

Smart Move: Five Steps to a Successful Data Center Relocation



A fast-growing number of organizations are relocating their data centers, but too many lack plans that reduce the short-term risk of business disruption and the longer-term risk of having to move again.

By Michael Bullock and Tim Schutt

EXECUTIVE SUMMARY

ACROSS THE U.S., DATA CENTERS ARE LITERALLY IN MOTION. MANY COMPANIES—from manufacturers to retailers, from health care to high tech—are relocating their computer facilities in search of more efficient, effective and secure IT operations.

With data centers today representing about one-quarter of a typical large company's total IT costs, managing the relocation has taken on increased importance. Directing a complex data center move is anything but easy, however. When done right, a move requires careful planning, expert execution and experience. But if poorly managed, a move can disrupt business operations for days once the

new site goes live. Longer term, moving to a bad location—one with insufficient power, suboptimal space, or an inflexible landlord—can force a company to move its data center again long before it should.

More than 70% of the Global 1000 organizations will have to either move or modify their data center facilities significantly over the next five years.

Data center relocations require excellence in planning and execution.

Common mistakes such as failure to properly evaluate the “build versus lease” decision or relying too much on an overburdened IT staff, can be prevented. In this white paper, we discuss the pitfalls to avoid as well as the site selection, facility design, and relocation techniques that can make any data center move a success.

WHY DATA CENTERS MOVE

Today, more and more companies are planning to relocate their data centers. In fact, according to a Gartner Group 2007 study, more than 70% of the Global 1000 organizations will have to either move or modify their data center facilities significantly over the next five years. There are many reasons justifying a data center relocation, the most common being a need to replace an aging infrastructure. The average age today for a data center is 12 years old, which frequently leads to the following types of business and technical problems:

OUT OF POWER—Facility lacks sufficient power needed to upgrade to high-density server and storage systems. When 200 watts per square foot capacity is required and only 100 watts per square is available, the only options are to retrofit the space, use different systems or move the data center.

OUT OF COOLING—A point of diminishing returns is reached where cost for additional cooling increases at an accelerated rate. In these cases, options are to retrofit the space (assuming sufficient power and airflow are available in the location), consolidate systems or move.

OUT OF SPACE—With the need for more power and cooling, operating data centers in traditional office space is becoming increasingly difficult and expensive. In some cases, the migration to high density systems is blocked simply on limitations in floor to ceiling height (and the inability to introduce sufficient cool air while adequately handling the heated exhaust).

LEASE RENEWALS—Consistent with the above (power, cooling and space), a leased facility may be reaching the end of its useful life. The facility owner may be unwilling or unable to economically upgrade the facility to meet “state of the art” requirements for high density data centers.

The reasons why companies may choose to relocate their data centers are clear and compelling. However, since a data center move is often a “once in a career” event, many companies experience the same avoidable and costly mistakes (see chart, “Top Three Reasons Why Data Center Relocations Fall Short”).

TOP 3 REASONS WHY DATA CENTER RELOCATIONS FALL SHORT

Experience shows that data center relocations that go poorly do so for the following reasons:

Problem Area	Signs of Trouble
<p style="text-align: center;">1</p> <p style="text-align: center;">“Squeeze It In”</p>	<p>Companies often underestimate the complexity of a data center move and try to accomplish a data center relocation with current, oversubscribed staff.</p> <ul style="list-style-type: none"> • Limited practical experience in moving operations (few companies consider this as a “check box” item in employee screening/hiring) • May have limited understanding of application dependencies in a heterogeneous IT environment, especially for legacy systems • Lack expertise in emerging data center design infrastructure including high density provisioning and high efficiency operations (Green IT)
<p style="text-align: center;">2</p> <p style="text-align: center;">Operate in Silos</p>	<p>With the emergence of high density computing, high efficiency facilities and complex, enterprisewide application systems, companies must work collaboratively across departmental silos to assure business objectives are met.</p> <ul style="list-style-type: none"> • IT may inflate their power and cooling requests above forecasts to assure “buffer for the unknown” without realizing the impact on space design, layout and infrastructure costs (more expensive infrastructure: generators / back up, cooling, etc.) • Conversely, facilities may be not fully understand the impact high density systems will have as they approach points of rapidly diminishing returns and escalating costs related to power and cooling physics • From a business perspective, there may be service level agreements in place with a company’s customers requiring advance notice of planned outages. Any such business obligations require careful consideration by both technical IT and facilities management working together
<p style="text-align: center;">3</p> <p style="text-align: center;">Vendor Reliance</p>	<p>Organizations turn to outside software and hardware vendors for “free advice” to accelerate their learning curve and avoid common mistakes.</p> <ul style="list-style-type: none"> • Most vendors’ sales reps and professional services staff are trained to believe that data center relocations are the best time to introduce new products and services. While it is important to know about emerging technologies, more “moving parts” add risk and complexity to data center relocations • Conversely, these vendors seldom have experts in-house for relocations and will outsource the move to subcontractors. These subcontractors are then directed based on vendor perceptions and priorities often far removed from the company’s strategy and business goals
<p>SOURCE: TRANSITIONAL DATA SERVICES (TDS), 2008</p>	

HOW NOT TO MANAGE A MOVE

A number of companies have found moving data centers to be anything but easy. In April 2007, for example, Hostway merged with Affinity Internet to become one of the world's largest Web hosting providers, with 600,000 customers and 15 operations centers in 11 countries. Three months later, Hostway planned to move 3,700 servers for 3,000 of its customers from its Miami center to Tampa, Fla. The company warned customers to expect outages of between 12 to 15 hours during the move.

Relocating a data center is not a simple matter of pulling out the plugs in site 'A' and plugging them back in at site 'B.'

As it turned out, those outages lasted three days and longer for more than 400 customers, resulting in lost revenue and profit, not to mention serious blows to their reputations. Summarized by a Hostway vice president, "The company saw an unusually large number of hardware failures that occurred during the transportation."

"It literally sounds like Hostway took their servers, put them on a truck, unpacked them and tired to plug them in again," said one analyst.¹

Also in 2007, another hosting provider supporting 165,000 websites planned to relocate 200 servers to a new location. Customers were told their sites would be down for about 12 hours on a Saturday. In fact, many sites were down for days. Truth is, relocating a data center is not a simple matter of pulling out the plugs in site 'A' and plugging them back in at site 'B,' as many companies (to their distress) have discovered.

THE RIGHT WAY TO MOVE A DATA CENTER

Fortunately, best industry practices do exist and can help guide a company through any data center move. The following steps summarize the most important areas to keep in mind when going through this process.

STEP ONE: Decide to Build or Lease

The first decision confronting an organization that has decided to move is whether to build or lease.

When a company owns its own data center, it assumes much greater maintenance costs, security expenses (such as guards), and other risks. Building a new data center from scratch requires a large capital outlay. For example, a Tier 3 data center can run as much as \$2,000 per square foot. Although building a new center gives an organization maximum control of its data center, for most companies this option is too far removed from their core competencies to be considered. Relatively few organizations have the expertise needed in real estate and construction, data center design, operations, security and maintenance.

On the other hand, leasing has its own challenges. If a company does not own its own facility, its landlord can raise the rent or make other demands. We have seen landlords give 30 days notice for renters to purchase more of its services or pay additional rental fees. In one case, rent was tripled and as a result, some tenants moved. Those unable to do so were seriously hurt by this increase in costs.

When leasing, long-term lease agreements are an absolute necessity. Relocation is simply too expensive, time-consuming, and risky to be forced prematurely. This is especially true for larger companies with bigger data centers. Companies must lease with the future in mind. This means contracts should include extension provisions. It also means leases should contain expansion options for future growth and possibly purchase clauses should the landlord falter and be forced to sell.

¹ "HOSTWAY FAILED TO PROPERLY PLAN SERVER MIGRATION," EWEEK.COM, AUG. 2007

Whether a company decides to build or lease, it cannot afford to trust to luck or to any provider's unvetted expertise that the design of the data center will fulfill its current and future needs. Whether it builds or leases, a company can (and most often should) outsource the design work if it lacks internal design expertise relative to current and emerging high-density data centers.

If a company is leasing a new data center, it is of course constrained in design by the available space and future expansion rights. This will make optimizing the available space even more critical. At a minimum, the company must evaluate the following key points and ask the right questions:

Capacity (initial and future)

- Is there enough power and cooling? Is the power and cooling “in balance” or will one run out before the other?
- Is there enough physical space? When you need to grow, where will additional space be provided (e.g., is it adjacent and on the same power / cooling systems)?

Facility Design Verification

- How can you verify capacity is “as advertised” for uptime design, redundancy, load, etc.?
- Are there any failure points that could cascade through the facility?

Facility Maintenance

- Are the systems properly maintained and are the records auditable (e.g., generators, air handlers, pumps, chillers, fluid levels, etc.)?
- Is maintenance outsourced or provided by facility staff? How are they hired and trained?

If a company is building a data center, it must be involved in all the design issues from the start. These will range from facilities concerns like verifying that floor-to-ceiling height is adequate, to the more arcane (yet critical) disciplines of rack configuration.

Regardless which path is most appropriate—build or lease—the next step is to make sure the specific site will meet your short term and long term objectives.

STEP 2: Conduct a Site Suitability Analysis

A site suitability analysis should be conducted prior to either leasing or building a new data center. There are many factors to consider when choosing a site, including:

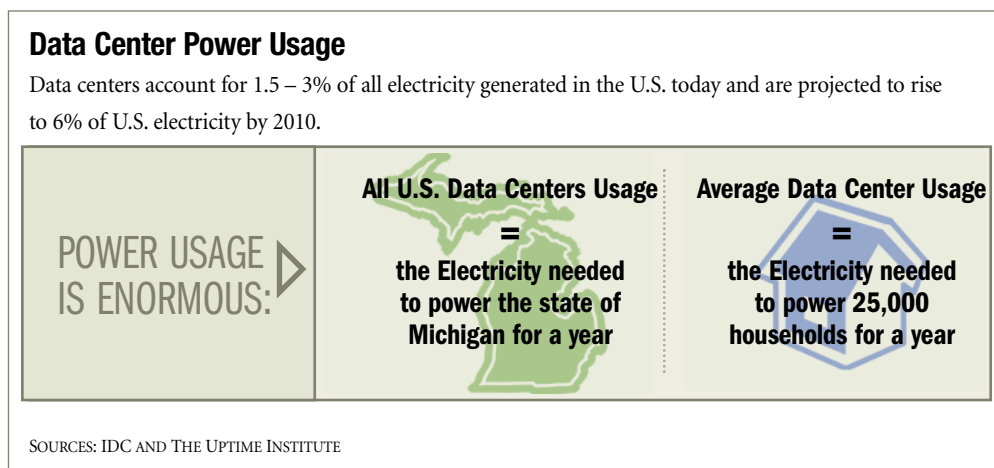
GEOGRAPHY. The data center should be located far from sites of potential natural disaster, such as floods, earthquakes and hurricanes. Locations near major highways and aircraft flight corridors should be avoided as part of risk mitigation. The site should be on high ground, and protected.

COMMUNICATIONS. The site should have multiple, fully diverse fiber connections to network service providers.

ABUNDANT POWER. Data centers consume up to 3 percent of all electricity generated in the U.S. today, and are projected to devour 6 percent of the nation's total by 2010 (see chart next page, “Data Center Power Usage”). Any site under consideration should have easy access to abundant power from multiple sources of electricity, taking advantage of low cost providers whenever possible.

SPACE. Data center relocations, as noted, are expensive, and one doesn't want to do them often. Therefore, before siting a new data center, the organization must analyze its business growth plan. Don't build or lease based on your current needs. Always determine as best you can how much space and power you'll need five or 10 years down the road.

Many other considerations related to location will also enter the picture. For example, you'll need to consider the availability of water (needed as a reliable backup supply for cooling towers and chillers); environmental approvals for fuel (including backup generators) and building exhaust; 24x7 building security; and much more.



STEP 3: Plan Thoroughly and Well in Advance

A successful data center relocation project requires comprehensive planning and preparation well outside the scope of normal day-to-day IT operations. With many IT departments already stretched thin, the chances for success greatly increase when outside experts are brought in to help. While there are several ways to determine a move team's success after the fact, two of the best methods are to measure system performance and the satisfaction of end users after the move is completed. Both metrics should be verified "equal to or better" than they were prior to the move.

In creating a comprehensive move plan, the following steps are recommended:

BENCHMARK APPLICATIONS. This will provide the basis for verification when the systems are returned to service. Establishing a baseline also provides a validation point / frame of reference should questions be raised "post move" regarding application performance.

DETERMINE MAXIMUM ALLOWABLE DOWN TIME ACCEPTABLE FOR THE MOVE. With proper planning, a move can be accomplished in a time window that is appropriate to the mission / operations: from zero downtime, to several hours or even a day or two. For example, high volume e-commerce businesses and applications where public safety is at risk may demand a "no down time" move whereas B2B operations that operate on a Monday to Friday schedule may be appropriate to move over a weekend. Some large-scale moves may make sense to accomplish in a series of move events with each "bundle" being achieved in the appropriate move window.

Any change undertaken during a move adds risk and complicates the project.

IDENTIFY SERVER, STORAGE AND APPLICATION DEPENDENCIES. As enterprise applications cross departmental boundaries, it is important to define functional "move bundles" to assure full business process is returned to service as quickly as possible.

REVIEW ALL RELEVANT AGREEMENTS AND CONTRACTS. The list should include vendor leases, maintenance agreements, warranties and insurance policies. Be sure to determine how requirements or restrictions may impact the move success and introduce risk.

IDENTIFY MOVE RESOURCES. What employees will be involved and what will be their role be prior to, during and following the move? What supplier and service contractors will be involved? When multiple organizations are working together, make sure the chain of command and responsibilities are clear.

CREATE A “MOVE DAY” TIMELINE. And be sure it takes into account all of the above.

STEP 4: Minimize Complexity and Change

Prior to the move day, organizations should freeze their application configurations and not introduce change and complexity. Sometimes, data center relocations are viewed as opportunities to upgrade software, hardware, or certain network elements, as change seems easier to accomplish in a fluid environment. This is a bad idea for many reasons. Changing the application portfolio makes it difficult to measure the move’s success because the pre-move baseline has been altered.

Any change undertaken during a move adds risk and complicates the project. This is especially significant when it comes to today’s popular practice of server virtualization. Resist the urge to virtualize as part of a data center relocation. Virtualization is a significant project in itself, and attempting to virtualize servers during a move means trying to do two very difficult things at the same time—a recipe for disaster.

There is one exception to the “no changes” rule: An organization should consider the purchase of new core networking gear before the move. This will significantly reduce the risks and down-time of reinstalling network gear at the new site during the move. The network should also be up and fully tested before the move is made.

STEP 5: Be 100% Focused on Move Day

Before moving day, you will have already developed your timeline, manpower / resource plan, interdependencies and move bundles. The systems are labeled, cables ready and transportation is on its way.

As with many complex tasks, the devil is in the details. Managers making a data center move must create detailed checklists covering everything from server rails to cabinets to specialized tools (e.g., screw threaders for stripped screws; sledge hammers; special power cords to prevent outages when servers cannot be reconnected, etc.). Extra manpower will accelerate the move, reduce down time and allow optimum use of individual skills.

To limit downtime, a data center move should begin as soon as applications have been shut down. In addition, the move should be scheduled at a time when involved employees are able to fully focus on the move’s success. Trying to “squeeze in” a move on top of full time, daily responsibilities is doomed to fail. It will create a heavy tax on employee morale and unnecessarily prolong the move and impact the business.

For example, one software company wanted to move 225 servers to a new data center. It planned to accomplish this relocation over the course of five weekends during the summer, effectively eliminating summer weekends for its IT staff. By reworking the plan and leveraging experts in data center relocations, this company completed the move in one weekend. This saved significant time and money, while keeping core IT staff focused and motivated on day-to-day operations.

WHY EXPERIENCE MATTERS

There is a truism in the military: “No plan survives contact with the enemy.” This means that no matter how detailed the strategy, the people who must execute it must always be ready to make adjustments for the reality on the ground. Make sure the “move day” team knows the plan and their responsibilities. Make sure you have data center move experts on hand—this is clearly not a good time for on-the-job training.

As IT becomes ever more essential to business success, companies are outgrowing their data centers and data center relocations are moving to the center stage of IT execution. However, a poor site selection or poor planning process can result in higher expenses and another move far too soon. Worse, a botched move can stop an enterprise dead in its tracks.

Unfortunately, operational IT knowledge does not translate into an understanding of how to best move a data center. Nor does real estate knowledge translate into the ability to select the best site.

Businesses need data centers that can both facilitate their current operations and provide the flexibility for future growth. As more and more companies contemplate data center relocation, they need to remember that a move is like a battle. It requires great planning, excellent execution and sufficient manpower.

About the Authors

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About Transitional Data Services (TDS)

TDS provides independent assessments, recommendations and improvements for IT including data center designs, relocations, consolidations, operational support and applications software development. By acting without the bias typical of a vendor or VAR, TDS takes an enterprisewide view of business and technical requirements and recommends solutions based on true needs—not the latest trend or highest commission.

TDS clients include successful organizations of all sizes and focus including John Hancock, Monster.com, Boston Red Sox, Cedars Sinai, Liberty Mutual and many others. As these organizations are committed to leadership in their respective fields, they rely on quality business partners like TDS to operate transparently in their best interest.