



THE INFORMATION SOURCE FOR THE DATA CENTER INDUSTRY

Executive Guide to Data Center Selection

A look at avoiding “cookie-cutter” data centers and DC customization

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Summary

Today's modern IT environment is rapidly expanding beyond the means of their existing infrastructure. In fact, a recent [2012 Data Center Market Insights](http://www.datacenterknowledge.com/archives/2011/09/28/2012-data-center-market-insights-report/)¹ report indicated that 65% of data center managers were looking at cloud computing and another 62% were interested in deploying even higher levels of virtualization. With more data distribution and greater demand for IT consumerization, organizations are finding themselves requiring more hardware, resources and data center bandwidth. All of these trends are fueling the push for more efficient data center utilization and, more specifically, data center consolidation. Given this trend, organizations must work with the right type of partner to help them stay agile and resilient. The data center is becoming a truly integral part of any company. At the heart of the IT infrastructure, a data center which is capable of scaling with the needs of the business is crucial. However, not all data centers are created equally. Furthermore, not every data center can customize a solution that can best fit your IT needs. In this guide, we examine what it means to be a flexible and customizable data center — and how to avoid making the “cookie-cutter” mistake.

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¹ <http://www.datacenterknowledge.com/archives/2011/09/28/2012-data-center-market-insights-report/>

Introduction

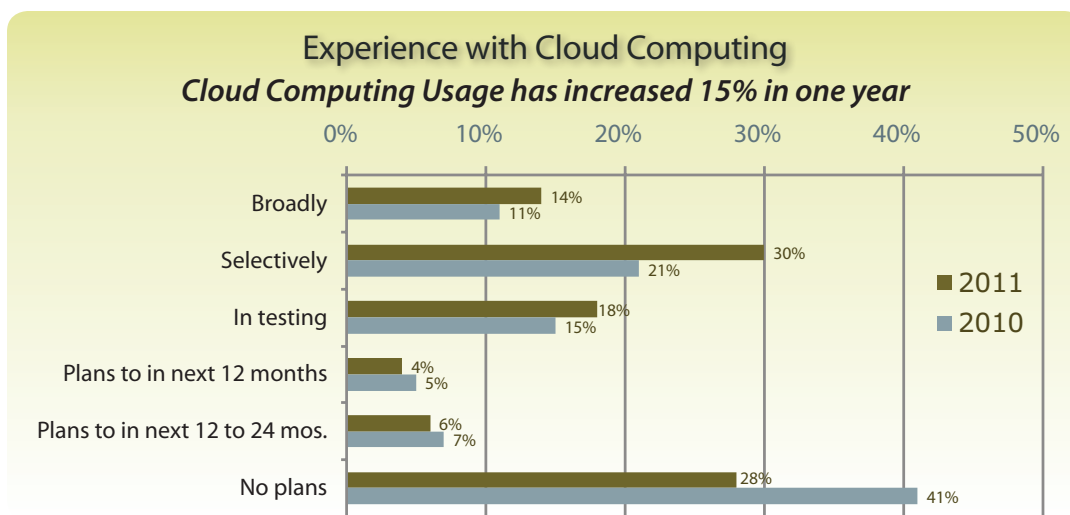
New technologies are paving the way for more efficient environments capable of scaling with the demands of the business. This means that the IT infrastructure must do the same. Data-on-demand has become the new norm in the user world as more information is being pulled at any given time. Today's reality is simple: Data center managers need data center customization to stay agile and efficient in today's market. This doesn't mean that pre-fabricated solutions don't have a place in the market; or, that spec built solutions won't work for your organization. However, working with customizable solutions allows an organization the flexibility it may need to holistically grow in the near and long-term. In looking at a more flexible and customizable data center — it's important to understand the choices that need to be made in selecting the right partner. This guide will take a look at the various components a well-designed data center can provide while still being able to allow for room to grow. This includes power, cooling capacity, physical footprint and even facility amenities.

The current data center trends are changing. Managers are looking at new types of technologies to help their organizations be more agile and flexible. Modern IT demands have placed the data center at the heart of any organization. In fact, spending is expanding around

data center technologies. The [2012 Uptime Institute Symposium](#)² report indicates that 32% of managers interviewed said that they will be increasing their budget for data center spending year over year. Plus, with virtualization and cloud computing in the mix, it's more important now than ever to have the right data center partner. As the graph below indicates, since 2010, the data center community has seen very steady double-digit growth in the cloud and virtualization space.

Let's look at the numbers

- ▶ A recent [Uptime Institute](#)² survey revealed that 66% of their respondents are looking into even more server consolidation over the next 12-18 months. This means more cloud, more virtualization, and more demand for a flexible data center provider.
- ▶ In a recent [Data Center Market Insights](#)³ report, over 62% of the respondents said that both virtualization and cloud computing were high on their project list.
- ▶ Finally, in the same report, one of the biggest challenges that faced data center managers (43%) was DC flexibility. This is why the need for an agile provider is so important.



Source: Data Center Knowledge Audience Survey, 2011/2012

² <http://www.uptimeinstitute.com/2012-survey-results>

³ <http://www.datacenterknowledge.com/archives/2011/09/28/2012-data-center-market-insights-report/>

Best practices and considerations

This guide will seek to identify the best practices and considerations which go in to making the right decision for your data center provider needs

Section 1 – Defining your data center needs

- Defining the resource needs
- Understanding the users and application requirements
- Having the end (goals) in mind (many users can't accurately predict their 5-10 year growth rate)
- Analyzing the "current vs. future" scenarios including IT refresh rate
- Creating a future-proof infrastructure
- Involving the entire IT team

Section 2 – Creating your own data center environment

- Power requirements
- Green data centers
- Growth capabilities

- Service-level agreements
- Amenities and facilities
- Redundancy and uptime

Section 3 – Avoiding the "cookie-cutter" mistake and some best practices

- Watch out for "cookie-cutter" contracts
- Work with dedicated, flexible solutions advisors
- Deploy adaptable framework from day 1
- Leverage flexible technologies
- Never forget about good management practices

It's clear that in many cases, a "cookie-cutter" data center solution may not be enough. The trend has been to work with flexible data center partners who are capable of scaling with the demands of the user, the business and the data model.

Section 1 – Defining your data center needs

In working with a data center provider, it's important for your organization to first plan around the needs of your IT infrastructure and business. This means looking at various components within the company and how they can be supported by a data center partner. Remember: No one data center is built the same. Each provider has their strengths and weaknesses and finding the perfect medium means thorough planning by your organization. In designing the right type of environment, there are several aspects of the business and data center to consider.

Defining the resource needs

The conversation around resources is ever-expanding. There are core areas where a data center partner must be flexible in providing the right type of infrastructure support. In working with a provider; ensure that there is room to grow and that the environment is capable of handling the needs of your organizations. During the planning and early development stages, data center managers should focus on the following:

- ▶ **Space** – This means both floor space as well as rack space. Furthermore, if a distributed environment is needed, ensure that the provider is able to accommodate future plans to grow the infrastructure.

- ▶ **Power** – Numerous variables can fall into this planning metric. However, working with a partner which can provide a range of power is very important. This means that both current and future equipment can be supported. Even now, high-density computing, although it improves efficiency, can take up more power than standard rack-mount servers. Also, never forget about redundancy.
- ▶ **Redundancy** – Ensure that the provider is able to offer N+1 or more redundancy on separate circuits. Keep in mind that to truly measure redundancy it should be considered from the top down not just visible areas that the servers occupy. For example, dual corded infrastructure powering the servers doesn't necessarily mean it is a true 2N redundancy.
- ▶ **Utilization** – The planning stages will analyze how the environment will be utilized both now and in the long-term. This can help define critical systems and allow your data center provider to ensure you have the right solution in place. If some systems require more care than others, look for a partner which can adapt to those types of needs.

Understanding the users and application requirements

Part of a good design will be the understanding of the underlying workload. This means forecasting for the applications as well as users. In some situations, an environment may see a spike in application and user activity which could increase with growth over time. In those cases, it may become necessary for the data center provider to provision more resources. If that's the case, ensure that your partner is capable of doing so — without adding a lot of extra charges. This point in particular is one of the key reasons to work with a truly flexible data center provider.

Having the end (goals) in mind

The challenge with data center design is that technology is capable of very rapid change. In many situations, users don't or can't accurately predict their 5-10 year growth rate. When working with a data center provider, the ability to scale and be agile in conjunction with the organization will be crucial. This is why a seemingly attractive long-term contract can prove to be very costly if scalability isn't built in.

Analyzing the “current vs. future” scenarios including IT Refresh rate

The refresh cycle of any organization should be a serious consideration point when selecting a flexible data center provider. In some cases, this can be built into or around a contract. By understanding both current and future demands, data center managers can work with providers and ensure that they scale when needed. Without a good idea of when hardware is end-of-life, data center technologies can become old and dated. Now, an organization may be stuck with an aging contract they can't get out of — and — mounting hardware refresh costs. Initial capital investment in networking cabling and support infrastructure can also prove very costly to abandon in place and relocate to a different data center if needs in the existing facility exceed capacity of any of the listed factors.

By understanding both current and future demands, data center managers can work with providers and ensure that they scale when needed. Without a good idea of when hardware is end-of-life, data center technologies can become old and dated.

Involving the entire IT team

Data center design is not a one-man or even one-team operation. Since the data center has truly become a core part of any organization, multiple IT teams will now need to be involved to get the job done right. The data center environment now hosts numerous different types of resources and must be able to handle performance requirements. This is why during the planning stages, any IT team that has a vested interest in the data center should be involved:

- ▶ LAN Team
- ▶ WAN Team
- ▶ Storage Team
- ▶ Application Development Teams
- ▶ IT Leadership and Management
- ▶ Desktop and End-user Management Teams
- ▶ Infrastructure Teams
- ▶ Security Teams

Once the above needs are outlined, managers can really begin to identify the right type of partner to work with. In some cases, working with a pre-defined data center is the right move. However, in many other situations, data center managers actively strive to build a data center environment they can call their own.

Section 2 – Creating your *own* data center environment

Too often, organizations try to work with data center providers who promise the “easy” way out. The important note here is that the easy way isn’t always the right way. In working with a data center provider, organizations must know where they have to expand and the capabilities of that provider to flow with the needs of the business. In selecting the right provider, there are several infrastructure components which need to be detailed out for the data center to truly be unique.

Flexible data center partners are able to not only create a customizable package — they can add resources a la carte as needed.

This is where planning around the data center environment becomes an integral part in designing a truly agile data center.

Power requirements

- ▶ **Now vs. the future** – Each organization is unique in the types of requirements they set forth for their data center. This means that power needs *will* fluctuate with the evolution of the business and technological innovations. Do not get stuck in a contract specifying very limited power capabilities. Look for a partner that not only scales, but provides services around their power infrastructure. For example:
 - Power monitoring
 - Battery testing
 - UPS redundancy
 - N+1 or more power redundancy
 - Generator testing and availability
 - Utility power grid diversification
 - Local power distribution options
- ▶ **Stranded power or no power left with excess square footage** – Over or under provisioning of resources can be extremely costly in the data center world. This is why working with a partner that can dynamically monitor and adjust power requirements is very important. Being caught in a situation where a set of racks are running low on power is not something any administrator wants to be in. This is why it’s important to work with a data center provider which is capable of providing not only redundancy, but room to grow.

Green data center

- ▶ **Cooling efficiency** – There’s no doubt that a data center’s ambient conditions must be carefully regulated. The important point here, however, is how that cooling is being delivered. Progressive data center providers look for direct efficiency in every technology that they deploy. This means it’s wise and cost-effective to work with a partner that has diverse cooling options and is able to economize where applicable. Why can this be valuable? When working with an environmentally conscious provider, cost savings from efficiently operating equipment is often recovered directly by the user (not the provider). Water cooling and intelligent centrifugal chillers built around N+1 redundancy can offer some serious green cooling capabilities. Furthermore, many climates allow the opportunity for air-side or water-side economization. This can be further enhanced with the use of VFDs and efficient chillers and other central plant equipment. Look for a provider which is both cooling-ready, and environmentally friendly.
- ▶ **PUE, green initiatives, and the environment** – The PUE metric has become a great gauge of data center green efficiency. Look for a provider that strives to break the 1.25-1.3 barrier or at least one that’s in the +/- 1.2 range. And it’s not just about infrastructure efficiency. The entire building can be certified as an environmentally friendly facility — this includes office space. Look for LEED Platinum Certification as the highest mark a facility can obtain today. From there, see if their office space is designated as Class “A” to not only support the customers — but also provide a comfortable working environment.
- ▶ **Containment** – There are direct benefits in working with a data center provider which is centric around the environment. Outside of the PUE and LEED certification, internal data center operations can speak volumes as to how green a data center really is. Ensure that air flow is well controlled and that hot/cold aisle containment is deployed by your organization wherever possible. Efficient aisle control as well as good airflow management can really help a data center remain environmentally-conscious.

- ▶ **Computational Fluid Dynamics (CFD) Modeling/ Real-Time Monitoring** – Intelligent modeling tools, such as CFD modeling, help to identify and eliminate stranded power or cooling. Look for a provider who offers the CFD tool for analyzing the effectiveness of cooling within the racks and aisles. Data centers use CFD modeling to generate flow simulations using a variety of computer software programs, and can provide customers with a detailed 3-D analysis of how cold air is moving through a data center. This allows the ability to identify potential hot spots where equipment is receiving too little airflow as well as areas where power may be stranded.

Growth capabilities

- ▶ **The ability for the data center to increase IT load within the original footprint** – The need to expand and scale, as mentioned earlier, is one of the top concerns for data center managers. In working with the right data center provider, ensure that there is direct room to grow. The important part here is that this capability should span multiple sites. Many organizations are trying to bring the data closer to their users. Because of this, there is the need to deploy infrastructure at various points. Not only should a provider be able to expand within its own walls — there needs to be the ability to grow regionally or nationally as well.
- ▶ **The ability to scale the current package** – When creating a contract, work with a provider which can help you scale even when you are within an agreement. That type of flexibility not only builds good rapport, it also allows the customer to grow and leverage more data center services. Too often organizations get stuck within an agreement and have to pay hefty rates to add new services.
- ▶ **IT continuity** – Since many organizations look to upgrade, migrate or change their environments as the need arises, their concern turns towards outages and downtime. In finding the right data center partner, look for the ability to avoid disruption to existing IT operations whenever possible. Furthermore, truly flexible providers can do this without having TCO go through the roof.

When creating a good SLA, work with your data center provider to identify core infrastructure components, how they should be configured and what their service-level requirements are.

Service-level agreements (SLAs)

- ▶ **Meeting your needs both now and in the future** – In line with planning out your environment, it's important to create an SLA that is not too constraining and can bend when needed. A solid industry recommendation is to develop an SLA that includes a "Day 1" capacity so that an organization can get started quickly. The SLA should also spell out capacity over the entire term of the contract. Strict SLAs can be great for very structured platforms. However, in some cases, there needs to be flexibility. When creating a good SLA, work with your data center provider to identify core infrastructure components, how they should be configured and what their service-level requirements are. This way, there are no surprises when a certain system requires extra data center services.
- ▶ **Understanding scalability** – In working with the right partner, SLA should be designed with scalability and business continuity in mind. More specifically, an SLA should spell out how an infrastructure will be scaled in the future without disruption to systems running on that platform. This type of SLA not only gives administrators peace-of-mind, it also greatly helps with the IT refresh cycle and infrastructure growth.

With the rapid advancement in the technology world, standard data center solutions are no longer meeting the needs of many organizations. In those cases, working with a data center provider which can go beyond a standardized solution is truly important.

Amenities and facilities

- ▶ **It's not just about racks and servers** – Having a comfortable and secure place to work is very important. Ensure that the provider has adequate security built into their environment and that they are capable of handling meetings and other gathering requests. From a security perspective, look for the following:
 - Security and on-site support 24x7x365
 - Various levels of physical access controls (biometrics, badges, PINs, etc.)
 - CCTV surveillance
 - Mantraps throughout a campus
- ▶ **Facility amenities** – The facility itself must be accommodating to work from. This means engineers need a good place to operate from and meeting rooms should be available when needed. As mentioned earlier, look for a Class “A” data center provider which can offer various options when it comes to onsite amenities. For example:
 - Office space (customizable to customer’s needs)
 - Internet access
 - Conference rooms/lobby
 - Break rooms
 - Receiving area /loading area
 - Restrooms/showers
 - General building & mechanical space
 - Dedicated storage area with biometrics access
 - Parking spaces

Redundancy and uptime

- ▶ **Meeting your needs** – Part of the SLA discussion will be to understand which systems are in need of high levels of uptime. The next part of the conversation will be the capabilities of the provider. Ensure that your critical systems can be monitored, secured and held in high redundancy. Having these discussions early in the planning stages will help determine whether the provider is capable of supporting your needs. In terms of planning for redundancy, look for the following:
 - Cooling: at least N+20%
 - Central plant: at least N+1
 - UPS infrastructure: 2N or more
 - Local power distribution: 2N or more
 - Building and/or campus power capacity: at least 2 redundant substations(or diverse utility feeds)
 - Carriers: look for at least 5-6 available onsite options
- ▶ **Concurrent maintainability, both now and in the future** – As systems evolve and grow, there will be the direct need to enhance or change the existing data center redundancy infrastructure. This means that a data center partner should be capable of supporting resiliency needs both now and moving forward. This is where multi-level infrastructure redundancy is a must. Look for a partner that is capable of growing your redundancy as your own infrastructure expands.

The data center selection process entails several important steps. A truly flexible solution is capable of adapting to the needs of the customer as the business evolves. Remember to work with a provider which can help you not only scale — but also distribute data. In many cases, more than one data center is required for optimal regional; or even global, performance. With the rapid advancement in the technology world, standard data center solutions are no longer meeting the needs of many organizations. In those cases, working with a data center provider which can go beyond a standardized solution is truly important.

Section 3 – Avoiding the “cookie-cutter” mistake and some best practices

Part of working with any data center is establishing a baseline of operations for both today and tomorrow. Too often organizations find an attractive package without realizing the repercussions of that solution in the future. Contract or vendor lockdown is a serious issue to growth. This is why establishing a good IT plan and knowing the capabilities of a provider are vital to the success of a data center environment. The latest [Data Center Market Insights](#)⁴ report indicates that data center scalability is the primary concern for DC operators. More than 40% responded that they’re trying to improve both data center capacity as well as become more scalable.

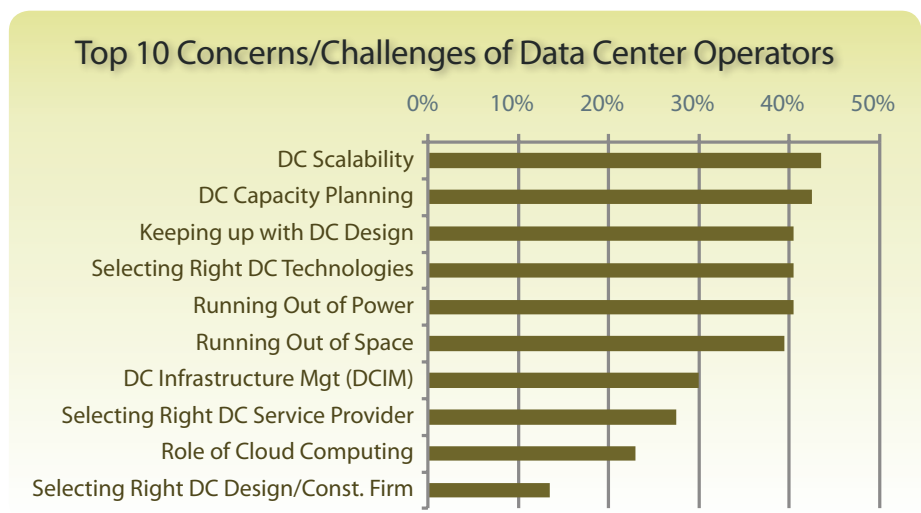
Why is this becoming a challenge? Many organizations forgot to plan out their environments for long-term growth. Sometimes, they would be locked into some type of contract or in-flexible data center which would inhibit growth. This is why working with flexible providers and applying some data center selection best practices can really help keep an organization agile.

Watch out for “cookie-cutter” contracts

► **Can be limiting** – In some cases, structured and pre-provisioned environments are the right move for an organization. However this is certainly not the norm. The reality is that some data center provider

contracts can be limiting. This is especially the case when growth is a necessary component of any modern organization.

- **Additional tools and features may end up costing a lot of money** – In pre-set contracts, anything additional can cost some serious dollars. This is why working with a flexible partner capable of adjusting to your needs is very important. Part of the beauty of working with an agile data center is that tools, features, infrastructure, amenities and even expansion can be done a la carte without blowing a budget away.
- **Infrastructure doesn’t lend itself to changing technologies** – For truly expanding organizations, the data center partner must be able to grow and change with the needs of the company. In some scenarios, a pre-built contract may hinder growth in that existing technologies don’t fare well with newer systems. This is where seamless upgrades are extremely useful and minimal-downtime data center providers can really help out. Look for a flexible provider which is capable of adjusting systems and infrastructure to help your IT environment scale.



Source: Data Center Knowledge Audience Survey, 2012

⁴<http://www.datacenterknowledge.com/archives/2011/09/28/2012-data-center-market-insights-report/>

Work with dedicated, flexible solutions advisors

- ▶ **Evolve the solution as your business evolves** – This is one of the core underlying themes of this guide. Good support and the ability to change as the industry changes will help keep organizations ahead of their competition. It's important to work with a data center environment which clearly sees the business value in evolving in-line with the needs of their customers.
- ▶ **Adding new components proactively** – Now that the data center is at the core of almost any business, managers are working hard to keep the environment up and running. This means changing the reactive model and making the environment proactive. Good data center providers will actively analyze power flow, resource utilization, and even facility needs for the customer. From there, they are able to make educated, proactive, decisions which help guide the customer into the right direction. Now, instead of adding more hardware during an emergency state, data center administrators can do so calmly knowing that the new resources were planned out and will be properly utilized.
- ▶ **Deploy adaptable framework from day one** – This is one of the key features of working with a truly flexible data center provider. By planning out and deploying flexible infrastructure from the onset, administrators are able to strategically plan out their environments in the long-term. Look for data center flexibility in the type of hardware they are providing. Can the data center adjust for more power and space? Will it support an increased number of users? Data center providers which deploy adaptable technologies can answer a resounding 'yes' to all of those types of inquiries.

Never forget about good management practices

- ▶ **Set a good contract with the provider** – As mentioned earlier, always take the time to develop a good SLA and contract with your data center provider. Establish uptime metrics, determine critical systems, and ensure that your data center is capable of scaling. Under no circumstance should you enter into a rigid contract were new feature add-ons or environment expansions become far too costly to adopt. Flexibility ranges from infrastructure to contract development.

- ▶ **Know your roles and don't forget about good management** – In working with a data center provider, it's important to understand one simple fact: This is a two-way partnership. Look for a provider who will treat you as a partner, a customer, and a valued addition to their infrastructure. By 'partnering' with a data center, you are able to align your vision and share that with the provider. From there, both the organization and the data center can build an infrastructure capable of growth, capacity and efficiency.

By applying best practices and working with a partner who is capable of being flexible, data center administrators are able to better adjust their IT needs. Getting locked into an agreement can have very detrimental results for any infrastructure. This is even the case when the upfront contract may seem less expensive. Remember, the benefits can be very thin in the long run. Flexibility within a data center infrastructure is a must for any organization looking to scale as their business and industry evolves.

Conclusion

There's little argument that the data center has evolved far beyond the standard "physical" environment. High-density equipment, cloud computing, and virtualization have all helped shape the data center 2.0 movement. Now, organizations have to look for flexible options since their needs may change much more quickly than in previous years. With technology evolving at the pace that it is, data center administrators are consistently tasked with providing optimal service and maximum flexibility.

In working with a data center partner, remember to plan out your infrastructure for the future. This means plans around capacity, redundancy, and even future growth should be established. In 2013 and beyond, the data center will continue to be leveraged as the key piece for any organization. As more data is pushed through an IT infrastructure, DC managers will have to find new ways to keep their environments flexible and, very importantly, scalable.