

Cabinets and racks.



Why cabinets? Why racks?

A cabinet is an enclosure with a door (or doors); a rack is an open frame. Both come in many different sizes and styles. Some are freestanding; some are designed to be mounted on a wall; some sit on the floor but attach to the wall for more stability. When choosing a cabinet or a rack, consider:

First, what equipment will you be putting in it? A cabinet's extra stability is important if you're installing large, heavy equipment like servers. But if you need frequent access to all sides of the equipment, an open rack might be more convenient. Don't neglect your equipment's airflow needs if you enclose it in a cabinet.

Second, in what environment will you be installing it? For open or dusty conditions, you might need the extra protection of an enclosed cabinet. But a rack might be adequate in a well-maintained data center.

Third, will customers or clients see your installation? A cabinet with a door looks much neater than an open rack.

Finally, there's security. An enclosed cabinet can be locked—and all the passwords in the world aren't as effective as a simple lock and key. Open racks provide easy access, airflow is generally not a problem, and you can swap out equipment easily. For security, you can keep an open rack in a locked room.

If you need to set up your installation in a hurry, order preassembled cabinets.

Consider your options.

Do you need a fan?

Even if your cabinet is in a climate-controlled room, the equipment in it can generate a lot of heat. Adding a fan can help keep your equipment from overheating. Adequate ventilation is especially important in an enclosed cabinet.

Getting power to your equipment.

To avoid a forest of extension cords, you'll need at least one power strip. Some cabinets come with built-in power strips.

Rackmount power strips come in versions that mount either vertically or horizontally. Some have widely spaced outlets to accommodate transformer blocks—ideal if your equipment uses bulky power transformers. Some power strips include surge protection; some don't. Make sure all your equipment is protected.

Any mission-critical equipment should also be connected to an uninterruptible power supply (UPS), which keeps your equipment from crashing during a brief blackout or brownout. It also provides time to shut down your equipment properly in a more extended power outage. Choose a rackmount UPS or plug all your equipment into a standalone UPS.

Managing the cables.

Your equipment may look very tidy when it's neatly stacked in a cabinet, but you can still make a mess once you start connecting it all. Cable management guides, rackmount raceways, horizontal and vertical organizers, and cable manager hangers help you manage your cables.

Plot your connections in advance. Knowing where the connectors are on all your equipment will tell you where it's most efficient to run cables horizontally and where it's better to run them vertically. The important thing is to have a plan. Most network problems are in the cabling; try to prevent cabling problems up front.

Choosing the right server cabinet.

Consider this checklist of features when choosing a server cabinet:

- High-volume airflow. The requirements for additional airflow increase as more servers are mounted in a cabinet. Additionally, manufacturers are making servers narrower to increase available space. But with more servers in the same amount of space, heat buildup is frequently a problem.
- Extra depth to accommodate newer, deeper servers.
- Adjustable rails.
- Rails with M6 square holes. Although 10-32 tapped and drilled holes are sometimes still required, newer hardware has M6 square holes. Know which type of mounting equipment you need.
- Front and/or rear accessibility.
- NEMA and/or UL[®] rated cabinets, depending on your application.

Choosing the right rack.

Before you choose a rack, you have to determine what equipment you need to house. This list can include CPUs, monitors, keyboards, modems, servers, switches, hubs, routers, and UPSs. Consider the size and weight of all your equipment as well. The rack must be large and strong enough to hold everything you have now, and you'll also want to leave extra room for growth.

Most racks are designed to hold equipment that's 19" (48.3 cm) wide. But height and depth may vary from rack to rack. Common rack heights range from 39" (99.1 cm) to 87" (221 cm).

Another measurement you should know about is the rack unit. One rack unit, abbreviated as U, equals 1.75" (4.4 cm). A rack that is 20U, for example, has 20 rack spaces for equipment, or is 35" high (88.9 cm).

Black Box Explains

NEMA ratings for enclosures.

The National Electrical Manufacturers' Association (NEMA) issues guidelines and ratings for an enclosure's level of protection against contaminants that might come in contact with its equipment.

There are many numerical NEMA designations, but we'll discuss only the types of NEMA enclosures relevant to this catalog: NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, and NEMA 12.

NEMA 3 enclosures, designed for both indoor and outdoor use, provide protection against falling dirt, windblown dust, rain, sleet, and snow, as well as ice formation.

The **NEMA 3R** rating is identical to NEMA 3 except that it doesn't specify protection against windblown dust.

NEMA 4 and **4X** enclosures, also designed for indoor and outdoor use, protect against windblown dust and rain, splashing and hose-directed water, and ice formation. NEMA 4X goes further than NEMA 4, specifying that the enclosure will also protect against *corrosion* caused by the elements.

NEMA 12 enclosures are constructed for indoor use only and are designed to provide protection against falling dirt, circulating dust, lint, fibers, and dripping or splashing noncorrosive liquids. Protection against oil and coolant seepage is also a prerequisite for NEMA 12 designation.