DAMAC
A DIVISION OF Maysteel®

WHITEPAPER

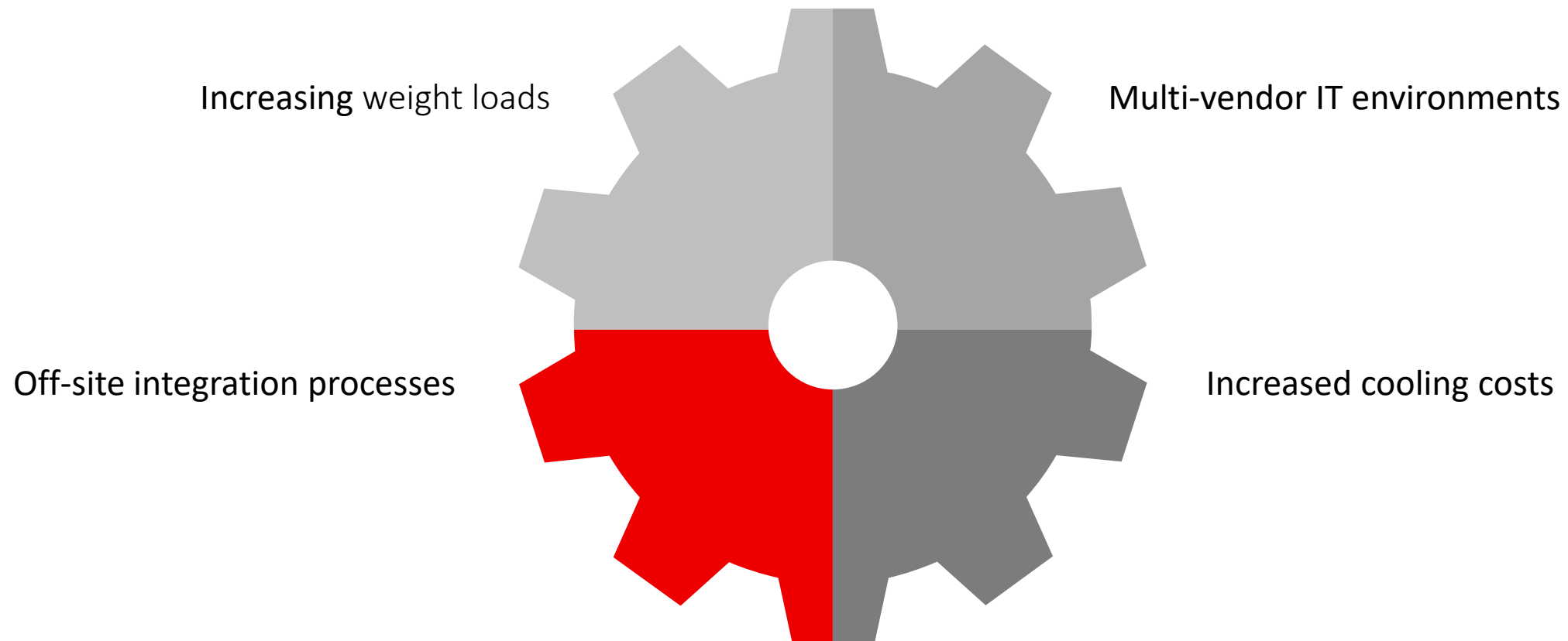# 5 CONSIDERATIONS FOR SELECTING THE RIGHT DATA CENTER RACK FOR HIGH-DENSITY ENVIORNMENTS

Executive Summary

Data center racks were once only thought of as cabinets to organize equipment. With new technology increasing data center density requirements, data center racks have come to play a vital role in the reliability and flexibility of the IT infrastructure. In addition, the right rack enclosure can reduce data center operational costs by preserving valuable floor space, optimizing cooling and increasing the efficiency of IT staff.

FOUR FACTORS HAVE ALTERED THE REQUIREMENTS FOR DATA CENTER SELECT**IO**N

Increasing weight loads

Multi-vendor IT environments

Off-site integration processes

Increased cooling costs

Organizations need data center racks that can hold heavier loads and maintain their structural integrity when shipped with equipment. Racks should also provide the flexibility to accommodate equipment from multiple vendors. High-density data centers further demand racks that provide maximum usable space, minimal air mixing, adequate clearances for airflow and easy access for troubleshooting and reconfiguration of equipment.

Rack Strength

Off-site Integration Processes

Usable Space Within the Rack

Cooling and Thermal Management

Standard or Custom

This whitepaper will discuss 5 key considerations for selecting the right data rack for your data center environment.
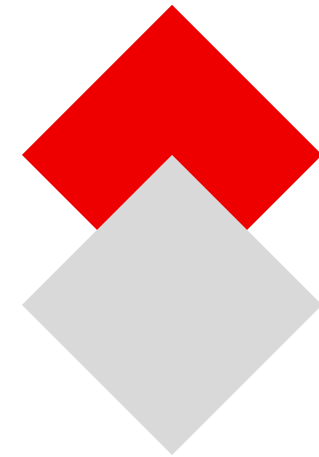
CONSIDERATION #1:
Rack Strength

Organizations are demanding that their data centers deliver 24/7 availability, top performance and ever-increasing storage capacity. As a result, the physical data center infrastructure is under increasing pressure to support growing server and storage densities.

Equipment is also getting heavier due to increased data storage requirements and the cooling demands of next-generation processors. Five to ten years ago, data center racks needed to hold about 2,000 pounds. Today, weight loads of 3,000 pounds or more are not uncommon.

Before making a purchasing decision on your rack, examine the rack weight loads. Also, consider both your weight load requirements for today, as well as potential weight load requirements to plan for future technology.
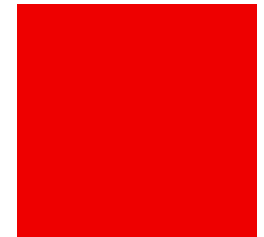
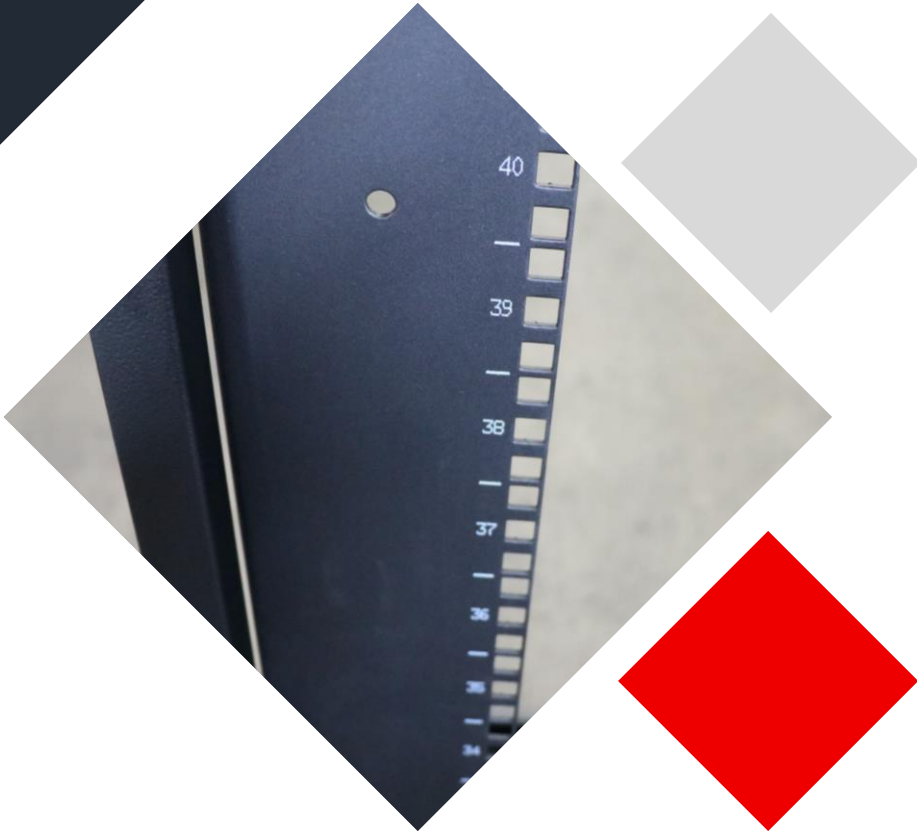# CONSIDERATION #2: Off-site Integration Processes

Many organizations are turning to off-site integration processes to minimize the disruption associated with installing, configuring and integrating equipment within the data center environment. System integrators "rack and stack" equipment in fully configured units and deliver these to the customer's site.

In this scenario, structural integrity of the data center rack is mission critical. The rack must not only hold the weight of the equipment when stationary, but it must also withstand the stressors of shipment. During the transportation process, factors can exert force on both the x and y axes of the rack's structural members potentially causing damage.

If you currently utilize or are considering off-site integration processes, ensure that your rack provides both vertical and horizontal strength. In addition, ask your potential rack suppliers about their welding techniques. Many manufacturers save on labor and material by using "stitch" welding rather than a continuous seam weld. Stich welding limits rack weight loads to about 2,000 pounds for the rack to arrive with its original structural integrity. These racks tend to become damaged when shipped fully populated, and may buckle, damaging valuable equipment.

CONSIDERATION #3: Usable Space Within the Rack

Data center racks have become taller, wider and deeper to accommodate increasing equipment densities. The most popular racks are 42U, 45U or 48U high, 24 inches or 30 inches wide and 42 inches or 48 inches deep. However, these industry standard specifications do not indicate how much usable space is available inside the rack. This is an important consideration given that IT managers are "building up" cabinets to maximize valuable data center space.

Any industry standard rack will support the mounting of 19-inch equipment, but may not provide the capacity to support growing cabling and power distribution requirements. Space is premium in racks constructed from sheet metal, which leads organizations to purchase larger cabinets to ensure that cables and power distribution units (PDUs) do not block equipment access.

While the value of orderly cabling may be worth the investment in a larger rack, a rack that can support cable management with a smaller footprint delivers a greater ROI on data center investment.

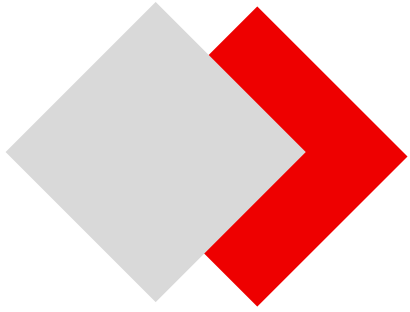# CONSIDERATION #4: Cooling and Thermal Management

High-density data centers demand effective thermal management, and proper cooling plays a key role in maximizing system availability and longevity. High temperatures and humidity can quickly lead to equipment failure causing data center downtime. Cooling is one of the largest expenses in any data center, making cooling efficiency one of the most important considerations when selecting a data center rack.
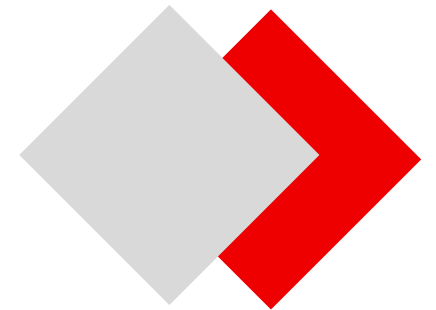
When considering which data rack to use in your data center for cooling and thermal management, be sure to ask questions on the rack's design. Most equipment is designed to draw chilled air in through the front and exhaust hot air through the back. Standard racks also often require airflow management accessories to make them compatible with hot-aisle/cold-aisle arrangements. Blanking panels and vertical airflow baffles must be added to prevent short cycling and ensure that hot exhaust air is not drawn back into the cool aisle. However, add-on equipment cannot provide the optimized airflow needed to support high-performance equipment in a high-density data center environment.
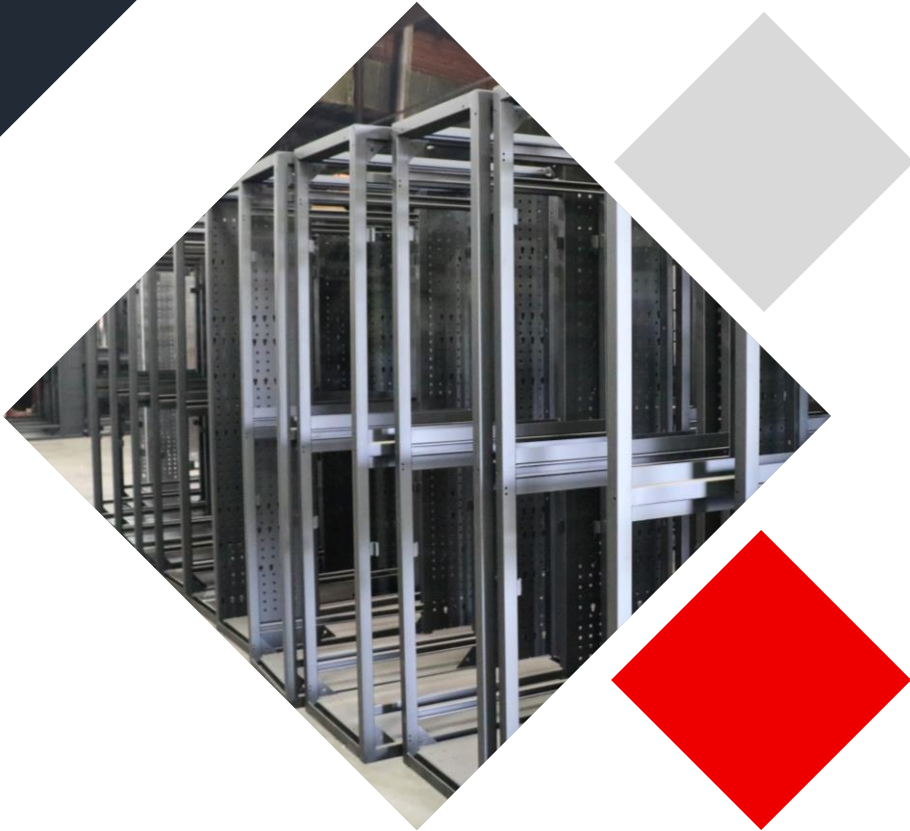
Due to the increased heat load of next-generation servers, equipment manufacturers increasingly call for clearances of 6 to 11 inches to ensure proper airflow. It is important to select a data center rack with sufficient capacity and cabling management for unobstructed airflow through equipment.

Keep in mind that airflow efficiency within the rack can lower operational costs dramatically by reducing the amount of chilled air that must be circulated. Selecting a rack that is built to enhance your facility's cooling system will reduce chilled air volumes even further. An investment in cabinets with advanced cooling features can pay big dividends.
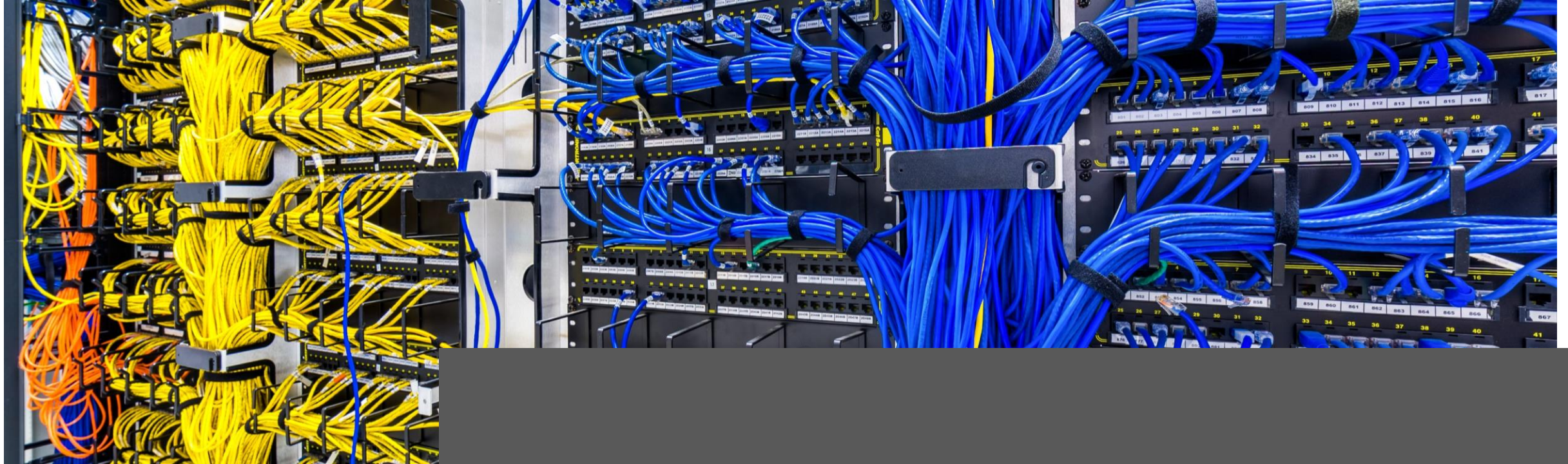
CONSIDERATION #5:
Standard or Custom

Looking at the previous four considerations: rack strength, off-site integration processes, usable space within the rack and cooling and thermal management, the last consideration to make when selecting a data rack is whether to use a standard rack or a custom rack in your data center. Creating a list of your equipment and data center requirements is a great way to start this portion of the decision-making process. This allows you to clearly see if a standard rack will realize all of your requirements or if you need to investigate a custom solution. Because data centers are highly complex and dynamic, it is difficult to overstate the value of a data center rack or cabinet that complements the environment in which it is installed.

Many misperceptions surround the world of custom data rack solutions, the largest being increased cost. In general, custom products do cost more than generic products due to economies of scale, however that rule of thumb doesn't necessarily apply to data center infrastructure products.

Custom racks also enable greater efficiencies in equipment access, cabling management, airflow and other factors, cutting operational expenses and cooling costs.

CONCLUSION

In this whitepaper we reviewed 5 considerations for selecting the right data center rack for high-density environments.

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The cost of a data center rack is relatively insignificant compared to the total value of the equipment it houses, and the cost of the labor to configure and integrate that equipment. Nevertheless, it is a strategic component that must be carefully selected with today's data center challenges in mind.

The right rack will provide the structural integrity, flexibility and cooling support needed in a high-performance, high-density data center environment. It will also enable offsite integration processes, arriving in perfect condition when shipped fully loaded with preconfigured, pre-integrated equipment.

DAMAC's standard and custom racks have the strength and flexibility to support growing equipment weight loads within the data center and in transit, along with superior ease of use and airflow optimization. They provide the features needed in today's dynamic multivendor data center environments, delivering reduced operational costs, increased efficiency and investment protection.

Ready to review DAMAC's standard and custom rack options for your high-density data center?

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Let's start a conversation:
www.maysteel.com/get-a-quote/.

Want to learn more?
Visit: www.maysteel.com/data-center-solutions/

THANK YOU FOR READING!