



STRUCTURED CABLING : Strengthen Your Backbone *As data-intensive applications are likely to flood enterprises, it is crucial for them to carefully choose the right cabling solutions and select trained installers*

[Kannan K](#) Thursday, March 05, 2009

Enterprise data is growing exponentially, and would continue to grow in the future. This is particularly true for India. This data explosion will only multiply in the coming years owing to growing business needs. According to a recent NetApp-Nielsen survey titled, 'Data Explosion in India: Trends and Challenges', IT applications, including Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) emerged as the topmost factors for the avalanche of data. The study indicates that 24x7 data access (31%) and data proliferation (15%) are the major business challenges arising out of data explosion.

The underlined point is that although mass enterprise IT adoption is a welcome trend, enterprises run the risk of an IT infrastructure breakdown if they do not choose the right cabling solutions depending on the different kinds of requirements for data transport.

With structured cabling forming the foundation of any network, it is important for enterprises to meticulously design their networks at an early stage. The cabling is usually concealed within the building and it is difficult to make changes once the network has been implemented. Unlike other active components, cabling cannot be changed at will. So it is necessary to plan



early and ensure that cabling is able to support at least three generations of active network infrastructure.

Golden Rules

Cabling infrastructure will outlive the rest of the information transport systems. A typical lifespan of the cabling infrastructure is 20-25 years. Seventy percent of the network downtime is attributed to poor cabling. Investment for a cabling infrastructure is less than 5% of the overall IT spend, but this investment ensures that the remaining 95% is protected. Hence, it is important to evaluate the product offerings of vendors and choose the right solution meeting product quality, installation/customer references, etc.

Experts panel

Dileep Kumar, director, product management, ADC
KRONE

DS Nagendra, general manager, LAN, Nexans Singapore
Ispran Kandasamy, VP & MD, solutions division, Asia
Pacific, CommScope Enterprise

KK Shetty, director, sales, India and SAARC, AMP
NetConnect/TOSP, Tyco Electronics

Kannan Rangamani, country manager, Anixter

Ketan Kothari, MD, Sigma-Byte

Milind Tamhane, VP, manufacturing, Digi-Link

Rajesh Kumar, country manager, Siemon

Rajesh Shenoy, business head, South Asia, CDT Belden

SA Mohan, regional sales director, India & ASEAN Region, Molex

James Bunday, marketing manager, Asia Pacific, Molex

Shajan M George, technical director, India, Reichle & De-Massari (R&M)

Subhashini Prabhakar, chief technology manager, Dax Networks

Satish Rao, national business development manager, VDI, Schneider Electric
India



Selection is a long and sensitive process that ends with purchasing. Typically, purchasing decisions are valid when commodities are involved and unfortunately, many consider cabling a commodity while it is not. Cabling is a system and, therefore, all elements must be evaluated with competence that generally does not belong to only one individual. An enterprise building construction should start from designing and installing fundamentals like cabling infrastructure for the enterprise. Most of the time cabling is considered at the end and sometimes, not even considered as a part of IT.

As structured cabling is the backbone of the information system, enterprises should discrete while choosing, installing, and maintaining the right cabling solutions. According to industry experts, there are three golden rules while choosing cabling solutions-future proof investment, scalability, and security.

When cabling solutions are being selected and installed, it must be noted that the network will last at least fifteen years of active network infrastructure. This is to ensure that the cabling remains effective and can support changes in active network infrastructure. While the solution should last for at least fifteen years, it should also be chosen in a way that it supports speed requirements for at least six years. Then, with scalability feature, the solution can be upgraded for further speed requirement and data needs.



When the CIO/CTO chooses a cabling solution, they need to look not only at meeting the standards but also to exceed the parameters defined in the standards. The standards only

prescribe minimum set-up parameters that could be matched by most vendors. By exceeding the standards, cabling solutions will provide peace-of-mind to CIO/CTO in supporting current applications, as well as future applications and technologies.

While enterprises consider these aspects, they must not forget one more important point-enterprises must not settle for a solution just because the solution is cheaper in the market. Cost is an important but not the decisive factor. The cabling must first satisfy the performance requirements. A good quality and properly designed product will help a CIO/CTO reduce opex on repairs or maintenance in the long run. Apart from this the solution should comply with industry standards such as TIA/EIA and ISO. And an open architecture (standards based) rather than proprietary will help reduce opex.

Golden Rules for Choosing SCS

- Future-proof Investment-the network should last at least 15 years of active network infrastructure
- Scalability to handle emerging applications
- Security is a very important criterion
- Don't be price-dependent, but quality dependent
- The cabling system should support minimum gigabyte throughput and future applications
- The vendor should offer performance warranty
- The cabling system should be zero-bit error-free performance
- Select a solution that is completely standards compliant and backed by a single vendor
- Ensure that the performance specifications given by vendors are backed by an independent agency
- Ensure reference checks are done before selecting a vendor
- Select a right integrator for a particular solution.

Points to Analyze

A complete analysis has to be carried out to see if the solution under consideration will meet current and future requirements. A solution should be chosen depending on the kinds of applications enterprises run on the network. Ten gigabyte solutions on copper or fiber optic cabling are recommended if your enterprise network demands are high-speed and data-intensive applications. As most enterprises have the requirements for 7x24x365 availability of network, reliability, continuous monitoring, fast installation, data center solutions with plug-and-play factor, and pre-terminated and pre-tested structured cabling products are generally recommended. Intelligent infrastructure management systems have now become a key trend among enterprises that need to monitor MACs and other network status constantly to avoid any down-time.

Key Cabling Trends

- 10 Gb over copper
- Cat-6 continues to rule the roost
- Intelligent cabling solutions to constantly monitor MACs and other network status to avoid any down time
- Cat-6A gaining momentum following its ratification by the ISO and EIA
- Data Center Cabling is increasingly adopted by vendors
- Offer solutions for energy efficiency and conserve energy that results in reduced opex
- Cost of fiber optic deployments is nearing that of copper solutions, thus increasing acceptance of fiber optics
- Pre-terminated cabling solutions are preferred for both CDC (Corporate Data Center) as well as IDCs

Choosing a new infrastructure is not always about choosing the latest and greatest. It is about understanding which system best suits your company needs. A network infrastructure is a long term investment, and it is vital that you make the right decision from the start. Otherwise, an expensive upgrade could be due sooner than expected.

For a CIO/CTO, the following aspects are important while choosing a cabling solution:

- The number of transistors in a chip doubles every eighteen months
- Memory usage doubles every eighteen months
- The value of the network is proportional to the square of total users.

Enterprises should see whether a cabling system can support minimum gigabyte throughput and future applications. The cabling system should provide zero bit error-free performance. Another basic factor enterprises should consider is obtaining performance warranty from vendors. The warranty-clause provided by the vendor, and components covered under them have to be carefully considered.

Application guarantee, easy administration, and availability of managed solutions from a vendor will be of great help for enterprises. Enterprises should also see availability of certified cabling resources, test and measurement equipments, and financial capability from system integrators. Despite these crucial considerations, a vital factor is choosing the right implementation partner, who needs to be someone recognized by the OEM and certified in their technology.



The most important aspect is to ensure that site-certifications and warranty is provided directly by the OEM for implementation done through their recognized partners and integrators. It may also help to demand assurance on the support of applications that vendor claims to meet, and not just a product warranty.

Enterprises should opt for vendors that are technically very strong. The company that provides the best after sales support, using the right production methods in manufacturing, having technical innovations in designing networks, a complete product portfolio and flexibility must be considered.

The vendor should offer end-to-end solutions-both active and passive solutions-and provide 24x7 support for enterprises. Reference sites by vendor will be an added advantage for enterprises. Selecting standards-based solutions backed by a single vendor is also important. Enterprises should ensure that performance specifications given by vendors are backed by independent agency.

It is safer to ensure that reference checks are done before selecting a vendor. Enterprise CIO/CTO needs to consider the credentials of the vendor before they settle for choosing the right cabling. This becomes very relevant considering that vendors are said to be substituting copper with other cheap metals to maintain the gauge of the cable.

Choosing Integrators

Proper installation by trained personnel is crucial for reaping maximum benefit out of the chosen solution. Proper installation is as important as choosing the right solutions and therefore integrator's reputation and experience should be considered. Shortage of well-trained engineers for structured cabling installation has always been an issue in the SCS market. Proper training is highly critical for people who install SCS networks because quality of interconnections and the way cables are laid is directly proportional to quality of bandwidth that a network delivers. Poor connections result in less bandwidth that slows down the speed of network applications that run on it. For installing high performance cable infrastructures such as 10G/Cat-6A/Cat-7 cables as well as Drop Wire FTTH cables, installers need good training. In other words, inadequately trained installers can ruin the performance of an otherwise capable infrastructure.

Partners should be able to understand the technical requirements of the customer, only then will they be able to suggest the right solution. Partners should be able to understand why the company requires a network and what type of load it will carry. Secondly, the partner should understand what will be the lifetime of the deployment. The customer should specify whether he intends to remain in the premises for a short or a long period of time, and accordingly suggest solutions.



Simple things like unpacking a cable box without creating knots, that can affect the performance of the cable, the number of bends that you can have in a segment, the amount of unsheathing of cable at termination points, etc are taught installation engineers.

Cabling Trends

Though it is a growing economy, India has always been very unique in the development and deployment of structured cabling solutions. While many developing countries continue to plan structured cabling solutions on a 3-5 year basis, Indian customers have always planned for the long term, investing greater sums in their networking infrastructure.

The copper medium has seen a definite shift from 100 Mbps transmission to 1 Gbps and now to 10 Gbps. In terms of the current trend in technology adoption, Cat-6 continues to be the leading choice for most enterprises. Cat-5E cabling has become almost negligible as Cat-6 cabling is still the de facto medium. Cat-6A (STP) implementations were limited to data center projects especially in the network backbone. On the UTP side, Cat-6A following its ratification by the ISO and EIA is expected to gain momentum.

Another key trend in India, as compared to developed countries, is the far wider use of fiber cable solutions, in both single mode and multi mode fiber cables. FTTH is primed to become a reality and many top vendors have the entire end-to-end solution in this space. Bandwidth and speed hungry networks are shifting to fiber optics. Fiber optics deployments as the backbone for both campuses and buildings is being witnessed. The good news for enterprises is that cost of fiber optic deployments is almost equal to that of copper solutions as the price of active fiber equipment has dropped.



On the fiber front, the number of fiber installations and ease of installations is increasing tremendously. Though fiber optics sales to enterprises have not been very high, they have contributed to about 8-10% of the overall structured cabling business.

There has been a mental block among installers that the installation techniques for fiber cabling solutions are complex. Today, the fear psychosis has definitely died down and the fiber cable finds increasing acceptance. Pre-polished connectors, pre-terminated fiber, and MPO fiber plug-and-play connection systems decrease the complexity of installing fiber cabling with reduced risk of error. Though fiber optics is gaining importance and is mainly used in the case of large campus installations, trained/competent workforce is still a stumbling block in its growth.

Intelligent cabling solution or IIMS is making its presence felt in large networks where efficient network management, fault detection, and documentation are basic requirements to reduce down time and save costs. Specialized cabling solution for data center is another development in structured cabling. Many vendors are having a dedicated portfolio for data centers. Another

interesting trend is the proliferation of green solutions in structured cabling. While cost-cutting and cost saving is the new mantra, especially in these times of recession, this environment-friendly green solutions offer energy efficiency and conserve energy that result in reduced opex.

Role of CIOs

CIOs today are assuming much more importance with the changing economic scenario. They are looked upon for cost-cutting initiatives and at the same time are asked to cut down IT expenditure, which puts them on a double edged sword. In such a scenario, CIOs are implementing a hybrid solution which is cost effective and can run applications without any compromise on quality or output. CIOs are serious about RoI in word and spirit. The hybrid solution could probably mean a combination of fiber for high-end/bandwidth-hungry application and a vanilla Cat-5e solution for normal office applications.

In the earlier days it was believed that fiber was the only option for high bandwidth application or for high data speeds. But today with the advent of Cat-6A and Cat-7, which can achieve data speeds of 10 Gbps and 40 Gbps on copper, CIOs have a clear-cut cabling choice. In fact Cat-7 offers more flexibility to run some of the applications that we could never think of earlier.

With all the above advantages of copper cabling solutions, CIOs still prefer fiber in many cases as it offers unlimited bandwidth compared to copper solutions. Installers are also geared up to install fiber with ease due to techniques like splicing. Nowadays fiber installations are made easier with products like pre-terminated fiber, and MPOs used in the network also offers-plug-and-play flexibility to users.



Future Outlook

Cat-6 UTP will dominate the market, however there would be definite increase in 10G UTP, 10G STP as well as Halogen free cables this year. We might witness further advancement in 10G solutions. In fiber, while single mode would increase its presence in LAN environment, new fibers such as bend insensitive fibers- Clearcurve from CORNING as an example, would find their place in the FTTH environment.

In multi-mode fiber, though the price would be an effective driver but OM3/Laser optimized fiber seems to have an edge over OM1 and OM2 types. FTTX for first mile and last mile connectivity has become a necessity due to increased demand for bandwidth. Enhancement of low-loss fiber and security-solutions in structured cable networks could be there for us to see in the future. And, the market is likely to witness an increase in residential and industrial structured cabling solutions.

While it is difficult to predict what technology trends would exactly prevail, if the market picks up, we might see data center technologies gaining newer dynamics with solutions including integrated data center emerging. It would be worthwhile to note that Hi-D cable management systems that reduce real estate footprint for SCS would be very relevant in today's scenario for all verticals because they would help maximize real estate costs.

Through sheath sharing technology, four pairs can be used for multiple applications simultaneously. In CAT-7, since the cable is a shielded solution, a sheath sharing implemented could use two pairs for data; one pair for voice, and another for an IP application (phone/surveillance) or video, etc.

Pre-terminated fiber and Multiple Point Outlet (MPO) will become more suited for data center applications where there might be the need to provide flexibility to users for creating a work group. The MPO in combination with the pre-terminated fiber offers a solution that is flexible and can be implemented quickly.

The trend of implementing intelligent infrastructure management systems has been increasing. It will gain further impetus as CIOs are realizing the benefits of this as it offers easy administration, easy to implement, adds moves and changes, IT asset management, sending alerts via SMS to network administrators among other benefits.

Growth Drivers

The key growth drivers will be data centers and verticals like telecom and government. The basic criterion for driving the growth would be the need for high data transport speed and evolution of bandwidth. There is a definite increase in Internet traffic. New applications coupled with the growth of Internet users are driving the need for increased bandwidth. Innovative solutions by structured cabling vendors and increase in data applications will drive the growth of structured cabling industry.

Nowadays it is expected that enterprises will increasingly use data intensive applications like videoconferencing. 3G and WiMax services also will offer data intensive applications once they are rolled out. Will enterprises and service providers require different cabling solutions, increasing the business for structured cabling market?



In an ideal situation, and going strictly by the expectations this could really happen. However, the market scenario is far from ideal. Data intensive applications like videoconferencing are yet to take off in a big way and require huge amount of investments both on active and passive devices. With the current slowdown, businesses are being very cautious in terms of investing even in technology.

Increase in such demand for high bandwidth cabling solutions would increase the demand in 10 Gb cabling systems. High-end applications cannot be supported on conventional cabling and will require a complete structured cabling infrastructure. To achieve the measurable performance for high-end applications, specific cable such as HFC (Hybrid Fiber Coaxial), Long Haul Fiber, etc, will be adopted by the service providers.

Telecom operators are creating kiosks for videoconferencing in multiple locations within the city and in their operational regions. They also contribute to the cabling growth. Effective structured cabling solution would handle triple play far more effectively than before. This means offering new applications such as videoconferencing, public address system, and IP telephony using the common infrastructure. This has definitely increased the growth potential for appropriate structured cabling solutions.

Data intensive applications including videoconferencing require highly bandwidth-intensive networks with reliability and redundancy. The LAN cabling depends on the applications used, which will only be more demanding in tomorrow's enterprises. With the specified technologies requiring higher bandwidth on WAN, there is definitely a need for higher bandwidth on the LAN as well. This is further emphasized with progressive and demanding applications that require not only higher bandwidth, but also reliability and redundancy with future-proof networks. These requirements can only be achieved with high-end structured cabling solutions that offer the flexibility to support future applications and technologies with very high reliability.

As applications become increasingly data intensive, Quality of Service will be a priority. Nowadays there is a move toward providing multiple applications like data, voice, video, videoconferencing, IT applications etc, and hence there is a need for robust networks. These networks have to be properly planned and implemented. In cabling, the focus will be on QoS which will provide the required data rates for these applications.

Data center remained the toast of the SCS market and of the IT segment as a whole, but the last two quarters saw substantial decrease in demand of new data center projects or even in expansion of existing ones. There has been good traction in SOHO projects from B and C class cities across the country. Telecom, transportation, hospitality, healthcare, and real estate verticals will adopt deployment of structured cabling solutions, giving more and more business opportunities.

Class Solutions

While fundamentally the solution remains the same for all three customer classes viz, SOHO, SME and large enterprises, only the scale changes. In SOHO, the same infrastructure is expected to transmit voice and data whereas in large enterprise there would be two distinct solutions for voice and data. Similarly, data integrity becomes the key parameter for large enterprises.

Each vertical needs a solution which could be marginally different or could be drastically different. This difference could be in terms of solution or the type of products that need to be used. SOHO, SMEs and large enterprise will require different kinds of solutions keeping in mind

complexities of large setup, scalability, cost, etc. For example, SOHO will not require a solution that is scalable while large enterprises would require completely scalable solutions.

SMEs and large enterprises will go for Cat-6 or Cat-6A and fiber cabling products in their campus. Customers with high bandwidth requirements usually opt for 10 Gb cabling. In the SOHO sector, for broadband usually Cat-5e is used. However, as the cost difference is not significant, there can be a move toward Cat-6.

For various large-enterprise consumers and data centers, including progressive industry verticals, the structured cabling solutions required will be similar in technology and quality; with a need for high-performance, flexibility, and future-proof technology. But there could be a variation in their mix of various high-end products, depending on specific requirement.

The major differentiator for SOHO and SME segment could be the choice of technology and quality, owing to their scale of operation and investments that are generally in short-term infrastructure for a flexible manpower and temporary location. However, in case of long-term investments, the need for higher performance and flexibility will drive them to deploy high-end solutions from reliable vendors.

Kannan K

kannan@cybermedia.co.in