



Deploying Innovative IP-based Solutions is Necessary to Support Innovation

Rip-and-replace Infrastructure Alternatives Create Operational Efficiencies, Opportunities

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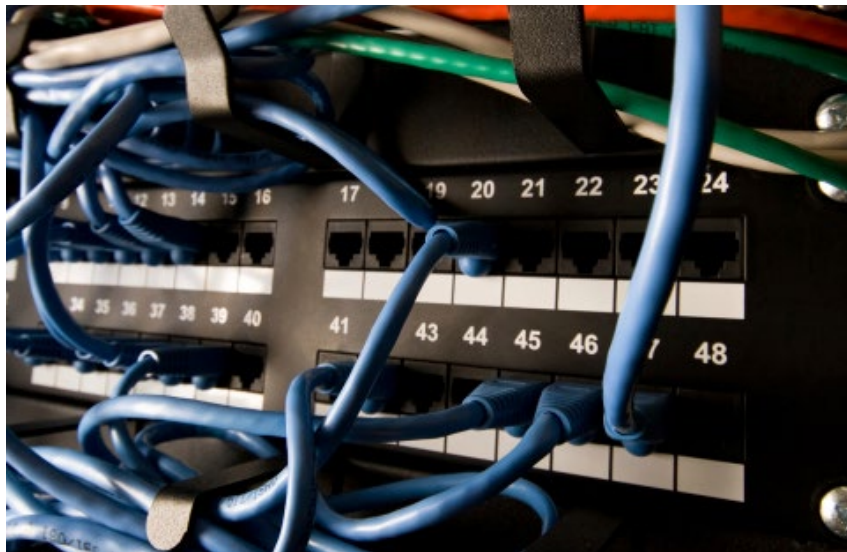
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INTRODUCTION

Based on well-defined standards and features, Internet Protocol (IP) has evolved into the foundation of nearly all business applications and networks. Leveraging IP to enable access to network-based data and applications is by far the most popular use case; however, previously segregated solutions such as telephony services or security applications are also converging on the IP network in most businesses. It is clear that a unified business network creates operational efficiencies and integration opportunities that were nearly impossible to achieve in the past. By leveraging IP, businesses can architect an infrastructure that delivers mission-critical applications, solutions, and services, deployed in a location that best fits their needs, including locally on-premises, in remote corporate data centers, and increasingly from the cloud. Put another way, decision makers are now empowered to make deployment decisions based on the needs of the business rather than solely on application or platform requirements.



However, while IP allows for highly flexible infrastructure designs, the transport of data between applications, devices and users still requires a physical connection, most often based on Ethernet. It is this physical connection, and its inherent limitations, that remains an inhibitor to truly innovative business infrastructure designs. This white paper will consider the barriers and challenges that businesses face in deploying next-generation, IP-based solutions over Ethernet, as well as effective alternatives to help overcome these challenges.

IDENTIFYING INFRASTRUCTURE CHALLENGES WHEN DEPLOYING IP-BASED SOLUTIONS

In an ideal situation, business applications and solutions could be deployed in a so-called “greenfield” environment. In such an environment, the physical infrastructure, the cabling and other components that connect devices to the business network can be architected to balance the physical infrastructure requirements and current business needs. However, the reality is that most businesses have to contend with existing buildings and the infrastructure already in place. Enabling a facility to support IP throughout can be an expensive proposition and at times become the largest cost item in IP migration projects. The biggest challenges that businesses often face include:

Retrofitting for Ethernet: Installing the Category 5 (CAT5) or Category 6 (CAT6) structured cabling that Ethernet relies on is a labor-intensive process. The cost to retrofit buildings includes the labor to actually run the Ethernet cabling, which can reach several hundred dollars per connection, depending on location and market rates.

Furthermore, for each connection that is run within a facility, certification testing must be performed to ensure that it was both correctly installed and capable of supporting the promised network speed. Finally, installing new cabling can have a material impact on the facility itself. In order to connect hard-to-reach parts of a building, installers may have to drill holes into walls or ceilings and create additional costs for patching and repainting.

Distance: The reach of Ethernet over industry standard CAT5 or CAT6 structured cabling is limited to 100 meters between networked devices. For small offices, 100 meters might be reasonable, but larger facilities will require its network infrastructure to be specifically architected around this limitation. As a result, intermediate distribution frames (IDF), commonly referred to as secondary wiring closets, are required to deliver Ethernet connectivity throughout a facility. On a local area network (LAN), IDFs serve as a junction point for Ethernet cabling, with network switches installed to essentially address Ethernet's distance limitation and connect nearby networked devices. Building an IDF within an existing facility can be a disruptive process, as it consumes valuable square footage as well as requires additional hardware and material investment. Because an IDF installation needs network-switching equipment in order to extend Ethernet connectivity, considerations for primary and backup power and cooling sources have to be accounted for. For even longer distances, fiber optic links between distribution frames may be required, requiring specialized hardware, technicians and tooling to deploy.

Building- and Industry-specific Challenges: While traditional CAT5 or CAT6 cabling is acceptable for typical office buildings, there are many environments where extra measures have to be considered. For example, highly secure environments, such as government installations, are very restrictive to retrofit. Installing Ethernet networks in industrial sites, such as oil rigs or chemical plants, needs to comply with stringent cabling requirements that will raise the installation costs. Likewise, many manufacturing plant, warehouse and shop floor environments will require additional protection for cabling, such as metal conduits, which will add to the cost of installation. Finally, there are unknown factors, ranging from thick concrete firewalls to discovering asbestos in the walls that can quickly turn even a relatively small CAT5 cabling installation into a significant project well beyond its budget projections.



The wireless enterprise and changing user habits: In recent years, business workers have become increasingly mobile, opting for laptops and mobile devices rather than traditional PCs tethered to a desk. As such, users are increasingly more likely to leverage enterprise Wi-Fi connectivity as their primary network access, rather than a physical Ethernet connection at their desk. As more users rely on Wi-Fi, decision makers are finding less justification for installing Ethernet everywhere.

Ultimately, as an enabler for a unified business network, the physical infrastructure provides very little business value on its own and is often viewed as a sunk cost by decision makers. As such, if the costs associated with this infrastructure rise due to various challenges, the value of the applications and solutions that rely on the network come under scrutiny.

AN ALTERNATIVE TO COMPLEX ETHERNET INSTALLATIONS

In response to these limitations, vendors have brought to market innovative networking products that can overcome both the physical limitations of traditional Ethernet and the disruption to business that a cabling installation can cause. Instead of requiring CAT5 or CAT6 cabling, these networking switch products leverage the cabling infrastructure already in place from the previous generation of business solutions. For example, most business facilities have already been wired with Category 3 or station wire to support legacy private branch exchange (PBX) extensions. Likewise, a number of these solutions can also leverage coaxial cabling installed for legacy video surveillance or security cameras. By using a combination of a purpose-built network switch and the appropriate adapter at the end of the connection, these networking products can replicate the performance of most traditional Ethernet switching products with existing physical infrastructure, allowing businesses to move forward with IP-enabled solutions without a complicated and expensive retrofit.

The most obvious benefit of these products is the ability to deploy IP-based networking with very little disruption to the business or its workforce. The latest generation of these network switch solutions is even more compelling by offering support for Long Reach Ethernet (LRE), which allows businesses to connect devices at distances up to six times longer than CAT5 cabling, along with support for Long Reach Power over Ethernet (LRPoE), supplying an industry-standard power source across these extreme distances. In other words, businesses can transparently connect far-flung network devices to a unified business network without a significant investment in the physical infrastructure.

CREATING BUSINESS INNOVATION ON EXISTING INFRASTRUCTURE

Frost & Sullivan has identified several use cases where leveraging existing physical infrastructure can provide value to businesses by cost-effectively supporting innovation.



Unified Communications: Over the past decade, the enterprise communications market has seen a transition from time division multiplexing (TDM)-based PBXs and key systems to IP-based unified communications (UC) platforms. UC solutions leverage the business network to offer a compelling set of tools for business communication and collaboration, as well as tight integration with other business applications, such as customer relationship management (CRM).

There are multiple benefits to leveraging existing physical infrastructure as part of a UC migration. While modern UC platforms support myriad communications endpoints, Frost & Sullivan research suggests that IP-based desktop phones are still most commonly deployed and typically replace existing legacy phones. The power over long reach Ethernet switches transform the cabling from the previous system into powered Ethernet links, enabling a simplified and cost-effective IP migration with minimal disruption. Furthermore, leveraging existing station wire creates a physical segregation between the endpoints and the rest of the business network, which can help ensure the quality of voice calls. In the event of disruptions to the primary business network, segregation can also aid in maintaining voice calls.

Finally, businesses are increasingly choosing to replace on-premises PBX systems with cloud-based hosted telephony and UC services. In this scenario, service providers can leverage existing cabling infrastructure to create an overlay or extended network, ensuring that the providers can achieve their quality of service and required service-level agreements (SLAs) without impacting a customer's primary business network or conversely having the business network impact the hosted customer's user experience.

Physical Security and Surveillance Systems: With the flexible deployment and management options available, it makes sense that the security and surveillance markets are leveraging IP to connect remote monitoring devices, such as cameras or sensors. By using IP, security personnel can remotely monitor these devices from anywhere in the organization or even across the Internet. As these devices are often installed in difficult-to-reach areas, Long Reach Power over Ethernet (LRPoE) is well suited to leverage existing infrastructure such as coax or multi-pair unshielded twisted pair (UTP) cable. Additionally, there are a number of extra benefits. First and foremost, the resolution of video surveillance camera equipment has been steadily increasing, which translates into increasingly higher amounts of bandwidth required. By segregating most of the video traffic in a dedicated overlay network, businesses can gain the benefits of IP-enabling these systems without risking lowered performance on the primary business network. This physical separation is also an important option in the event of an emergency or network outage, ensuring that the security platforms continue to operate, even if primary network is affected.



Furthermore, traditional security solutions were deployed without regard to either the business network or legacy phone system infrastructure, meaning that the infrastructure was consolidated in a security office rather than in the data center. By using LRPoE products, business can add IP-enabled security and surveillance solutions

without the additional expense of rationalizing separate distribution frames into a unified infrastructure. Ultimately, through long reach network solutions, businesses can reap the benefits that come from connecting security and surveillance applications to the business network without assuming the risks.

Hospitality Applications: Many providers in the hospitality industry, such as hotels, resorts and cruise ships, are considering ways to increase customer engagement, for example, with highly interactive concierge applications delivered on in-room TV or display phones. Retrofitting Ethernet into hundreds of rooms would be an extremely expensive proposition. In the case of a cruise ship, such an upgrade would require taking the ship out of service. By leveraging existing physical infrastructure, however, both land-locked and floating hotels can be upgraded with little downtime.

Machine to Machine (M2M) or Internet of Things (IoT): Sensors and controls built into the machines on the plant floor and warehouses can provide a significant amount of the valuable data, including production volumes and efficiency levels, and can even help spot trouble before it becomes a larger issue. The concept of the Internet of Things is to capture these data points and leverage it to drive exceptional business intelligence and insight. However, Ethernet’s physical limitations can quickly appear in the manufacturing environment. Long Reach Ethernet solutions are available to connect these devices, either with or without existing physical infrastructure.

CONCLUSIONS AND RECOMMENDATIONS

The very nature of IP makes solutions like Long Reach Ethernet possible. As a high-level protocol, IP is agnostic to the physical transport of its data packets, making it the ideal choice to connect devices in the global Internet or as part of a unified business network. The marketing teams at large networking vendors have worked to convince decision makers that expensive Ethernet switches and structured cabling solutions are the only way for businesses to migrate to IP. The reality for many businesses, however, is that making use of their existing physical infrastructure is not only the most cost-effective approach, but could be the only choice available.

Network architects engaged in thoughtful network design for their business should go beyond the conventional wisdom that exists in today’s marketplace. Alternatives now exist to a traditional CAT5 or CAT6 cabling for Ethernet deployments, and in many cases, offer a lower overhead cost and less risky IP migration strategy to the “rip-and-replace” nature of Ethernet installations. Long Reach Power over Ethernet (LRPoE) solutions deliver the advantages of IP with lower sunk costs due to physical infrastructure, and offer capabilities such as physical segregation that are difficult to achieve using standard practices. Ultimately, with a wide range of solutions available on the market today, businesses can focus on leveraging technology to drive operational excellence and innovation, rather than limitations that thwart progress.

THE LAST WORD—RECOMMENDATIONS

1	Businesses should consider all available options when deploying IP-based networks, including leveraging existing cabling and physical infrastructure.
2	Providers of cloud-based services and IT managed services should provide overlay network options to their customers. An overlay network using existing physical infrastructure allows a high level of control, even on the customer premises.
3	Businesses should no longer allow physical limitations to slow down business innovation.

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