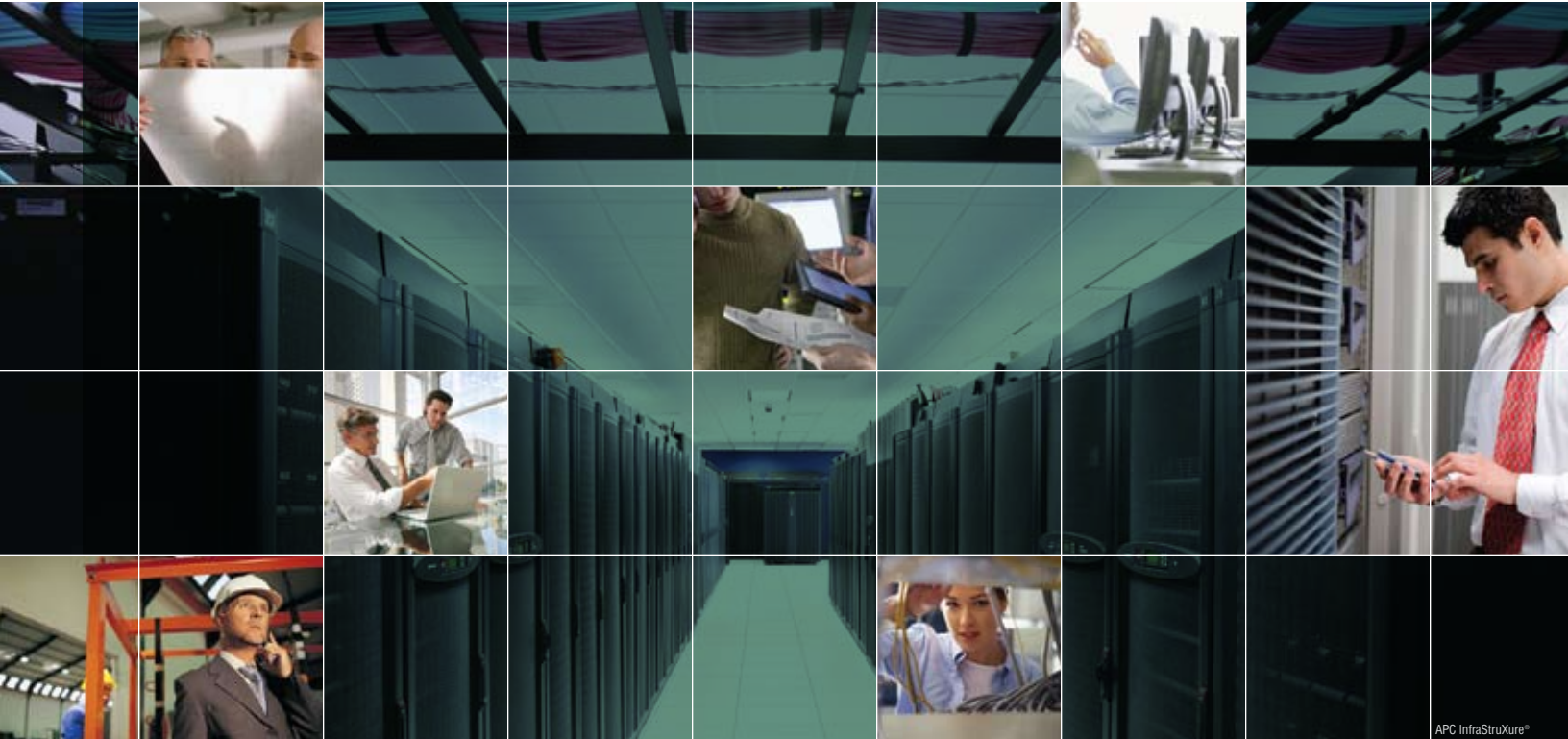




**The art of the possible.**

*Rapidly deploying cost-effective, energy-efficient data centers*



**Growth. Cost. Obsolescence. High density. Sprawl. Hot spots.** Growing organizations often find themselves in a quandary. They need to continually increase IT capacity to ensure business resiliency, support application growth and meet customer demands. At the same time, they must contain operating costs. **Something's got to give.**



To meet capacity demands, many organizations are implementing high-density computing solutions, including blade servers. But high-density servers place greater demands on the data center's energy consumption. As energy prices continue to rise, so does the cost of operating the data center.

Other organizations are finding themselves simply running out of usable floor space. But building another 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. Mergers and acquisitions further disrupt the IT infrastructure, increasing the tendency of data center operations to sprawl out over multiple buildings, companies or even countries.



APC InfraStruXure®

### **The beat goes on—keeping pace with business growth while controlling costs**

To address the many challenges facing the physical data center, IBM is leading the development of a new concept in data center design and deployment—scalable, modular data centers. This approach provides design and construction for a complete, turnkey, high-density and energy-efficient data center environment in a short amount of time.

Scalable, modular data centers can be deployed in a wide range of configurations to take advantage of the space available and to provide a precise solution to the problem at hand. They help minimize up-front capital expenditures and, through energy efficiencies, provide lower operating costs. They also provide an efficient means to implement server consolidation and rationalize scattered and fragmented IT infrastructures.

### **Built-in flexibility to meet a variety of deployment needs**

Scalable, modular data centers provide the flexibility needed to solve a wide range of data center challenges. Unlike a traditional raised-floor data center, a scalable, modular data center contains most of its IT infrastructure in rows of racks, helping to increase power and cooling and saving floor space. The traditional raised floor may be eliminated entirely, significantly reducing the time and cost of deployment. Standard racks also enable multi-vendor support, including support for IBM BladeCenter® servers.

Scalable, modular data centers can be designed and implemented in as little as 8 to 12 weeks. They can be installed in almost any working environment. They feature lower design, build and daily operating costs than traditional raised-floor data center solutions. They use proven methodologies and standardized components to help reduce implementation risks. Most importantly, scalable, modular data centers are energy efficient and help deliver sustainable operating cost savings.

IBM has successfully deployed its own IBM Scalable Modular Data Center (SMDC) offering in a wide variety of applications for its clients globally. Here are just a few examples that illustrate how an SMDC can help organizations of all types.

## Rapidly deploying cost-effective, energy-efficient data centers

Industry: Public social services

Data center size: 1,500 square feet

Location: United States

Business problem:  
Scattered IT infrastructure



### Consolidating IT infrastructure to enable better service delivery

One of the biggest benefits of scalable, modular data centers is that they can be customized to fit the available space. They can be built as small as 200 square feet or as large as a few thousand square feet or more.

A decentralized IT infrastructure was making it difficult for a public social services agency, for example, to manage its processes for determining benefits eligibility. But by constructing two SMDCs—one of which had to fit into a converted school locker room—the agency was able to implement new, centralized back-office processing centers.

Altogether, the solution incorporated 16 racks of IBM System p™ and IBM System x™ server equipment—each with its own uninterruptible power supply (UPS), air-conditioning units and overhead cabling. Each SMDC is energy efficient and will support high-density computing in a small-footprint implementation.

Industry: Retail financial services

Data center size: 2,100 square feet

Location: China

Business problem:  
Expensive real estate for data centers



### Exploring new markets on a budget

Fitting an SMDC 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.

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

The SMDC that the company implemented comprised 2,100 square feet, with 11 racks holding 50 IBM BladeCenter servers. Despite the space constraints, the SMDC design was scalable, energy efficient and highly reliable—and it was installed quickly. It also included several innovations to help achieve high reliability, such as fully redundant power supply and cooling systems. The SMDC is expected to save up to 20 percent in energy costs when compared to a traditional data center.

## Providing reliable services by rationalizing the infrastructure

Implementing an SMDC provides CIOs with the opportunity to rationalize and consolidate their IT infrastructure. They can make technical upgrades at the same time and in a way that uses staff resources efficiently.

A bank wanted to ensure a high level of IT service for its end users, but its infrastructure was not configured to provide a highly available, flexible environment. Its sprawling server farm was spread out in four different rooms.

To rationalize its IT infrastructure, the bank deployed a 672-square-foot SMDC. The new data center holds ten racks of servers, including five racks of Intel® servers and IBM System i™ hardware. The bank expects that by consolidating its servers it can use its IT assets more efficiently and effectively, make the data center easier to manage, and reduce costs, including the cost of energy.

Industry: Banking

Data center size: 672 square feet

Location: United States

Business problem:  
Fragmented IT assets



## Cutting costs through server consolidation

An SMDC provides a way to capture efficiencies in the IT infrastructure that can help deliver immediate and long-term cost savings.

A growing university had experienced a 300 percent increase in student applications over the past decade—until its three data centers were no longer able to handle the growing demands for IT services. The scattered IT infrastructure was costly, inefficient and unable to scale.

The university implemented a centralized, 500-square-foot SMDC solution that enabled consolidation of its 75 servers down to three IBM BladeCenter platforms holding a total of 40 IBM System x and IBM System p servers, along with two storage area networks and a tape library.

The up-front capital costs of the SMDC were less than 20 percent of the cost of a standard raised-floor data center. And the new data center was implemented in half the total space required by the previous three. The smaller footprint, coupled with energy-efficient components, significantly reduced the university's energy costs—contributing to a 40 percent reduction in overhead costs.

Industry: Education

Data center size: 500 square feet

Location: United States

Business problem:  
Server sprawl



## Rapidly deploying cost-effective, energy-efficient data centers

Industry: Retail

Data center size: 1,300 square feet

Location: Austria

Business problem:  
Outdated infrastructure



### Enhancing business resiliency by upgrading the data center

Scalable, modular data centers also are adaptable to changing configuration requirements during the design and build phases, and can be scaled up to meet evolving needs afterwards.

A European retailer was undergoing a lengthy process to revamp its 20-year-old data center.

The design phase was difficult because it had to address nagging problems of run-down air-conditioning, deficient fire-extinguishing systems, imminent roof leaks and other deficiencies.

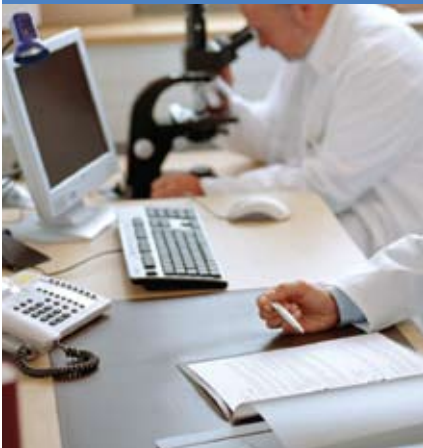
Despite several changes in priorities and requirements over the length of the project planning cycle, the flexibility of the SMDC design process helped the client reconfigure the design on the fly. In the end, the company was able to implement a new 1,300-square-foot data center with ten racks of equipment.

Industry: Healthcare

Data center size:  
Two 2,500-square-foot SMDCs

Location: United States

Business problem:  
Scalability



### Sustaining rapid expansion with a pay-as-you-go approach

The scalability of the SMDC provides a significant advantage in how new data centers are financed, since capital expenditure costs need only be incurred as the data center grows.

Scalability can help a company manage its capital expenditures—now and in the future. A medical research company, for example, needed to consolidate and virtualize scattered servers into two new data centers while continuing to scale its capabilities to satisfy its customers' needs.

The company implemented two SMDCs of 2,500 square feet each, quickly and affordably acquiring the data center environment it needed to support its rapid growth. It can now grow—and finance—its computing environment incrementally as its business continues to expand. Had it designed and built its own data centers on traditional raised floors instead, the data centers would have been 10,000 to 15,000 square feet. The company would likely have had to invest significantly more capital up front and then spend years filling up the facilities.

The company expects to achieve dramatic cost savings by reducing its total number of servers from approximately 800 to only a few hundred, including eight racks of IBM System x servers.

## Increasing computing capacity while reducing IT costs

Not only can scalable, modular data centers be used as new, stand-alone data centers, they can also be implemented in larger, existing data centers to create high-density computing areas.

A large commercial bank wanted to add more than 6,000 IBM BladeCenter servers to its IT environment. But the bank's expansion plans came to a halt when excessive energy usage and inadequate cooling issues in its 50,000-square-foot data center would not allow the implementation of high-density servers.

The bank solved the problem by implementing SMDCs in special zones set aside in the data center to hold a dozen equipment racks. Each rack was 50 feet long by 4 feet wide and contained 500 IBM BladeCenter servers. In-row coolers addressed the needs of the blade servers without wasting energy cooling the entire data center. The bank expects to save 20 percent to 30 percent in energy costs.

**Industry:** Banking

**Data center size:** 3,500 square feet

**Location:** United States

**Business problem:**  
**Blade server hot spot**



## Increasing business flexibility with a quick-to-deploy data center

In addition to being flexible for its initial deployment, an SMDC is easier than a traditional raised-floor data center to relocate if ever needed, with uninterruptible power supplies (UPSs), air-conditioners and cabling all contained in its racks instead of under a floor tile.

A mining company was developing a new operation in northern Canada, 14 hours north of the nearest major city. It needed to quickly deploy a data center, but was struggling with how to implement a solution given the remote location. To complicate matters, there was also a good chance that the company would eventually need to mine underneath the proposed data center site.

The company implemented a 400-square-foot SMDC beginning with one row of eight racks but with the ability to add another row of eight racks. The decision was driven by the cost-effective and space-efficient design of the SMDC solution as well as its flexibility and low-maintenance features.

The new data center is designed to be relocated quickly and easily. Moreover, the mining company expects to save 15 percent of the cost of building a traditional data center—simply by avoiding the expense of building a raised floor.

**Industry:** Mining

**Data center size:** 400 square feet

**Location:** Canada

**Business problem:**  
**Remote location**



## Services are the key to a successful deployment

As you plan to deploy a scalable, modular data center, it's important to consider the many factors that can contribute to its success. Work with a technology partner that can provide expertise to help evaluate, design, implement and manage both your IT infrastructure and your physical environment.

You might begin with a data center energy efficiency assessment. This can provide a good foundation for creating a data center strategy designed to optimize your server and storage environments through consolidation and virtualization projects. Consolidation and relocation services can help you get the most from your investments while supporting availability, scalability, recoverability and agility throughout your data center transition.

Finally, 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.

## Providing an important new tool to achieve business growth and operational savings

Scalable, modular data centers provide an innovative approach to help growing organizations solve some of their toughest data center challenges. They can help organizations double IT capacity in the same energy footprint. They can help reduce operational costs. And they can help organizations build a positive environmental image. Altogether, scalable, modular data centers help lead the way to a more flexible, responsive and efficient IT infrastructure.

## The strength of IBM and American Power Conversion Corporation

American Power Conversion Corporation (APC) is an IBM alliance partner that provides technology to our clients worldwide as part of our integrated SMDC solutions. The APC InfraStruXure® architecture for data centers provides a basis to design SMDC deployments that fully integrate power, cooling, rack, management, security and services. This on demand architecture allows the selection of standardized components to create a solution through modular and mobile configurations. InfraStruXure is available for any IT environment, from wiring closets to large data centers.

## For more information

To learn more about IBM IT Facilities Assessment, Design and Construction Services – scalable modular data center, please contact your IBM sales representative or visit:

[ibm.com/services/siteandfacilities](http://ibm.com/services/siteandfacilities)



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