IBM Global Technology Services
Thought Leadership White Paper

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Scalable modular data centers—the right choice for midsize organizations

Rapidly deploying cost-effective data centers to help meet your growing business demands

IBM

Executive summary

Growth. Flexibility. Reliability. Efficiency. Sprawl. Midsize organizations often find themselves in a quandary. They need to continually increase IT capacity to support new technologies like cloud, analytics, mobility, and social while improving availability, supporting application growth and meeting new customer and business demands at the same time, they must contain operating and capital costs. Something's got to give.

For many organizations, data centers are the engines that drive the growth of the enterprise. Typically, CIOs have met the demands of a growing business by expanding IT capacity with new equipment. But with power densities growing 20 times the past decade alone, this strategy is creating unsustainable power and cooling requirements in existing data centers. And with future requirements for cloud computing, analytics, mobile and social business applications, it will be increasingly difficult to keep up with the pace of change. Already, continual growth from mergers, acquisitions and geographic expansion has resulted in server sprawl across many server rooms or aging data center infrastructures that are no longer able to meet today's reliability requirements.

Building a traditional, raised-floor data center is frequently out of the question. The up-front capital expenditures often make new data centers unaffordable. Designing and building a new facility can take months. And the space available for new data centers often constrains the implementation of traditional designs. If an organization can't build a new data center, it may be forced to install critical IT equipment in unconditioned, unsecured and unmonitored space.

Modular data centers allow for quick and cost-effective implementation for increased server room capacity. We recognize that midsize organizations are typically more agile than larger organizations, with fewer resources and a mandate to do more with less. This paper discusses how IBM's innovative approach to data center design and deployment can help organizations design and implement a new server room that can meet availability, capacity and scalability requirements while reducing capital and ongoing operating expenses.

Meeting the challenges of growth while keeping costs in check

To address the many challenges facing the physical data center, IBM has led the way to more efficient data center design and deployment—scalable, modular data centers (SMDC). Our SMDC solution is designed to enable rapid deployment of cost-effective, high-quality, typically 500 to 2,500 sq ft (50 to 250 sq m) data centers designed to meet a client's availability, capacity and operations needs. The turnkey solution can be designed and installed in nearly any working environment in less time and with less floor space than most traditional raised-floor data centers—as little as 8 to 12 weeks after the design is completed.

Moving from server sprawl or aging data center infrastructures to modular data center designs can deliver significant benefits. Scalable, modular data centers help reduce up-front capital expenditures and daily operating expenses, reduce inefficiency from over provisioning and improve availability in a cost-effective manner. Proven methodologies and standardized components can help reduce design and implementation risks while lowering daily operating costs. Most importantly, scalable,

modular data centers can help deliver ongoing, sustainable cost savings—with up to 15 to 25 percent less capital and operating costs than a traditional, raised-floor data center.[1]

Rather than building for maximum capacity, organizations can add smaller increments of power, cooling and rack space components—when and where they're needed. Scalable, modular data centers are also adaptable to changing configuration requirements during the design and build phases and can be scaled up to meet evolving needs afterwards.

Scalable, modular data centers can provide an efficient means to implement high density server consolidation/server virtualization efforts or to support the rationalization of scattered and fragmented IT infrastructures. In addition, active monitoring and management of IT and facilities equipment can help ensure data center operations continue to cost-effectively meet availability, capacity and energy requirements.

Improving availability to meet around-the-clock demands

Availability is at the heart of what any data center must provide. Customers have increasing application availability requirements and decreasing tolerance for downtime. With application outage windows getting shorter and shorter, mitigating outage risks is critical to your company. Yet application availability must also be maintained in a cost-effective manner.

Enhancing business resiliency by upgrading the data center

A European retailer was undergoing a lengthy process to revamp its 20-year-old data center. Nagging problems of neglected air-conditioning, deficient fire-extinguishing systems, imminent roof leaks and other deficiencies made the design phase particularly difficult.

Despite several changes in priorities and requirements over the length of the project planning cycle, the flexibility of the scalable, modular data center design process helped the retailer reconfigure the design on the fly. In the end, the company was able to implement a new 1,300-square-foot data center supporting the growing IT equipment inventory.

Increasing IT capacity and energy efficiency while minimizing risk

A college in Canada experienced rapid expansion in a short time, increasing the technology requirements needed to support the growth in students. The increased demand for computing was accompanied by an increase in IT power consumption. Intermittent power surges and outages were becoming a daily issue for IT staff, impacting the system's availability to the student population. With energy management and sustainability a high priority across the campus, the college wanted a solution that could increase IT while minimizing risk, reducing energy costs and demonstrating commitment to environmental sustainability.

IBM worked with the college to implement a fully functional scalable modular data center in an existing office next to the previous data center, enabling IT operations to continue during construction. The college also synchronized facilities and IT, and the entire campus around accounting policies for energy use and cost. The built-in efficiency of the scalable modular data center allows the college to meet growing capacity requirements while saving money on energy costs. Much more efficient than the previous solution, the scalable modular data center delivers almost seven times the computing power in a similar size space.

IBM's turnkey solution approach is targeted at balancing your availability needs with the cost to achieve them. We use smarter design choices to help achieve the same availability at less cost. We can work with you on generator options, dual power feeds to critical equipment, redundant UPS and cooling capacity, and power and cooling system concurrent maintainability.

Built-in flexibility to meet a variety of deployment needs

Scalable, modular data centers can be deployed in almost any working environment and in a wide range of configurations. By providing a higher level of design flexibility, they can provide a precise solution to a wide range of data center challenges and the responsiveness needed to meet unpredictable changes in business and technology requirements. Unlike a traditional raised-floor data center, a scalable, modular data center contains most of its IT infrastructure in rows of racks, helping to reduce power, cooling and space requirements. The traditional raised floor may even be eliminated entirely, significantly reducing the time and cost of deployment. Standard equipment racks support multivendor IT environments, including today's integrated compute, storage and networking infrastructures.

IBM has implemented scalable, modular data centers in diverse environments, such as converting a school locker room to a data center, changing office environments to server rooms, and deploying a new server room in weeks to beat the expected monsoon season. Often, space constraints dictate the design and build. Fitting a scalable, modular data center into the available space is not just about coping with a physical limitation; in some cases it may be the only way to make a new data center affordable at all.

Exploring new markets on a budget

A retail financial services company from Europe was seeking to begin operations in Shenzhen, People's Republic of China, and was challenged to find a place for its data center. Because rents were high, it had no choice but to locate the data center in its office. This placed significant space constraints on the data center design.

IBM helped the company implement a scalable, modular data center that comprised 2,100 square feet, with racks housing 50 IBM BladeCenter servers. Despite the space constraints, the design is scalable, energy efficient and highly reliable—and installed quickly. It also includes several innovations to help achieve high reliability, such as fully redundant power supply and cooling systems. The scalable, modular data center is expected to save up to 20 percent in energy costs when compared to a traditional data center.[1]

Monitor and manage for more efficient operations

Midsize server rooms need to last 10 years or more and require a flexible, cost-effective design. With 20 percent of server implementations being impacted by lack of power and cooling in the server room and the average cost of outages increasing to over $70,000 per hour for midsize enterprises, having insight into how to improve the management of the server room to meet availability, capacity and energy efficiency objectives are key areas for innovation.[1]

The IBM Scalable Modular Data Center offering includes integrated monitoring and management services (also available separately) with user-friendly dashboards and reporting tools providing visibility and a simplified way to manage both IT and facilities operations. With this information, organizations can make more informed decisions regarding key issues, such as availability, capacity planning for power, space and cooling, and energy management. To further optimize expenditures and reduce risk, automated thresholding capabilities can be set up to alert based on targeted availability, performance or power consumption scenarios. Among other benefits, the data center integrated monitoring and management service can provide visibility to help:

- Drive higher availability by correlating IT and facilities events that could impact data center operations
- Forecast when additional power and cooling capacity will be needed to support technology implementations
- Save up to 10 percent or more of total power and cooling capacity by continuously right-sizing facilities supply to IT demands[1]
- Reduce staffing requirements with real-time, automated data collection

Selecting a data center partner is key to a successful deployment

Planning a data center from concept to implementation can be a challenging task. Just as changes have occurred in home construction that incorporates new products and construction techniques, the same has happened with data center design. There are many new approaches and products to help your data center infrastructure be responsive to change.

Many clients have not designed and built a data center in the past 10 to 20 years and may lack the expertise required to manage the IT and facilities planning, and integration with in-house resources. Designing and implementing a new server room requires many skills to provide a comprehensive solution, including those of data center and information technology experts, architect and engineering partners, data center and IT equipment vendors, mechanical and electrical contractors, utility providers, and other services. The need for a broad spectrum of skills is why one out of three organizations will look to work with a partner for data center design and build.

IBM has more than 30 years of global experience helping clients design, build and run their IT environments and improve their business resiliency. We have experience designing and constructing approximately 30 million square feet of data center facilities floor space globally. We leverage patent-pending analytics tools and extensive databases of conceptual drawings to help develop fact-based data center requirements. In addition, our strong relationships with local providers help us successfully provide design and build services for data centers of virtually any size. IBM Site, Facilities and Data Center Services has installed over 1,000 modular data centers worldwide for clients and utilizes a very strong ecosystem of global alliances and suppliers providing technology and services.

Our expertise in technological innovation, design and build leadership, best practices methodology, highly skilled data center specialists and hands-on experience in designing and supporting data centers can provide the thought leadership necessary to plan for the future while helping reduce the complexity and risks associated with your new or retrofitted data center, inherent risks associated with building a new data center facility can be reduced by capitalizing on IBM's project experience and intellectual capital.

Providing an important tool to help achieve business growth and savings

Scalable, modular data centers provide an innovative approach to help growing organizations solve some of their toughest data center challenges. They can help increase capacity without substantially increasing capital and operational costs. They can help improve reliability to keep up with business demands for increased availability. And they can provide the flexibility needed to support future business growth like cloud, analytics, mobile applications and social computing. Altogether, scalable, modular data centers help lead the way to a more flexible, responsive and efficient IT infrastructure.

For more information

To learn more about IBM Site, Facilities and Data Center Services, please contact your IBM marketing representative or IBM Business Partner, or visit the following website: **ibm.com**/services/us/en/it-services/business-continuity/site-and-facilities

Additionally, project financing services can help you not only secure the means to implement a scalable, modular data center, but also meet financial objectives throughout the life of the project—from the initial deployment to the scaling of the data center as your organization and its needs grow.

For more information on IBM Global Financing, visit: **ibm.com**/financing

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[1] Based on previous IBM engagements

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