

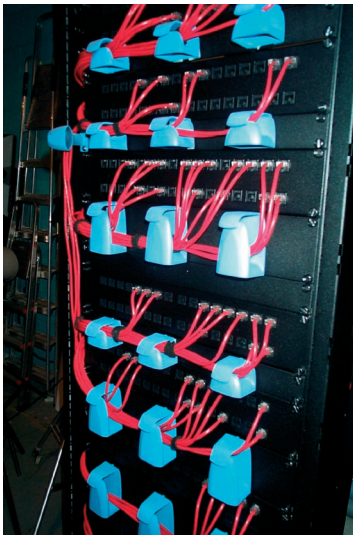
## Despite first impressions, 19" networking cabinets are not all the same

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Latest forecasts show that the IT industry is starting to recover from the dark days of 2001, and infrastructure investment is set to rise from its previous depressed levels. This is obviously good news for installers and contractors, who should see increased activity as network managers finally upgrade and extend their networks to enable higher bandwidth protocols to be deployed and increased business levels supported.

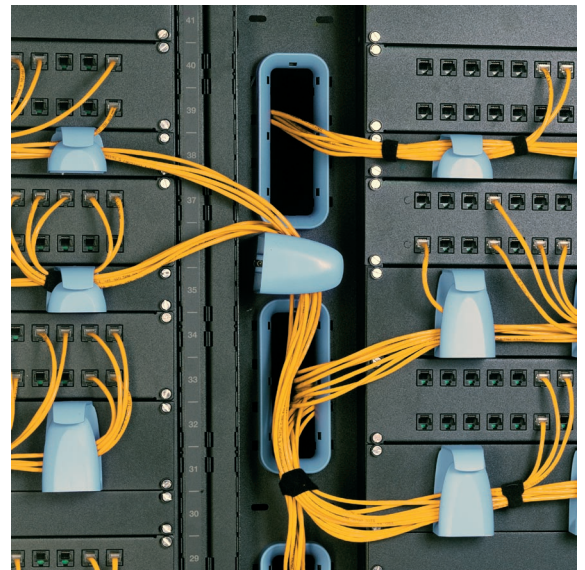
In many cases, as well as additional cable runs, new networking enclosures will have to be specified to house additional equipment, be it extra patching panels or additional or upgraded servers. In the last few years, despite the recession, technology has advanced so rapidly that it is essential to consider the differing requirements of a patching cabinet and a server rack. To the casual observer, there is little obvious difference between competitive offerings: a rack is a rack is a rack. In fact, there are significant variations between different manufacturers' products, differences that can add considerable cost to the installation process, reduce operational efficiency, restrict upgrade options and even degrade network performance. A detailed study of the key features of the different products on offer will be a worthwhile exercise to ensure that the new installation will meet current and future needs.

While at one time all networking enclosures were no more than 19" electronic racks fitted with a few cable management accessories, today's divergence between cabling cabinets and server housings has led the more technologically advanced and commercially competent manufacturers to produce different products for the two applications. Such an approach ensures that the compromises inevitable in designing a multi-purpose enclosure do not reduce the product's effectiveness in either applications.

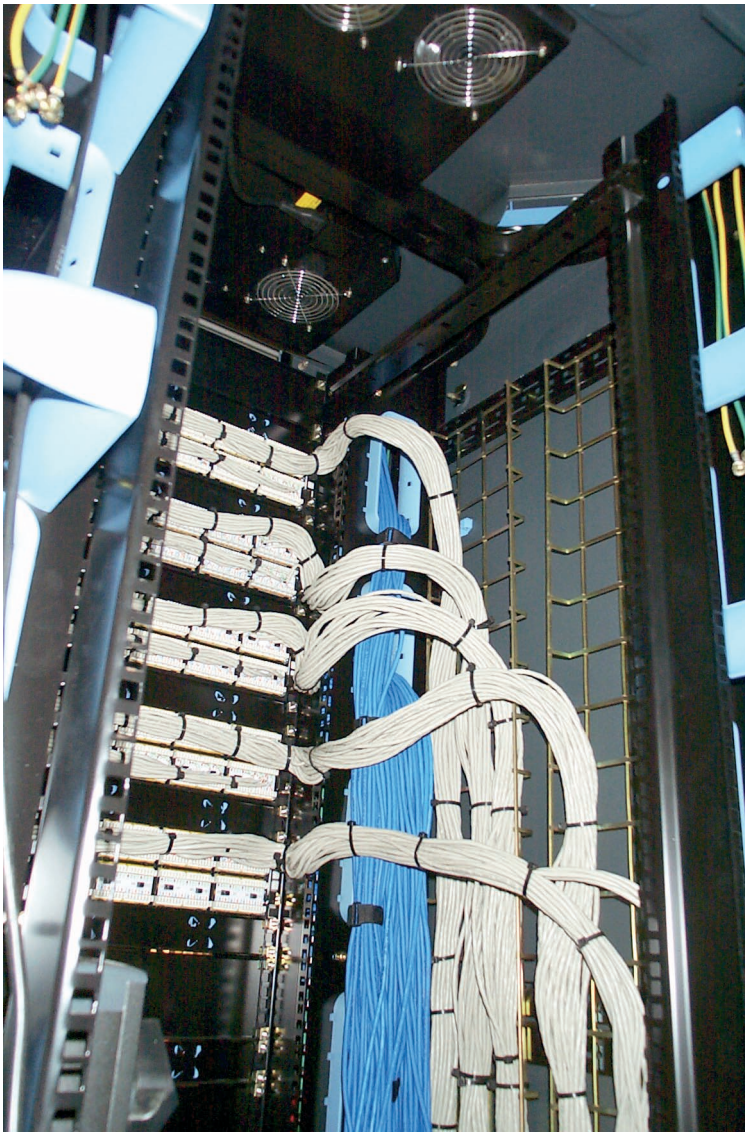


In a cabling rack, from the installer's perspective, ease of entry through the top, the base and the rear, cable guidance and routing, all round accessibility and the overall space available for cable runs are the most important requirements. One innovative design enables cables to be brought into the enclosure without having to thread them through the rack's framework, allowing the rack to be offered up to existing runs and the appropriate cables brought into the unit. Similarly, in bayed suites, cables can run vertically between cabinets, breaking out into the enclosure as required. An additional benefit is if the rack itself combines light weight with rigidity, transport and manoeuvring on site will be relatively easy. Once the original installation is complete, the network manager's requirements take priority. Effective cable management capability to preserve the network's integrity, as much space as possible around the 19" patch panel

area for cable runs, dedicated front to back cable runs, the ability to run cables to adjacent cabinets within the footprint of the cabinet, recessed mountings to provide space for front patching and access security are the primary requisites. With more and more cabinets being located in open office areas rather than in dedicated telecoms rooms, aesthetics and design can also play a part in the selection process.







It is in server racks that the most demanding advances from the enclosure manufacturer's point of view have taken place. 1U servers have become the most popular option, and they have been becoming steadily deeper with time, so any server rack should be available in a 1000mm deep version to ensure that the deepest standard form factors can be housed without modification. For instance, a typical Sun server, the Fire V20z, is 724mm deep. Add in a minimum of 60mm cabling space at the front and allowing 150mm at the rear for cable runs and mounting brackets brings the required depth of the rack up to 934mm. In data centres, a side effect of this increased depth is that double "wardrobe" style rear doors often have to be fitted as there is insufficient clearance for a single door to be opened.

Multi-vendor capability is an important consideration; the enclosure should be able to accommodate servers from all the major manufacturers without modification. The configuration of mounting hardware varies considerably from one server manufacturer to another, with different thicknesses, depths and attachment points of slides a particular variable. With



server upgrades becoming an increasingly frequent requirement, a versatile design of server rack enables upgrades to be implemented without having to worry about mechanical compatibility with existing equipment.

Load capacity is another significant factor: again using the Sun Fire V20z server as an example, it weighs 16kg, so a 47U rack, fully loaded, would have to support 752kg. To allow for future-proofing, the design rule of thumb is that the rack should be capable of supporting 25kg/slot. Structural rigidity and resistance to deformation is an important associated requirement.



The other main issue to be considered in server housings is thermal management. With high packaging densities, a typical server rack should be able to remove a total of around 5kW of excess heat with an internal temperature rise of no more than 10°C above ambient. To achieve uniform cooling throughout the rack, avoiding recirculation problems and efficiently removing the hot air through the roof requires careful attention to the internal design of the rack itself and the use of high performance fans in both intermediate and top cover fan trays. So high are the airflow requirements that a vented glass door is now almost certainly too restrictive: the current trend is a fully vented steel front door with the free air in excess of 60%. Intelligent fan control is normally required to avoid the noise problems associated with running fans at maximum speed, and the enclosure should support monitoring of the internal temperature to avoid loss of service if an over-temperature fault occurs as the result of a fan blockage or failure. As important as waste heat removal is effective power distribution to bring the energy into the rack in the first place. Modern heavily packaged servers often require dedicated power feeds into 32A power distribution panels because the 13A limit on a single ring main socket will be inadequate.

Although they may appear to be merely passive components of a network, the enclosure is in fact a key element that can, if badly specified or installed, cause degradation of the network's performance because cables are stretched, bent through too tight a radius, bundled together too tightly or servers are running at too high a temperature. As both cabling cabinets and server racks are visited during network reconfigurations, equipment upgrades and routine maintenance, ease of access, cable management facilities that make it very difficult to run cables improperly and physical security are all elements that also have to be considered. By discussing the application with a reputable supplier, the contractor or installer can ensure that the optimum solution is offered to the end customer.

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**Notes to Alex and James 27 January 2005.**

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