

## ***New Healthcare Systems Need High Performance Cabling To Deliver Full Benefit To Staff And Patients - Now And In The Future***

In recent years we in **Kedington** have witnessed a dramatic increase in the demands placed on data networks as applications become ever more powerful and associated file sizes explode. Nowhere is this more noticeable than in the medical diagnostic and support sector.

New technology offers an opportunity to meet the ever-growing demand for improved healthcare without undue financial pain for patients or hospital management. Advanced diagnostic and administrative systems have shown they can help achieve better patient outcomes while avoiding increased working hours for staff. However, unless information from these systems reaches the right people when they need it, many of the benefits are lost.

Magnetic resonance imaging (MRI), computed tomography (CT) and positron emission tomography (PET)scanners, for example, produce 3-D images that make diagnoses easier and more accurate. However, to maximize benefit to patients, the new equipment must form part of an infrastructure that delivers output quickly to the appropriate medical staff.

The same is valid for new administrative systems utilizing applications, such as PACS, to manage patient records, bed allocation and the dispensing of medicines. In many cases, these systems must provide hundreds of staff throughout a building, or across a campus, with fast, error-free information. If the network cannot do this, the investment in new software and equipment will simply create disconnected islands of information.

In teaching hospitals, multimedia links already play a key part in education programs by allowing students on remote sites see and

hear lectures, allowing top consultants to share knowledge and experience with a wider audience. In the same way, video can provide large groups a closer look at surgical procedures without ever entering the operating theatre.

More recently, telemedicine has taken these techniques a step further. Using video and audio links, consultants are able to make remote diagnoses, giving patients in other buildings, or even different countries, the benefit of their expertise. Beyond even this, some surgeons are using robotic links to work on complex procedures with teams located in other hospitals.

In the past, high quality video needed to support these applications required expensive, dedicated cabling. Today, high performance structured cabling allows staff to plug in video cameras at any network outlet, in the same way as a PC or printer.

### ***Bandwidth Demand***

New systems for diagnosis, management, and teaching, are not the only demand drivers for high performance networking. The structure of healthcare is changing in ways that make it more dependent on effective communication. As well as cooperating with each other, hospitals are starting to work closely with general practitioners and social service agencies. For example General Practitioners can upload patient record to a hospital system once a patient is admitted, making the patient's full history available on-line to consultants and hospital staff.

As well as cooperating with each other, hospitals are increasingly forming cooperative groups spread around the world. These cooperative groups must have strong wide area communications. This in turn, feeds more data traffic into the LANs (Local Area Networks) within each site, increasing their need for high bandwidth cabling. This trend will grow as groups build new systems

to drive down costs. Many, for example, are already gaining economies of scale through buying on-line for the whole group. As suppliers of products ranging from drugs to cleaning materials allow purchasing over the Internet, documentation will switch from paperwork to network, adding to pressure on cabling infrastructure. At the same time, collaboration in areas such as research is also accelerating the move to on-line communication. Using the LAN, researchers can share data and reports within a building or send them to colleagues on other sites via wide area connections. Added to this, the LAN is the gateway connecting medical staff with the vast information resources on the Internet.

### ***Moving to Gigabit Networks and Beyond***

Yesterday's networks will not support this new wave of bandwidth-hungry systems. Without a modern network that delivers information quickly and reliably, even multimillion dollar IT investments will disappoint users. A new system that keeps users waiting for information will soon be branded as a white elephant. Gigabit network electronics, transmitting data at 1000 Mb/s can provide the throughput needed to make systems fast and responsive. But they can only do this when linked by robust and reliable high performance cabling. Most cabling systems that work well at 100 Mb/s will simply not have the bandwidth to operate reliably at 1000 Mb/s.

Even if cable performance measured in the laboratory looks good, results in the real world may be very different. Factors such as mismatched connectors, electro-magnetic noise, resonance in short links and most importantly imperfect installation, can cause errors. Each error means data has to be resent, and that means waiting longer for information.

The impact of this is clear when transmitting a CT brain scan comprising 515 images totalling 150 megabytes of data, or a spinal scan amounting to 127 megabytes. A network giving true data throughput of 1000 Mb/s, will let staff anywhere in a hospital view the scans in just 2.2 seconds. At 100 Mb/s, the wait would be around 22 seconds, a delay that could cause more than just frustration when fast diagnosis is critical to a patient's speedy recovery. Currently there are plans to double the number of image slices in MRI and CAT scans thus doubling the associated file size.

Any new hospital, or medical support facility, being constructed today must include a cabling facility that will support the current technologies but also the technologies that will evolve in the future. During the twenty year expected life of a cabling system the computers will probably be upgraded 7 times, the software 10 times and LAN switching four times. In each case the demands on the cabling network will increase. Cabling infrastructure is installed in the fabric of the building, changing it will require major expense but more importantly massive interruption to services as floors will need to be closed down to facilitate the work required. To avoid the future cost and disruption, **Kedington** recommend that any new networks should be based on a certified guaranteed (by the manufacturer) CAT 6 system at a minimum, and we strongly recommend that the new CAT 6+ 10 G platform should be considered to give maximum security for the future. CAT 6a systems are available today and the IEEE standard is expected to be ratified in 2006. The CAT 6a systems are fully backward compliant with the usual CAT 6 standard.

### **Conclusion**

In applications where network performance is vital to patient care, lower quality cabling is simply not an option. Medical systems today require Gigabit

performance at a minimum. As scanning techniques evolve and the amount of data on the network increases, 1 G performance will not be sufficient. **Kedington** recommend that deployment of a CAT 6a (10G) system should be considered to help ensure that the passive data network is sufficient to support the operational needs of the hospital in the future. **The choice of cabling infrastructure, and the installation contractor, is a critical decision in ensuring the operational efficiency of the organization in the future. The wrong decisions today will prove very costly in the future.**

### **About Kedington**

**Kedington** is Ireland's largest dedicated data network installation company, headquartered in Dublin with offices in Cork and Limerick. **Kedington** have installed over 3 million ports and 250 Million meters of UTP. Kedington recently installed Ireland's largest Gigabit to the desk solution with 670 computers all achieving Gigabit performance on a Cat 6 cabling network. Kedington are currently installing three CAT 6a 10G networks in Ireland.

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