS

What good is a digital camera if your building is still under old-school lock and key? Luckily, cameras aren't the only pieces of security equipment getting the digital treatment. IP-based door access controls further IP convergence, allowing you to roll networked systems together for more efficient security.

Opting for IP door access controls significantly simplifies the amount of cables — and by extension, the maintenance commitment — of an access control system. Instead of bundles of cables, there's only one Cat6 or Cat6A cable to worry about. But many IP-networked door access systems are PoE enabled, so powering them this way offers some of the savings and reduced maintenance that you'd get with any PoE device.

IP door access controls also integrate with other security features, such as time and attendance products, to automatically restrict door access based on employee schedules. They may also be compatible with surveillance systems, allowing you to trigger events and camera behavior based on what goes on at the door. You can even program IP door control platforms to automatically send emails or text messages when a triggering event occurs, such as when a door is left open. All things considered, that makes it very powerful indeed.



IS YOUR BUSINESS READY TO UPGRADE TO A STRUCTURED CABLE NETWORK?

Before you commit to a brand-new network, ask yourself these questions first.

Like an IP camera, IP door access controls represent the vanguard of digital security products — but those advances are only possible with a well-powered structured cabling network. Planning your network for eventual advances in technology will save you pain now, while you have time to plan your network around your budget and future plans.

Any extensive adjustments to your network should only be considered after giving it some serious reflection. You'll need to look at your current budget allocations and restraints to help you weigh the benefits versus the costs. In general, some things to consider are:

- **How does cabling fit into my IT budget?** If you don't have the money for expensive fiber optic or Category 6A ethernet cables right now, you could save money by opting for lower cost Cat6 and Cat 5e cables. On the other hand, you'll likely have to pay more eventually to have those Cat5e cables replaced with higher quality products.

- **Am I planning other upgrades soon?** If you intend to upgrade soon to a VoIP system --or to integrate IP-enabled security products, plan on adding structured cable sooner rather than later. These products all perform better on planned ethernet or fiber networks, where additional bandwidth commitments can be matched with high-level networking.

- **What are the future plans for our current building?** If your company has been thinking of relocating, expanding, or changing offices, or is negotiating a sale, hold off on a network upgrade. After all, it doesn't make a lot of sense to improve your network only to move to a different office before you can take advantage.

- **What will my technology needs be like in the near future?** Earlier in this ebook, we talked about how burgeoning IoT, machine learning, and automation advances stand to impact many fields. There's a chance that your networks needs now won't match your needs five or 10 years from now. While it's impossible to predict exactly how any technology will unfold, if you've been investigating any big data, machine learning, neural networks, AI, IoT, or machine learning technologies, chances are, you'll need to fortify your network in the near future.

PERFORM AN IT INFRASTRUCTURE AUDIT WITH HELP FROM ONE OF OUR CONSULTANTS

One of the best ways to gauge your actual needs — and what costs you the most money — is to sit down and examine your current infrastructure and current maintenance expenses, as well as plan a roadmap for future technological integrations.

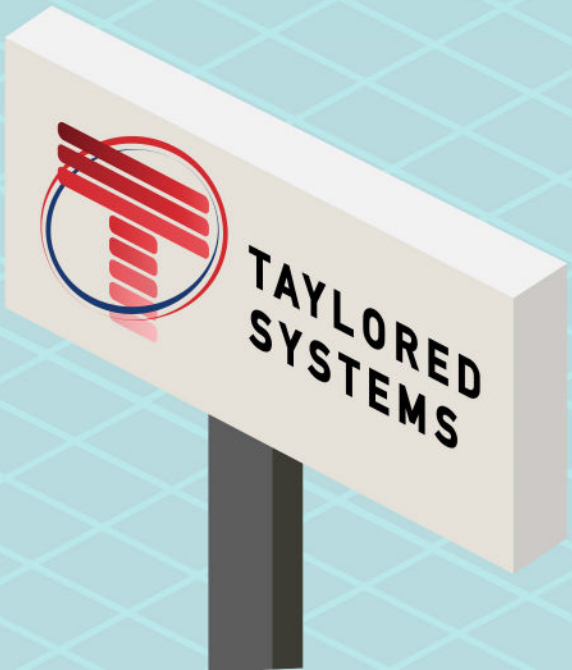
Budgeting and planning a new tech project takes experience, which is why we offer our clients consultations that allow you to set the budget and see a full cost analysis of your savings and expenses throughout the life of your integration. We can help you set goals for your organization and plan them in a way that fits your budget and view of the future. Whatever your plans for the future, we can help you prepare for them — and get you ready to take on the next era of networking.

TAYLORED SYSTEMS: WHERE TECHNOLOGY POWERS BUSINESS

Taylored Systems is an all-in-one Indiana-based technology and IT-services company headquartered in Noblesville. We have a reputation for combining leading edge technology with unparalleled customer support and have the honor of calling companies like Leviton, Panduit, Hubbell and Ortronics strategic partners.

Our Registered Communication Distribution Designers (RCDD) and our technical staff are trained by BICSI. Taylored Systems utilizes our manufacturers to ensure the highest quality installation. By providing customized solutions and building long term relationships, we've grown to currently serve more than 2,500 customers throughout Indiana.

A reliable and cost effective communication system is critical to the success of business. That's why Taylored Systems is structured to provide a vast array of products and services custom-designed to meet the specific requirements of each client. At Taylored Systems, we're dedicated to delivering custom communication solutions that ensure maximum system performance and total customer satisfaction for years to come.



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