



# Cabling Installation & Maintenance EUROPE

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## **Finding security in racks and enclosures**

### **Demand for remote monitoring drives new wave of cabinet design**

*By David Boothroyd*

As the cabling and networking industries develop at almost dizzying pace, the systems that physically contain them-racks and enclosures-may be their somewhat more conservative cousins, retaining the same features such as size and materials used for many years. Even so, some interesting trends are taking place across the European markets.

Security is an increasingly important issue for customers, according to Keith Reynolds, technical and marketing manager for Schroff ([www.schroff.co.uk](http://www.schroff.co.uk)) in Hemel, Hempstead U.K. First, customers are looking for greater physical strength in terms of better locks, hinge arrangements, and so on. "More significant perhaps is the greater demand for security in terms of remote monitoring," Reynolds says. "This means the ability to know if someone has



tried to tamper with a cabinet enclosure, for example, through electronic feedback in some format to identify that they have had an illegal entry."

Monitoring the environment of the cabinet is becoming more widespread and sophisticated as well, in terms of parameters such as temperature, smoke hazards, and humidity levels. Custom-built cabinet monitoring systems take in all this information from various sensors, format it, and then send it to a dedicated reporting area.



## **Monitoring worth the price**

Clearly, this adds something to the price of cabinets. Reynolds says a single environmental monitoring unit priced around 2400 Euros could monitor up to 40 inputs, and be easily expandable. For many customers, the benefits are well worth this level of extra investment.

Driving the demand for improved monitoring within cabinets is the constantly growing amount of electronic systems that are being installed in remote locations-places that are relatively difficult to access and where security is a major consideration, such as track-side equipment on the railways, or in underground applications.

With more electronic systems of increasing power being incorporated within enclosures as part of the package, the basic material costs of racks and enclosures is being reduced as a proportion of the end price paid by the customer. And in the last few years, there have been no great changes in the materials used.

"People have looked at various plastic and glass fibre materials, and these have been used to an extent, but they have their limitations," Reynolds says. "The conventional materials-aluminium, ordinary steel and stainless steel-still dominate, and I don't see that changing to any great extent for a long time."



More monitoring, which means more electronics in enclosures, also means more cabling. A few years ago, the typical cabinet might have held 20 or 30 cables. Now, it is frequently holding hundreds.

"That means much greater weight, so you can't just use cable ties and odd bits and pieces to secure these," says Reynolds. "You need good, solid, well-engineered supports for the cable. People tend to forget that and get upset when they have to pay a bit more. But with the best part of 100 kg of extra cable weight to support, if you don't do it properly, you risk ripping the connectors out of the electronics."

## **Cable-friendly**

The growing amount of cable that today's racks and enclosures have to handle has led manufacturers to pay greater attention to designing for cable-friendly installation.

"People are looking for ways of dropping cables in easily and quickly, and not having great chunks of metal in the way of the cables," says Marcus Edwards, a marketing leader at enclosure manufacturer APW Electronics ([www.apw-enclosures.com](http://www.apw-enclosures.com)) in Eastleigh, U.K. "This means less metal work in the design and more open structures. For example, frames used to be large and heavy; today, they have become a lot slimmer, which reduces the amount of space they take up at the bottom of the enclosure. This means that in a typical 600x600 rack today, you have significantly more open area available than you would have had 10 years ago." Edwards adds that more care has been taken for consideration of where the cables are likely to run, either from the floor or the ceiling into the enclosure.

There is little doubt that producing well-designed racks and enclosures that inherently foster good installation practices will become increasingly important over the next few years, as Category 6 and Category 7 cable systems go into widespread use. These more advanced cabling standards will not tolerate indifferent installation quality as easily as their predecessors.



"The typical Category 5 system is pretty robust, and if you mistreat it by not following the specifications of the standard to the letter, it appears to withstand it and still give a fair performance," Edwards says. "I don't believe that will be true of Category 6 or fibre. All cabling will have to be straight, smooth and not kinked."

Separation of power and data cables by a minimum of 200 mm, as will be required by the advanced standards, will also pose challenges for rack manufacturers. Edwards says, "You can certainly do this in a cabinet, but it becomes more difficult and more complex. With Category 6, I think this will be a significant problem for installers, and rack producers must work on what they can do to best help them achieve solutions. Every enclosure manufacturer will naturally claim their system is the best, but we are all thinking on the same lines."



**APW's IMserv and IMnet enclosures are designed for installations with separate requirements-one suited specially for servers and the associated electronics, and the other appropriate for cabling.**

One of the latest developments, points out Edwards, is letting customers patch from the front of one enclosure to the next one, without having to wind patch cords behind verticals. "These new designs, particularly popular in France and the U.K., mean you can patch between cabinets behind the front doors, but in front of the verticals."

## **Server security**

Edwards agrees with Schroff's Reynolds that enclosure security is a hot topic, but he sees it coming mostly from the Web-hosting environment. "Security for enclosures containing servers is reaching extraordinary levels, with cages around racks or that go up to the ceiling and through the false floor, as well as things like combination locks and swipe cards."

He believes the main incentive is for Internet Service Providers (ISPs) who are striving to be perceived as adding value and providing guaranteed levels



of service and excellent levels of security. It could well be given an extra impetus by the unbundling of the local loop, a process already happening across Europe. It involves independent (and often rival) companies putting their own equipment into locations belonging to the national telecommunications operator-hence, the need for good security.

Market growth for enclosures that house servers has exploded in the last couple of years with the demand from ISPs-even if currently there is something of a slowdown happening. Edwards believes this growth, together with the energy and drive of the ISPs, is proving of considerable benefit to the entire racks and enclosures industry.

"The ISPs have done a lot to drive the rack manufacturers forward, ourselves included, and forced them to look at new areas and ways of doing things," Edwards says. "They have put a lot of time and effort into the racks they use. They want them delivered and installed on-site, with maximum cable access, with designs that ensure the correct air flow, and so on. If you are putting 10,000 servers into one area, as Intel did, you take the whole question of cabling and the management of the servers very seriously and scientifically."

APW's approach to cabling is based on the view that enclosures suited for servers and the associated electronics, and those appropriate for cabling, have somewhat different requirements. Hence, the company's two central products are IMserv and IMnet.

Joe Weber, director of European sales for Chatsworth Products Inc. (CPI-[www.chatsworth.com](http://www.chatsworth.com)), sited in Guildford, U.K., came over from the U.S. last year to launch the company's European sales office.

In the U.S., CPI has been a pioneer of the open rack approach for handling structured cabling systems. In Europe, it sees a greater tradition of closed systems, but Weber claims this preference is changing in favour of open racking.

"Now that the network has become mission-critical, architects are taking it into account more, and in many cases, incorporating dedicated, limited access



rooms," Weber says. "The problem is, they are often not providing enough space to house the cabling and equipment involved."

## Open racking

The fundamental benefit of the open racking approach is that it occupies less space. In major European business centres like Frankfurt, Paris and London, where floors pace costs can reach 250 Euros per square meter, the savings produced can be critical. The footprint of an open rack system, with both vertical and horizontal cable management, is inherently smaller than most cabinet-based solutions.

Assuming that a suitable room is available, open frames are also less costly, since they use less material. Accessibility, both in terms of the initial configuration and for future moves, adds and changes, is also made easier. "Our research," Weber says, "has shown that the first thing that happens when people need to access a cabinet is that the doors and sides come off-and they don't always go back on. So, in effect, the customer has paid the extra for a cabinet but turned it into an open frame."

Cooling is a further factor that favours the open rack approach, at least for medium to large installations. A dedicated communications room can be kept at the required ambient temperature by the building's air-conditioning system. Cisco, for instance, has specified that its latest IP switches be installed in open racks as opposed to cabinets because of the cooling they need.

CPI's open racks are made from aluminium (another word Weber has had to learn), and have features such as pre-threaded holes for mounting, which CPI says speeds up installation. (This feature is common in the U.S., but not in Europe.)

Clearly, however, the open frame strategy does not suit all situations.

If a company chooses to locate in an historically listed building, for example-not that rare an occurrence in Europe-it may face severe restrictions in terms of creating dedicated communications rooms. So, cabinets may be the only answer.



## Frankfurt Stock Exchange increases space with open racking

Deutsche Börse, the Frankfurt Stock Exchange group, recently moved to a new purpose-built site with eight wings and 48,000 square meters of office space, housing some 2,000 workstations. Based on Gigabit Ethernet, its new network is one of the most highly specified in the world. "We require 99.97% availability for the LAN, which means it can be out of operation for a maximum of 2.5 hours per year," says Thomas Reich, project manager.

The racking system formed a key component of the project. Initially, network designers considered using conventional, enclosed 2.20-m standard cabinets. But they decided it was crucial to optimise the space available in the distribution rooms and to create as much space as possible for further expansion and upgrades. Hence, the idea of exploiting the full room height, which in places reaches 3.49 m.



**Designing the right racking system was key to a new installation at the Frankfurt Stock Exchange group building, where an open rack system without side elements was essential in the crowded telecommunications rooms.**

Traditional cabinets are poorly suited to such dimensions—doors and side walls are scarcely manageable on this scale—so, the network designers opted for an open rack system without side elements. There was no problem with access protection, since both the building and floor distribution rooms are designed as separate, fully air-conditioned and lockable rooms, accessible only to authorized IT staff.

Schroff's family of comrack units was chosen, in which the load-bearing function is performed by the 19-inch equipment compartment made of solid extruded aluminium sections. This design releases considerable space for



cables and cable routing, while also providing free all-round access to the equipment compartment so that no cables need to be threaded through. The 19-inch uprights can also be adjusted to fit almost any room height.

"The comrack design fulfilled the stiff requirements as a standard product and was, therefore, the choice not just on performance but also on price," says Uwe Fiedler, project manager at Delcom.

The distribution rooms have a raised floor, allowing the comrack base section to be dropped down into the false floor; on the ceiling, the comrack uprights were secured using blanking plates and brackets. This allows the Stock Exchange to make full use of the space from the floor to the ceiling, giving nearly 70% more space than 2.20-m racks would have provided.