



Council Elects Siemon Category 7A TERA

Runnymede Borough Council, a medium sized council, serves a population of over 82,600 people in 32,000 households, over 8,000 hectares, including the prestigious and exclusive, Virginia Water.

It was on 15th June 1215, that Runnymede earned its place in history with the signing of the Magna Carta (Latin for Great Charter). Aimed at improving rights and offering freedom to all the King's subjects, not surprisingly, it made no direct reference to the selection of structured cabling systems! But moving to a new building, the Runnymede IT team was about to design and install its second data network in a decade.



Based in offices that were old and difficult to maintain - one part being a concrete building of 1950's vintage - it was decided that a new building was required. Owning a site adjacent to the old building, the Council was in an ideal position to design and commission a brand new, purpose-built Civic Centre. Having thoroughly understood local needs, the Council agreed to an innovative move; to accommodate the local Surrey Police station (replacing another old building nearby) and also the Library Service.

The newly designed building had tough targets both for build and operation. For it to be acceptable, it had to be ecologically responsible and environmentally friendly to align with the Council's charter. This resulted in a unique concept in public buildings, taking an architect's design for the maximum light exposure through a totally open plan environment over two floors with a basement parking area with, for example, no air conditioning but using instead an electronically controlled system of circulating air. Nigel Watson, Head of ICT at Runnymede Borough Council says, "In planning the network for the new building, we needed to be sure that we got it right. It wouldn't be acceptable to undertake major work on the infrastructure in the next five to ten years, or inconvenient work for simple routine tasks, like moves and changes. Future proofing was the goal, but with the rate of change of technology being so high, in reality, it was more about being future-aware."



For operational reasons, Surrey Police decided to install their own separate network, so the Council had to cater for themselves and the Library Service. In addition, the Council operates Safer Runnymede Partnership consisting of a 24 x 7 CCTV unit monitoring theirs and a neighbouring borough. Additionally, they operate a 24 x 7 care line for sheltered homes and as Watson points out, "This is working with real lives, so up-time is crucial."

Predicated requirements were not just calculated on what existed. The Council saw the move as an opportunity to help its staff to work more flexibly. So for example, fewer desks were provided to encourage staff to work from home, with a hope that this would reduce travel time and its impact. IP telephony was decided upon to further support this objective and Nigel Watson says, "There was an emerging trend for conferencing - both internally and

externally - and this potential need may also have to be accommodated in the future, including its demanding bandwidth requirements."

The sixty-one week build project ended with occupation in May 2008. This was of course preceded by much agonised thinking and planning and Watson recalls, "That our first major decision was to decide what cabling standard we needed. Our initial thoughts that category 7A would be too expensive seemed to be ill-founded." Watson explains, "We looked at a number of case studies and also made some reference visits. Although some visits were to sites operating on a different scale, for example trading rooms, it was easy to see how they were really getting the advantage of the investment. As analogous deployments, they helped us understand how the standard could be scaled and helped us to understand the risks."

The category 5 network in the old building was installed in 1996 by Siemon Certified Installers, and this meant that the Council saw Siemon as a trusted supplier with good history. Watson says, "The manufacturer's role is critical, though in our case we didn't need to build or test it; Siemon were a known and appreciated force."

The installed network is built on Siemon category 7A twisted pair cabling, using the TERA connector (Figure 1) and this is presented to the IP phone and then onto the computer, using one cable per desk, providing 1200 outlets. Using this system means moves and changes are trivial tasks. The cabling lies beneath a suspended floor and so a single cable is pulled up through a floor tile grommet and patched in, to complete the move or change.

Effectively a two-storey building, it has two machine rooms - one at the front and another at the back - accommodating the maximum permissible 100 metre cable runs. There is a fibre backbone between the rooms with duplication, including two fire walls and two core switches. In addition they have installed a twisted pair between the machine rooms so that they can run analogue phones in an emergency. The network has been designed with a high level of resilience in mind.

The future with a past

Many IT managers lack real experience when it comes to the specification, design and implementation of network infrastructure, because of networks' life expectancy. Reflecting back to the old category 5 system, Nigel Watson, sounding like a veteran, opines, "I don't think that it was the standard per se that was a limitation. The network had grown in an unstructured way, with lots of workgroup switches meaning that there could be up to six hops in a connection. This was giving rise to performance problems - for example one failed switch affected many users." Reflecting on the past he adds, "Forward planning seems like a scary prospect when you consider that just ten years ago we were putting in Ethernet for the first time, and structured cabling was new to us - we were by no means a backwards council. So looking back and then forwards, makes it very hard to know what to expect."

The experience at Runnymede is that users as well as technology can be quite unpredictable. It's not possible to know exactly what will take off and when. Runnymede users are already working in different ways with the new environment. Watson remarks, "Users adopt technology and then use it in the most surprising of ways."

Supporting such a network was becoming a major challenge for the Runnymede IT team and Watson was determined to learn from this experience. He says, "That this made clear to me how important the planning and design phase was. We hadn't got it wrong first time around, we just knew more and this to us was a critical resource. The new system is utilising a small amount of its overall capacity, so there is plenty of headroom for the anticipated and hopefully, the unforeseen."



Illustrating the reality of thinking ahead, the Runnymede team have thought about the possibility of diminishing bandwidth with rising demand. In response to this voracious appetite, Watson sees additional headroom being delivered in the future through new technologies, such as optimisation.

Moving into the design

Graeme Stoker, marketing manager at Siemon, proudly asserts that, "Siemon's fully shielded TERA end-to-end cabling solution is the highest-performing, most secure twisted-pair copper cabling system available globally. We work in partnership with our Certified Installers to make sure this performance is delivered." The installer at Runnymede, Dimension Data, was actively supported by Siemon technical staff during the installation and the all-important testing.

Darren Whitwell, Project Manager from Dimension Data says that the Siemon cable "Lays and dresses very neatly and it is a pleasure to work with." Having installed two cables per desk, Whitwell adds, "The client has plenty of flexibility for the future." In the machine rooms, cabling was terminated in Siemon open frame racking. Whitwell points out, "The category 7A TERA system is a perfect balance of technology and value. With a 15 year life cycle to accommodate ever-increasing bandwidths, high density and 10gigbyte transmission to the desk, the return on investment (ROI) is affordable and realistic to all".

Commenting about the benefits of cabling a new building, Whitwell concludes, "Nowadays new buildings are designed with the network in mind. Ten years ago things were very different and the space allocation for networking was limited and inefficient".

If planning the design was critical, moving users across the road was potentially to surpass previous stress levels. "It was," says Nigel Watson, "a very positive experience overall. Once again, preparation was critical. There was a computer refresh on the desktop, but as much as possible was kept familiar for the users." They moved all the Borough Council staff on one weekend, but deliberately phased-in the transfer of much of the technology.

Clearly not shy of a challenge, the Council had decided to virtualise much of its server estate as a part of the move. It was here that it took out an insurance policy. For a nominal charge NTL Business provided a temporary fibre link to run between the old Civic Offices next door and the new Civic Centre building for a period of two months. This allowed them to take each stage systematically, securing as they went. The servers were moved over gradually and they reduced the server count from 60 to five VM ware servers, plus a number of small servers and appliances that weren't suitable for virtualisation.



Design the design

The starting point for Nigel Watson and his team was to understand what options were available, by talking to a number of installation companies. It was during this process that the Council recognised and enthusiastically adopted the merits of a category 7A pair based design, structured cabling system. Graeme Stoker refers to the system as 'cable-sharing'.

A structured cabling system that could offer data speeds of up to 10GB per second, with a Bandwidth of 1.2GHz, seemed to offer the Council all the promise they demanded.

While speed and bandwidth are important considerations in designing a network capable of operating beyond 2020, there are other things to consider such as outlet density, and the number of outlets required per user. It is probably safe to assume that the restrictions of physical space and user demands will continue to grow inversely to each other during this time. Stoker reflects, "Traditional outlet design would say, one outlet, one cable, one patch lead and one device. The TERA system from Siemon uses the same physical footprint as RJ45, but using a uniquely designed connector, allows up to four separate services (e.g. a laptop, Voice over IP handset, printer, fax,

IP camera, etc) to be provided through just one cable". Figure 1 illustrates exactly how this is achieved, using a flexible combination of four-by-one pair, two-by-two pairs or one-by-four pair patch leads.



Figure 1 - TERA 4-Pair Outlet

And it is here that the Borough Council saw its investment in the future. Without the need to install more outlets, it was able to offer today's users today's bandwidth, serving for example, two network applications such as VoIP on pairs one and two and a 10/100 laptop connection on pairs three and four, providing high outlet density. In the future, if the Borough Council were to move towards 10gbe Ethernet, Stoker points out, "That they already have the 10gig permanent link running through the building and will only need to upgrade the patchcord configuration at the work area and cabinet locations".

Stoker concludes, "This performance and flexibility is achieved through the solid copper cable that is running horizontally like an artery, through the building. It operates at 1,200 MHz and each cable pair is individually foil wrapped, allowing you to transmit data with no danger of any of the signals being corrupted by adjacent signals, eliminating what is technically referred to as alien cross-talk and ANEXT"

With the Siemon solution backed by an exclusive 20 year systems application assurance warranty, there shouldn't be much left for the Runnymede team to worry about for a while.

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