Rack *versus* Cabinet

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Choosing the right option for an installation often comes down to a balance between efficiency and the specific requirements of individual projects

During the past decade data centres have been affected by significant transformations, driven chiefly by the proliferation of new technological waves. Efficiency advancements across all areas have been at the core of any data centre strategy, and with that focus there has been a substantial shift towards the adoption of enclosed cabinets as opposed to legacy open frame racks.

While there is no true right or wrong decision when it comes to choosing an enclosed cabinet versus an open frame rack, it's worth considering the pros and cons of both. By doing so, it's then possible to make a sound decision based on the specific requirements of each individual installation.

Despite the latest trend towards using enclosed cabinets, open frame racks still present a perfectly viable solution for many data centre deployments and can address a variety of applications; from supporting active equipment (switches and servers) to simply providing a cable patching platform.

Choosing an open frame rack
Cost is probably the most prominent reason for selecting an open frame rack versus an enclosed cabinet. A complete rack solution, inclusive of cable management accessories, can be as little as 1/2 or even 1/3 of the cost of an equivalent enclosed cabinet configuration.

Secondly, open frame racks are intrinsically designed to provide unobstructed airflow while at the same time granting easy access to the equipment or cabling sections. The fact that open frame racks don't have side panels/walls makes hardware accessible from all angles, even when active equipment and cables have already been installed.
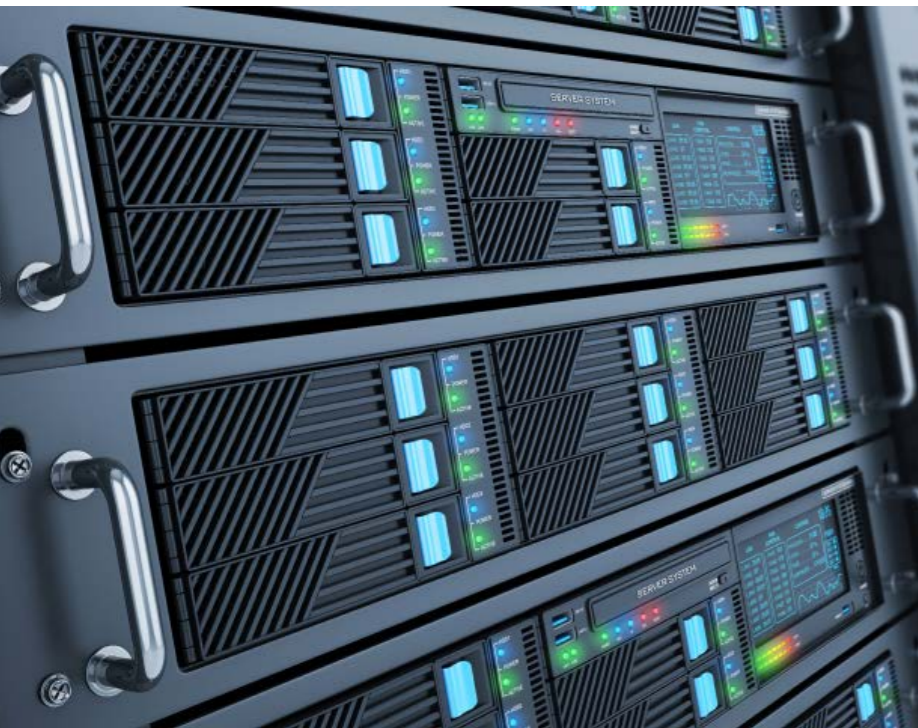
Ease of access is a key advantage to working with open frame racks as it can drastically reduce the maintenance time required for any moves, additions or changes. It's also worth noting that open frame racks offer the best opportunity to reduce MTTR (Mean Time To Repair) which can be hugely beneficial in regards to service level agreements (SLAs) since easy accessibility means the time needed to access cabling and equipment is reduced.

Furthermore, while two post open frame racks provide the most efficient use of floor space in the data centre, four post open frame racks are a more suitable choice for supporting larger and heavier equipment. This includes modular network switches because they provide front and rear support and greater stability. Two post open frame racks can be used in most applications, but are usually used with rack mount equipment that's less than 510mm deep.

Finally, open frame racks offer the optimum cable management solution for any given installation. Open frame racks aren't restricted by side panels or walls, so it's possible to use wide and deep vertical cable managers along both sides of the frame, offering the perfect cable management solution. In fact, when combined with advanced vertical cable managers, a 42RU open frame rack can expand density by up to one thousand connections, which is best achieved by using angled patch-panels, for both copper and/ or fibre cabling.

Cons of open frame racks

Lack of security and poor aesthetics can be a consequence of the cost savings achieved using an open frame rack solution. As the term 'open' suggests, open frame racks can be accessed easily, which creates a security concern for both accidental and/or intentional damage. Additionally, the active equipment is exposed to dirt and debris that can cause irreversible damage to the fans and the silicon technology. Furthermore, it could be argued that open frame racks don't offer the same degree of aesthetics as enclosed cabinets. With equipment, cables and cable managers all clearly visible, they can create an unsightly appearance, especially if they're poorly maintained.

The popularity of enclosed cabinets

The two key reasons for choosing an enclosed cabinet are controlled airflow and security. As the technologies surrounding cloud computing and convergence continue to evolve, the data centre environment will be tasked with supporting these platforms. The increase of equipment density per rack, and its associated cooling requirements, will be on the rise making the enclosed cabinet solution a perfect ally to better control the different dynamics related to airflow management.

With the use of built-in features and specific design geometries it is possible to create an almost perfect separation between hot air and cold air, improving cooling efficiency. Enclosed cabinets offer the best and most simple approach to a variety of air segregation strategies in a totally passive solution. These include:

- Cabinet level containment characterised by a Vertical Exhaust Duct (chimney) and combined with specific accessories and defined cabinet geometries to control airflow.
- Cold Aisle Containment defined by an aisle roof and two aisle doors to create a segregated cold aisle environment.
- Hot Aisle Containment created by building a hot-aisle exhaust system connected to the return plenum and two aisle doors to form a segregated hot aisle environment.

Enclosed cabinets provide a much higher level of physical security as opposed to open frame racks. Different types of locking systems are available to enhance physical protection from unauthorised entry. Considering that security is a major concern for most data centres, it's not surprising that enclosed cabinets have become the solution of choice in recent years as they offer a much safer environment for hosting sensitive data.

Despite offering a more secure solution, enclosed cabinets can present issues with maintenance operations due to the restricted accessibility. And it goes without saying that cabinets can be cost prohibitive for many data centres, especially for a small operation or start-up.

Making the best choice

With IT budgets under constant pressure, even within large organisations, many data centre managers find trying to choose the best strategy to deliver optimum performance within budget a daunting challenge.

When comparing open frame racks to enclosed cabinets, it's important to consider all the factors that will play a major role in the lifetime of the installation and choose the solution that will best serve the core requirements. Fundamentally, an enclosed cabinet will always provide greater security and better control of airflow, but an open frame rack can still be a viable alternative when it comes to housing a moderate amount of IT equipment or used as a main patching frame. Open frame racks are cost-effective, easily accessible and durable, which makes them a sound option for telecom equipment, servers or networking with a relative low power load where cooling requirements are not a major concern. ∎