

Future-Proofing Your Data Center Investment with Scalable Density

A detailed exploration into how scalable density designs can extend the life of your colocation investment

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Executive Summary

Enterprises are increasingly choosing colocation services to strengthen reliability and availability, maximize redundancy, eliminate security concerns and mitigate the high cost of building and maintaining a facility. Today, the U.S. has over 1,000 data centers and, according to Gartner, next year businesses will outsource nearly \$12 billion in colocation initiatives by 2012. With this continued growth, there are heightened concerns about the ability to scale cost-effectively and manage the need for increasing computing resources and associated power capacity.

47% of hardware challenges
are related to data growth*



The average data center in the U.S. is 11 years old and is challenged to meet the power and cooling needs of today's customer because of its inherent design limitations. Customers in these aging facilities face a few unappealing options for scaling their infrastructure: reserve or purchase a first right of refusal for adjacent space, lease non-adjacent space in the same facility at a later date or completely relocate their infrastructure to a different data center that can accommodate their needs. Growing enterprises seeking a colocation provider can future-proof their data center investment by selecting a facility that leverages a modular, high-density design for maximum flexibility and scalability to better address changing customer needs. The state-of-the-art data center changes the focus from space and power to power and cooling by combining structural changes with proven, complementary technologies to support high-density configurations in an on-demand basis.



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This white paper discusses the various approaches customers can use to solve data center capacity challenges. It dispels the myth that you must “go big” by colocating in a massive facility to meet your growing needs and, instead, explains why a data center designed for scalable density is the most flexible and cost-efficient method. Internap believes that customers should choose data centers configured for scalable density, which provides increased efficiency, flexibility and improved Total Cost of Ownership (TCO).

*Source: Gartner

Customer Requirements

Choosing a colocation provider is a strategic business decision that often includes a multi-year commitment of personnel, equipment and cash. Your requirements today may dictate a far different solution from what you will need in six months or a year, therefore, it is critical to measure a provider's ability to support evolving computing and network requirements as your business grows.

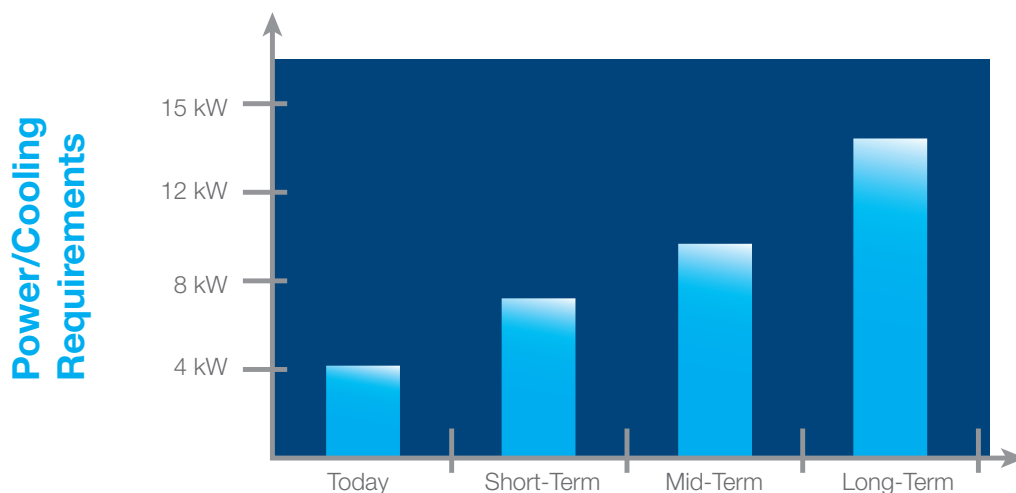
Customers choose colocation to improve reliability and availability, boost efficiency and performance, decrease costs, reduce risk and meet compliance needs. Many colocation customers find their demand for data and computing resources expanding and their providers unable to efficiently supply power and cooling capacity to support high-density configurations. Increasingly, customers demand:

Scalable capacity

Customers want to know that they can scale their overall power and cooling needs as their business grows in a pay-as-you-go format. For many customers, "vertical expansion" (higher-density rack configurations) is preferred as it represents a more cost-effective, efficient and realistic option over "horizontal expansion" (increased footprint). The ability to scale business efficiently positively impacts not only TCO, but also the bottom line.

Longevity within the same facility

Customers want to avoid the costs and burdens associated with relocating their resources from one facility to another due to the provider's inability to meet their growing needs.



Longevity of Customer Colocation Solution

Options for Growth in Traditional Data Centers

The options for growth in traditional data centers and their associated challenges are outlined below:

- **Reserve or purchase a first right of refusal for adjacent space**

To ensure capacity for future growth, you may be able to purchase extra space adjacent to your current racks. In some cases, a data center operator might offer a first right of refusal. Due to market growth, this flexibility is rare and when available is often short lived because of competing customer requirements. While this may be an option for some, it is one of the most expensive methods of growth and may prove cost-prohibitive for many customers.

- **Lease space later in the same facility**

A second option is to lease additional space in the future within the same facility. The risk with this option is that it may not be possible to obtain space adjacent to your existing equipment locations, which can create operational inefficiencies. In some situations additional space in the facility may not be available.

- **Lease space later in a separate facility**

Operational inefficiencies are exacerbated if your future plans result in having to acquire space in another facility and, potentially, through another provider. This configuration entails increased travel time for IT staff as they move among locations to address issues and maintain redundant equipment. Additionally, your purchasing organization must execute multiple contracts and manage additional provider relationships.

- **Relocate completely to a bigger data center**

Migrating technology infrastructure to another facility is easily the most disruptive of all options, operationally and financially. This option is a last resort, as a poorly planned move can result in downtime and quickly escalate out of control. Further, if the new facility has not been designed to support scalable density to address future needs, you may be faced with yet another move in just a few years.

The growth options described above can be used as short-term work-arounds, but they involve costly sacrifices. You should delve deeper to find a solution that better aligns with your long-term business goals.

Growth in traditional data centers is achieved by various approaches, none of which is optimal. At best these approaches can be used as short-term work-arounds, but they involve costly sacrifices.

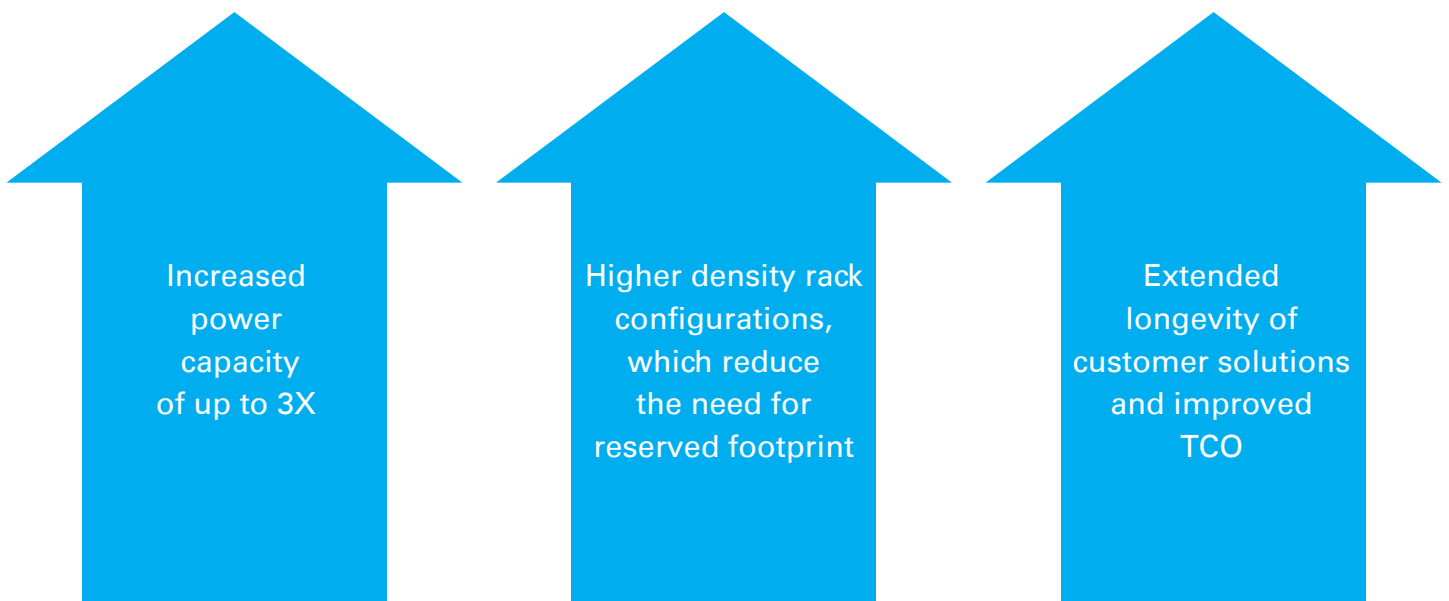
Scalable Density Defined

Progressive data center operators are already achieving higher density through scalable infrastructure, and we expect this to become the norm in the next several years. You should invest in data centers incorporating a flexible, modular design that can rapidly and efficiently scale power and cooling as needed. Choosing a colocation provider that has designed its facility for scalable density represents a significantly more efficient solution for growing platform requirements without the costs associated with more space.

In simplest terms, we define scalable density as a modular data center design that is able to support greater than 6KW usage per rack enclosure in an on-demand manner to allow growth as customers need it.

Scalable density differs from a traditional model in that space becomes only a function of the equipment's physical dimensions, rather than a function of power and cooling capacity. Scalable density is not defined by any one technology but, rather, is the unique integration of new facility design elements with numerous technologies and efficient practices that exist in the marketplace today. In other words, with scalable density, colocation customers can deploy high-density rack configurations within their existing footprint. The availability of power in this design is determined by the power requirements of the IT equipment placed within the rack enclosure. The availability of cooling is determined by the heat generated by the deployed equipment.

Scalable density is high-density design that provides:

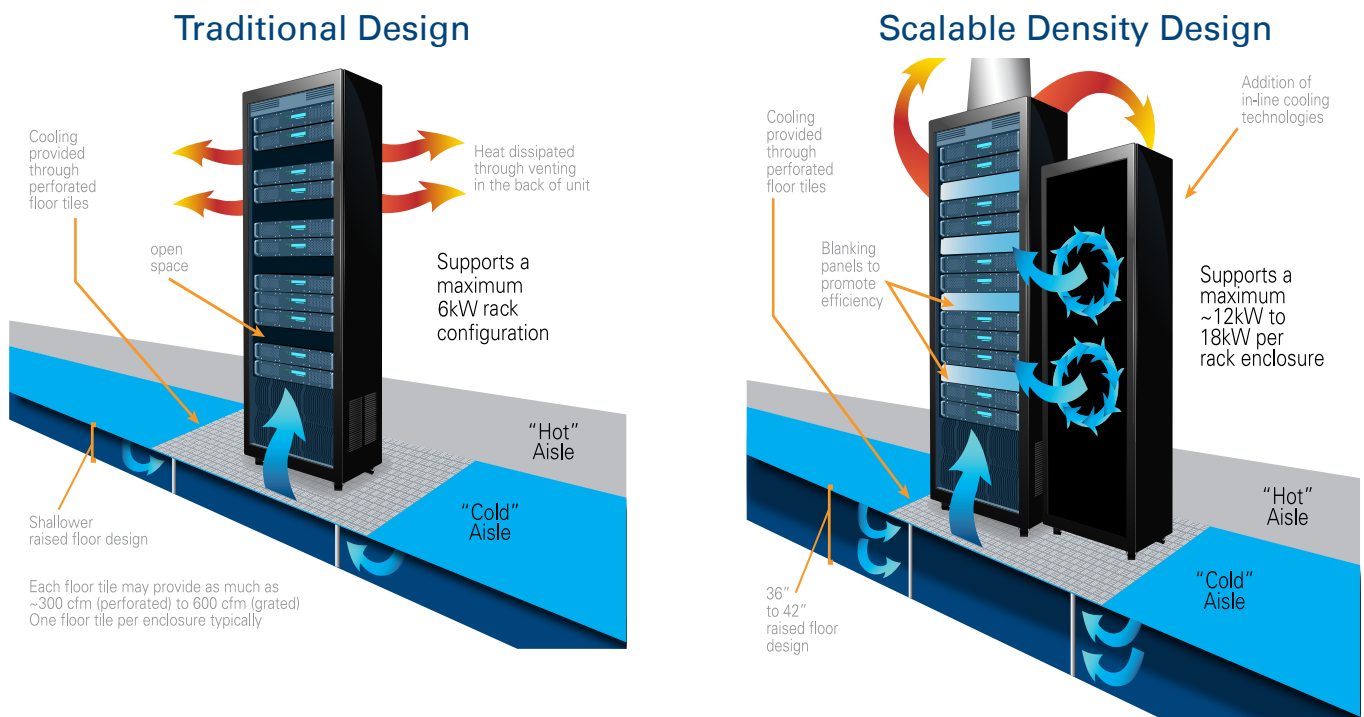


Achieving Scalable Density

A scalable density design incorporates power and cooling “spines” that work to create a delivery mechanism by which capacity can easily be added, aggregated and allocated to customers. In the last few years, electrical infrastructure has been componentized and modularized in more of a plug-and-play fashion. Expanding an Uninterruptible Power Supply (UPS) or generator system, one component or module at a time, allows the system to grow as needed and run at optimum efficiency levels along the way. The design captures efficiencies for the colocation provider, while supporting the levels of redundancy, facility integrity and on-demand scalability required by customers.

Scalable density data centers are characterized by:

- One data center pod with the ability to add others
- An electrical and cooling infrastructure connected to a central spine allowing additional capacity to be fed to new pods or enhancing power and cooling deployed in an existing pod
- The ability to add incremental capacity to the distribution spines as needed
- Shared redundancy within the spine infrastructure rather than within each pod



Scalable density utilizes customer-localized cooling technologies such as in-line cooling and “hot” or “cold aisle” containment to further extend capacity as customers require. In-row cooling solutions can extend the scalability of customer rack enclosures, easily taking equipment densities well beyond 12kW per rack to as much as 18kW per rack enclosure. However, their implementation requires pre-planning in the facility’s design. Scalable density can also be achieved through the use of “hot” and “cold” aisle containment technologies that can boost the density of tenant solutions beyond 18kW per enclosure. Each of these enhancements safely stretches a traditional infrastructure and ensures customers a relatively low cost for increased density.

Benefits of Scalable Density

Scalable density gives customers the ability to scale vertically within their existing footprints and stay with the same provider over a longer time horizon, significantly improving TCO.

- **Hassle-free growth**

Scalable density enables customers to avoid the complications involved with relocating, separating servers or paying for under-utilized space. This solution efficiently supports high-density rack configurations by powering equipment up to an 18KW+ threshold per rack configuration.

- **Greater longevity**

A high-density data center design provides the efficiency and capacity to extend the longevity of a colocation implementation. In addition, operations are not disrupted by retrofitting the data center to scale to support business growth.

- **Improved TCO**

Because a high-density design gives customers more options and can extend their longevity within the facility, TCO may improve compared to a traditional data center design. In addition, the design will allow customers to deploy more server and storage equipment in their existing footprints. As a result, customers won't have to pay for excess unused data center footprint and will require fewer cabinets to support their business growth.

- **Reduced OPEX**

Housing all equipment in one place allows containment of operating costs.

- **Reduced CAPEX**

Proper cooling better preserves customer equipment, decreasing the rate of server and storage degradation over time.

Summary

Colocating in a data center designed for scalable density represents a more efficient and cost-effective solution for customers to meet their growing business needs. As a result, customers can extend their longevity in a facility and improve the TCO of their colocated solutions and infrastructure. In today's typical raised-floor design, colocation solutions are incapable of scaling beyond 6KW per rack enclosure, except by adding additional data center footprint to an existing customer environment. However, simply throwing more colocation space at the problem is a costly proposition for customers. A more intelligent answer is to select colocation providers that offer scalable density facilities that are able to accommodate greater rack density of up to 18KW+ based on more efficient power and cooling designs that utilize best practices and integrate proven technologies. A facility designed for scalable density provides customers with the headroom to grow infrastructure vertically and flexibly without adding more footprint, thereby allowing greater overall efficiencies, extending longevity in the same facility and improving TCO.

About Internap

Internap's data centers offer a highly reliable and scalable IT Infrastructure to deliver and store content, data and applications. We are committed to delivering innovative solutions that create value for our colocation customers. With more than 40% of our footprint deployed within the last three years, our facilities feature the latest innovations in data center design, including scalable power, cooling density and environmental efficiencies. By integrating scalable density designs into our facilities, Internap is actively pursuing new ways to deliver colocation solutions that allow enterprises to cost-effectively and efficiently grow while getting the highest return on investment.

Internap provides intelligent IT Infrastructure services that enable our customers to focus on their core business, improve service levels and lower the cost of IT operations. Our enterprise IP, CDN, colocation, managed hosting and cloud solutions are differentiated by unparalleled levels of performance, availability and support. Since 1996, thousands of businesses have entrusted Internap with the delivery and protection of their online applications.