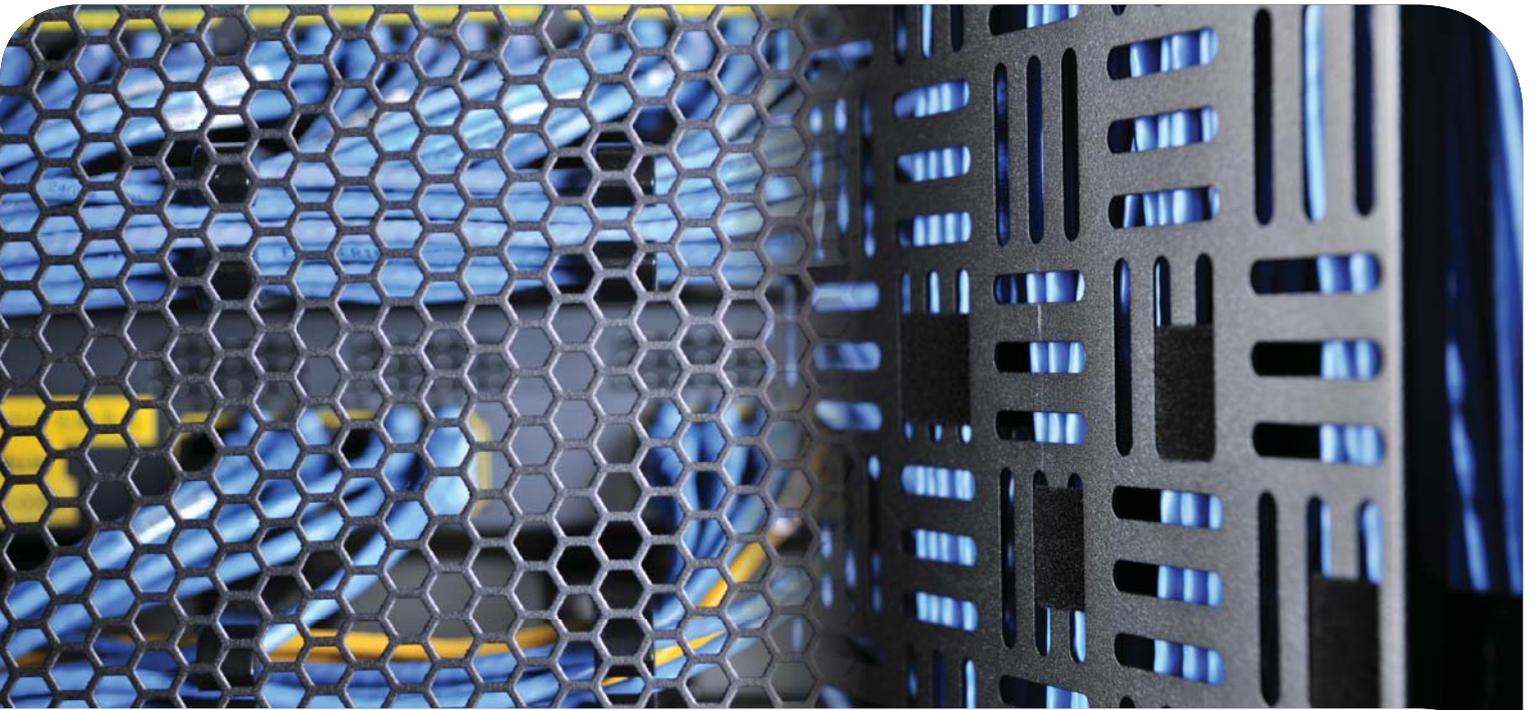




B&R Enclosures Pty Ltd
The Benefits of Cable Management
Technical Paper



INTRODUCTION

Cable management is an essential consideration when designing a data centre. Without cable management, data centres risk high fatigue rates of cables, difficulty identifying cables, and are more likely to have issues when expanding or updating.

Cable management allows you to identify and track cables easily, while maintaining the freedom to easily remove or change cables wherever necessary. AS/NZS 24764:2012 suggests that data centres with superior cabling systems can have a life expectancy of up to ten years.

In contrast, without sufficient cable management, data centres run the risk of being unable to keep up with the growth caused by our ever growing dependence on cloud-based systems and information.

This paper will discuss the risks of neglecting cable management, the benefits of it, and the different types of cable management available. It will also offer suggestions on how to get the best use out of your cabling systems.

THE BENEFITS OF CABLE MANAGEMENT

Cables live longer

Cable management ensures that cables are installed properly from the beginning, minimising the risk of excessive bending, or subjecting cables to heat sources or sharp edges. Even something as minor as using Velcro instead of cable ties to bundle cables together can increase the life of cables, as it is very easy to over-tighten cable ties, and cause internal damage.

Faster maintenance

Equipment can be accessed much easier where cable management is installed. Gathering all the cables together above, below or beside equipment within a cabinet means that access becomes straight forward. As cables are grouped together and easily identified, any removal or monitoring of equipment or cabling is also an easy process.

The risk of a cable being incorrectly unplugged is also reduced, as workers don't need to clear a path to equipment, and there is minimal risk of, for example, a worker pulling one cable and a tangle of other cables coming along with it.

Promotes growth

With cable management, the ease of consolidating equipment within racks, or adding additional racks is greatly increased. Bundles and individual cables are able to be easily identified, meaning time is not wasted trying to trace what goes where in a move.

Minimise risk of data issues

There is less chance of data losing integrity due to electromagnetic interference (EMI). Different types of cables are identified and easily kept apart with superior cable management. Even where cables have to cross, the effects of EMI are minimised by crossing the bundles perpendicular to one another, and ensuring they are exposed to each other as little as possible. In addition to this, there is also less chance of cables being removed accidentally from equipment, causing power outages or data loss.

Superior airflow

As cables are gathered tidily above, below or beside equipment in a server rack, there is less risk of airflow being impeded. This can help ensure your data centre is run as efficiently as possible, as fans and air-conditioning units won't have to work overtime to cool equipment.



Read our paper on the different ways to manage airflow in a data centre.

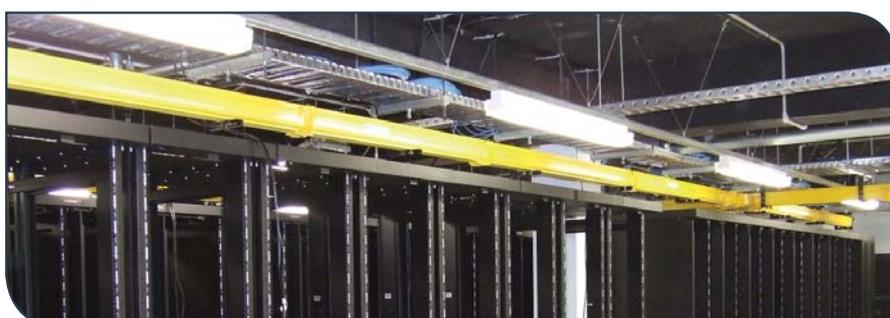
Aesthetics

On top of many other advantages, cable management also improves the aesthetics of a data centre. A data centre where every cable is neatly in its place and can be traced easily reflects a well-managed organisation.

Reduce costs

Best value for money is usually achieved through forethought in design and installation. Designing a data centre to accommodate what your centre needs today might save you money now, but can lead to additional costs in the future as the centre is refitted for new equipment. Data centres should plan at least three to five years into the future, in line with the ICT equipment refresh cycle.

Assume the labour costs to install 100 cables is almost the same as 200 cables. If the initial requirement is for 80 cables, but this is expected to rise to 180 cables over the next five years, then the best value for money could be to install 200 cables (Australian Government Department of Finance, 2013).



THE RISKS OF NOT USING CABLE MANAGEMENT

High cable turn-over rate

Cables tend to fatigue prematurely without sufficient cable management. Where cables are subjected to sharp edges or high heat, they can become visibly damaged. More serious issues can arise where cables are damaged, but you are unable to see evidence of it. This can occur when a cable is bent further than recommended by the manufacturer, or it is exposed to excessive moving, and the internal wires become compromised.

Inefficient data centre maintenance

With cables blocking access to equipment, maintenance becomes increasingly difficult. Time is wasted as workers either try to work around the cables, inefficiently and potentially inaccurately, or try to clear a space and accidentally unplug cables, causing disruptions downstream. Workers are also unable to easily track cables, adding extra wasted time to any jobs that need completing.

Airflow issues

Equipment can become damaged due to excessive heat loads where airflow paths are blocked by cables. Blockages lead fans or air conditioning units to work overtime, as they try to move the hot air away from the server. This can lead to equipment damage, and increase the cost of running a data centre.

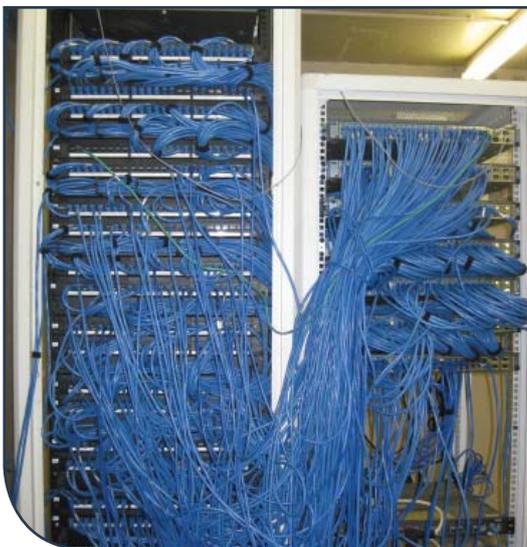
Stunted growth

Without cable management, it can be very difficult to make even minor changes in a data rack or centre. The inability to easily trace cables, or move bundles quickly adds significant time and effort to the job. Without a plan to monitor cabling into the future, data centres tend to grow ineffectively, and don't utilise space or energy efficiently.

Compromised data

The charge running through power cables gives off electromagnetic energy, which can compromise data running through other types of cables. Without cable management, it is hard to identify which cables might have this kind of effect on others, in order to separate them accordingly.

Before cable management



After cable management

THE DIFFERENT TYPES OF CABLE MANAGEMENT

Horizontal cable management

Horizontal cable management is installed within a data rack to neatly draw cables away from equipment. Horizontal cable management is typically one or two rack units (RU) high, but can be larger if necessary. This type of management is typically slotted directly in front of equipment, in conjunction with additional management above or below which channels the cables away.

Types of horizontal cable management include cable fingers, rings, and trays. Each type of cable management has advantages for different areas. For example, a covered cable tray will minimise the amount of dust settling on cables, but could reduce accessibility when changes are needed.



Vertical cable management

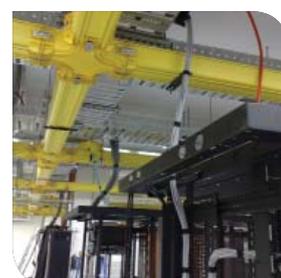
Vertical cable management creates pathways within data racks for cables to run to or from equipment. Vertical cable management usually works in tandem with horizontal management. Horizontal cable managers draw cables away from equipment, and vertical cable managers channel those bunches out of the cabinet and into roof or floor cable pathways. Vertical cable management designs can include fingers and U-channel systems, among others.



Overhead cable pathways/trays

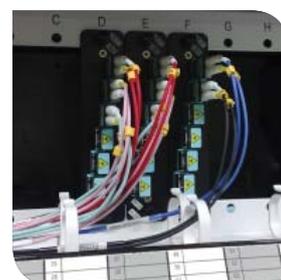
Overhead pathways and trays are used to safely guide cables where they are needed in a data centre. In most cases, overhead cable pathways are preferred to under-floor pathways, as accessibility is greatly increased.

Overhead pathways are generally easy to install and patch together to accommodate growth in a data centre. As cables are not confined under the floor, they are also at less risk of overheating, as they have free airflow around them. Additional cables can also be easily placed in an open tray, as opposed to being pulled through a pipe.



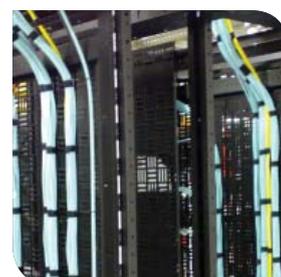
Labelling

Labelling is a basic yet essential form of cable management in a data centre. Each end of a cable should be tagged with a unique identifier. This identifier should be named consistently, so that all cables follow the same pattern, and confusion is minimised. In conjunction with this, different types of cables should be colour coded. This minimises the risk of a cable being improperly routed or gathered with other cable types, and causing issues down the line.



Bundling ties

Velcro ties are an efficient way to bunch cables together. Unlike cable ties, they do not risk over-tightening, which can easily harm cables. Velcro ties can also be easily undone and reused, minimising waste in the data centre. For best results, B&R's experts recommend grouping of cables every 30cm to 60cm.



RECOMMENDATIONS

Strategize

Before embarking on any journey, it is essential to have a strategy. This is no different in planning data centres. The first step is to determine the capacity needed for cabling. How many servers and network equipment will you be needing? How many cabinets do you need right now? How many will you need in the future?

Cable capacity must be considered when purchasing data cabinets, as standard size enclosures may not have enough room for cables required in a high-density installation. B&R's experts recommend allowing 30% to 50% extra capacity in horizontal and vertical cable managers for future growth.

Work to Standards

Data centres should be designed to accommodate future growth, and also pass safety and quality standards. AS/NZS 24764:2012 details generic cabling systems recommended for data centres. This standard anticipates that "the generic cabling system meeting the requirements of this International Standard will have a life expectancy of up to ten years" (Joint Technical Committee CT-001, Communications Cabling, 2012).

Installation

Ensure you get the most out of your cables by not bending, stretching, over-bundling, or exposing to heat or sharp edges. When installing network and data cables, ensure they kept as far apart as possible to reduce the effects of EMI. This can be as simple as running the cables on opposite sides of data cabinets. Consider a range of cable management options until you find the combination that works for your data centre.

Document

Keep track of every cable and wire in your data centre. Make sure any changes are logged so that all personnel can easily understand the layout of the centre. Keeping all documentation up to date ensures that, when it comes time to update or expand, all cabling can be located and identified quickly and efficiently.



AS/NZS 24764:2012 can be purchased online at www.saiglobal.com

HOW CAN B&R HELP?

Making the right choice in cable management solutions is an important step in ensuring your data centre is run as best as it can be.

B&R Enclosures offer a range of cable managers to provide a complete solution. With a wide range of data enclosures, B&R will be able to design a package to suit your cabling needs.

All B&R's data cabinets are fully configurable to suit any application. Our technical sales team are available to assist when deciding what cable management is required to ensure reliability in your facility.

Call 1300 ENCLOSURES (1300 362 567) to talk to our team of experts, or visit brenclosures.com.au for more information.





References

Australian Government Department of Finance, 2013. Data Centre Strategy 2010-2025: Australian Government.

Joint Technical Committee CT-001, Communications Cabling, 2012. Generic cabling systems for data centres: Australian/New Zealand Standard.

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