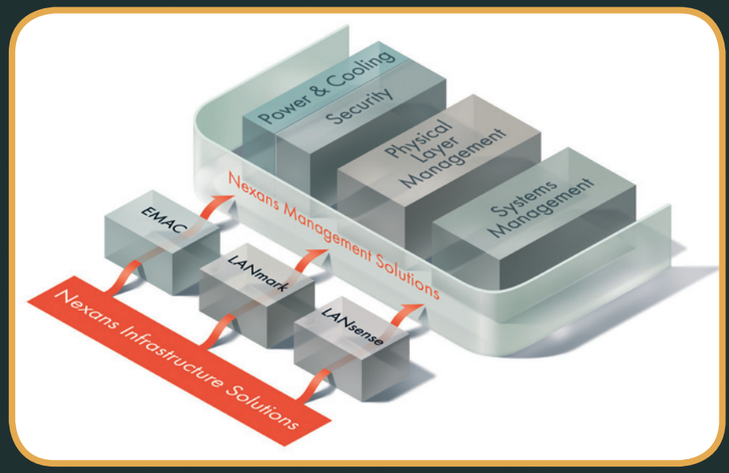
Latest network trends



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Mike Holmes is Marketing Manager for Nexans Cabling Solutions UK. Mike has worked in the cable industry for 20 years since graduating from the University of Bradford. He joined Alcatel in 1994 as the UK Product Manager for fibre and copper LAN cables and, following the creation of Nexans, he became European Product Marketing Manager for copper LAN solutions before taking his current position as Marketing Manager for Nexans Cabling Solutions UK.

Mike Holmes takes a look at the latest network trends, including ever increasing bandwidth and speeds. He also looks at the importance of reducing operating and energy costs.

With increasing regulation, soaring fuel costs, and a potential energy shortfall on the horizon, so called 'Green IT' is starting to have a major influence on networking. The usual technology drivers which demand ever increasing speed and bandwidth have not disappeared, but the need to deliver this enhanced performance now comes with additional constraints and the challenge to increase data throughput, whilst at the same time finding ways to improve efficiency and reduce power consumption. Green IT is not only to do with saving the planet and good PR – it has become an essential commercial necessity.

The other major driver is linked to the changing use of IT networks – both physically and in terms of management and responsibility. In the past, the typical IT department had clear ownership of the computing functions – the PCs, servers, and the LAN network in a company. A separate facilities team handled telephones, access control, CCTV, building management and other services, such as air conditioning etc.

However, as more devices become IP based and need to communicate with each other, the line between IT and Facilities departments has been become increasingly blurred. As an example, the humble mobile phone is no longer a stand alone tool to improve voice communication with mobile workers; it is now a sophisticated IT device that not only sends texts, takes pictures, plays music, and links to the web, but is used for email, contact lists and diaries, which are linked to the IT network. As a consequence, the mobile phone is now a device that needs to be managed by IT to ensure that both data integrity and security are properly controlled.

This constant change adds new complexity and challenges, all of which affect the needs of the network infrastructure.

Speed and bandwidth

The need for increasing performance has been the one factor that has remained unchanged, and application speeds have roughly followed the predicted 'Moore's Law' curve by doubling approximately every 18 months. However, some experts now believe that speeds will start to increase even faster than this. 10Gigabit Ethernet is the latest application for copper to be standardised and, like its slower predecessors, has brought many new challenges for the cabling infrastructure. The main issue for 10Gigabit over copper is that it is very sensitive to external interference induced by signals in other cables. The use of a screened cabling has proved to be by far the most effective, reliable, and cost efficient method of overcoming this problem and, as a result, screened solutions are becoming increasingly popular.

But if 10Gigabit starts to be adopted now, and speeds are increasing even faster, then what will follow next? Traditionally, we have seen application migration in tenfold leaps from 10 to 100 to 1000 Mbit, and now 10Gbit, so it would seem rational that the next step would be for 100Gigabit. However, such a solution would be prohibitively expensive. As a consequence, volume deployment of 100G Ethernet in servers is not expected within the next 10 years, so the IEEE has decided to work on a 40Gigabit copper solution to bridge the gap between 10 and 100 Gigabit as a more affordable next step.

Although it is too early to specify cabling requirements for such an application, tests conducted at Penn State University have demonstrated that Category 7A cabling has the capability to support 40Gigabit over 100m and even 100Gigabit over shorter distances.

A greener future

As mentioned already, speed is not the only driving factor. In 2007, the IEEE 802.3az, supported by US Federal Executive Order 13423 and the US Green Building Council, identified Energy Efficient Ethernet as a priority project. This was, amongst others, prompted by the fact that the IT sector emits a considerable amount of carbon dioxide (CO_2), the main 'greenhouse' gas that causes man-made climate change.

One of the negative outcomes of designing applications to run over existing cabling technology is that a large percentage of the processing power of active components is spent on noise cancellation. For 10Gigabit Ethernet, this represents about 40% of the energy consumption. If active components were developed that were geared towards Energy Efficient Ethernet, the potential savings would be significant. Higher performance cabling, such as Category 7A, not only supports higher bandwidth but also could allow the electronics to be simplified so that 10Gigabit could be transmitted using significantly less energy. In addition, the improved attenuation of enhanced cabling means that heat build up in the cabling is reduced. This, in turn, reduces the amount of cooling required – a major issue and cost within data centres.

Monitoring and control

The monitoring and control of networks is becoming increasingly important, and is of particular interest in modern data centres where the cost of cooling and power, and increasing regulation, means that maximising efficiency and reducing operational cost is vital. Intelligent Infrastructure Management (IIM) has been available for some time to monitor and log network events and map these against physical locations. The inclusion of Environmental Monitoring and Access Control (EMAC) into an IIM platform enables users to monitor and report energy consumption, and even switch on or off individual ports. This functionality enables the remote management of network devices and gives the ability to hard reboot a device such as a server without visiting the rack. The ability to monitor power consumption can be used to support 'green IT' initiatives, and potentially to allow power costs to be attributed to different cost centres or customers in a co-location environment.

Summary

In conclusion, whilst networking trends continue their progressive evolution of increasing speed and bandwidth, new additional factors such as fuel costs, regulation, and rapidly changing usage and environment are also having a major influence. Traditionally, physical networking infrastructure has been considered as an 'upfront cost', but we are now starting to see that the chosen solution can also have a significant impact on ongoing operational cost. This will become a more significant factor for future