



Hosted, Outsourced, and Cloud Data Centers - Strategies and Considerations for Co-Location Tenants

Hosted and Outsourced Facility Definitions

Hosted data centers, both outsourced/managed and collocation varieties, provide a unique benefit for some customers through capital savings, employee savings and in some cases an extension of in-house expertise. Traditionally, these facilities have been thought of as more SME (Small to Medium Enterprise) customers. However, many Global 500 companies have primary, secondary or ancillary data centers in outsourced locations. Likewise, collocation data centers are becoming increasingly popular for application hosting such as web hosting and SaaS (Software as a Service), Infrastructure as a Service (IaaS), Platform as a Service (PaaS) in Cloud computing. These models allow multiple customers to share redundant telecommunications services and facilities while their equipment is colocated in a space provided by their service provider. In house bandwidth may be freed up at a company's primary site for other corporate applications.

Hosted and outsourced/managed data centers are growing rapidly for both companies' primary and hot site (failover ready) data centers, redundant sites and for small to medium enterprises. Similarly outsourced data center services are on the rise and allow a company to outsource data center operations, locations, saving large capital requirements for items like generators and UPS/Power conditioning systems and air handling units. As data center services increase, many providers can supply one or all of these models depending on a tenants needs.

Outsourced Data Centers

In an outsourced data center, the tenant basically rents some combination of space, talent and facilities from a larger facility provider for all or part of their corporate applications and data center operations. There are several pricing options including per port, per square foot, and for power consumed, but in general a combination thereof. With power costs and demand on the rise, most newer contracts include a fee that is assessed when a tenant's kilowatt threshold is exceeded, or by power supplied. In the latter case, a tenant typically pays for more power than they need as power is averaged across the square footage of the tenant space.

Outsourced data centers are an attractive option for companies that have a myriad of platforms and applications alleviating the need for constant multivendor training and upgrades, patches, hardware changes, software platform changes, etc. In a typical company environment that has migrated from mainframe type applications to several server platforms just the cost and time for training can be a manpower and financial drain. As outsourced (managed) data centers have the needed expertise on site. A company utilizing this type of model will see a shift in employee responsibilities from IT/upgrade tasks to more fruitful and beneficial tasks. Outsourced data centers may be for a sole tenant or multi-tenant, and in the case of the latter will share the same concerns as the collocation facilities below.

Collocation Facilities

Collocation facilities are typically divided into cages, cabinet space or in some cases, subdivided cabinets to accommodate smaller computing needs. As a collocation

owner, division of space is a prime consideration. While these environments tend to be fluid, critical infrastructures (cabling, cages, power and cooling) that can remain unchanged provide advantages to the owner and tenants alike. There are very few existing outsourced locations that have not felt some pain over time as tenants move in and out leaving cabling messes in pathways that can be detrimental to air flow and cooling. Likewise, changing cabinet locations affects airflow directions, and equipment power loads can create hotspots and have adverse affects from one cage to another. Moving cage walls can render some spaces unusable. Reconfiguration of each space from tenant to tenant can be costly over time.

In a hosted only data center, a tenant leases square feet/meters of space and services including security, facilities (power and cooling), telecommunications and backup systems such as UPS's and generators. In a hosted space, a tenant generally uses their own resources for equipment maintenance, patch management, infrastructure, etc. Collocation scenarios can be an attractive option for redundant hot (instant failover) or cold (manual failover) spare sites, in the interim during a consolidation or new build, when primary data center site space has reached capacity, or when resources such as power, cooling, and space are at capacity. Similarly, if major upgrades are going to occur at a main end-user site (i.e. new chillers, reconfigured or new space) a temporary hosted or outsourced site may provide a solution. The dividing lines between collocation and hosted sites are becoming increasingly blurred as operators are beginning to offer blended services based on customer needs.

While some companies choose to build operate and maintain their own data centers, there is a large segment of companies that either wholly or partially take advantage of hosted/outsourced facilities. Global companies may choose to house a main facility and perhaps it's redundant counterpart in their own buildings. However as operations grow or new countries are added to the company's portfolio, a hosted/managed facility may serve well on an interim basis until it is cost justified to add another data center of their own. Small to medium enterprises which have a harder time attracting and keeping talented IT staff can in some cases, have a much better data center and support by utilizing already trained talent at a outsourced facility.

Cloud Facilities

Cloud computing is a new buzzword that is all encompassing, and can be either IaaS, SaaS, PaaS, or a combination thereof. In most cloud scenarios, an end user is renting space, bandwidth or computing power on an on demand, as needed basis. Each cloud provider has a set of tools that allow them to interface with the hardware installed within their site. Some of their software is proprietary, and there are still some security concerns, but as these facilities and their applications mature, they can offer valuable resources to companies.

Cloud provider offerings may be in collocation facilities, managed facilities, or housed in provider owned facilities. Clouds can also reside in private corporate data centers or as a hybrid combination of public (in a cloud facility) and private (company owned). Clouds can be thought of as clusters of services that are not location dependant to provide processing, storage and/or a combination of these offerings.

An example of cloud computing is Amazon's EC2 (Elastic Compute Cloud) platform. This service allows rapid provisioning of computing and storage needs on demand. For instance, if a customer needs to provision a new server, the server is already there in one of Amazon's facilities. The customer does not need to justify, purchase, configure, power and maintain the server. If a customer only needs the server for a short period of time, it can be commissioned and decommissioned on demand for temporary computing needs. One primary advantage of public cloud computing is that when temporary cloud resources are no longer needed, the bill goes to zero. Public cloud resources are billed on a per use, as needed basis. This allows companies to have burstable resources without having to build networks that support peak loads, but rather build to support baseline or average loads. Public and private clouds allow applications to burst into the cloud when needed and return to normal when peak loads are no longer required.

If a customer is looking at any of the above solutions, Service Level Agreements (SLA's), reliability and confidence in security are the largest factors in the decision making process. It is not as easy to manage what you don't control. Further, end users must trust that the sites are well maintained so that good service doesn't turn into a loss of service over time.

Hosted Space Evaluation for Tenants

When evaluating outsourced space security is a prime consideration. Security should include biometrics, escorted access, after hours access, concrete barriers, and video surveillance at a minimum. Some spaces utilize cages to section off equipment with each tenant having the ability to access only their cage. However, should multiple tenants occupy the same floor; it may be possible to access another tenant's equipment either under the raised floor or over the top of the cage. This may make the space undesirable if personal/confidential information is stored on the servers housed within the cages. Escorted access for service personnel and company employees provides an extra level of assurance that data will remain uncompromised in these spaces.



VersaPOD Zero-U Vertical Patch Panel

Personnel working in adjacent spaces may also provide a risk to equipment and services where pathways cross caged environments. Intelligent Infrastructure Management solutions, such as Siemon's MapIT G2 system, provide real time monitoring of connections to critical equipment, an audit trail of moves, adds and changes, and an extra level of troubleshooting support. While these factors may not apply to all situations, certainly where critical and sensitive information is being stored this additional level can ease troubleshooting and provide assurances for the physical infrastructure. Intelligent infrastructure management can be implemented for either the hosted facility backbone operations, inside cages for customer connections, or both. Due to the real time physical connection monitoring, accidental or unauthorized disconnects can trigger alarms and escalations assuring that services are restored in a timely manner.

Maintenance of the facility and its equipment is also a factor. Determining how often generators are tested, UPS systems are tested and failover mechanisms are tested is critical. The same is true for fire suppression and detection systems. The data center service provider should be able to provide you with reports from cooling and PDU units and explain their processes and procedures for testing and auditing all systems as well as their disaster recovery plans. The power systems should have enough capacity to support all circuits and power demands including planned growth for the entire floor..

It is in a customer's and site's best interests to utilize power supplies that provide power usage monitoring, not just power output monitoring. Without usage monitoring, a tenant may be paying for more power than they use. Power utilization management also helps with provisioning. Power systems that are over capacity may not be able to provide enough power in the event of a failure when redundant equipment powers up. If a user is paying based on port connections and/or power utilization, a risk assessment should be performed. This assures that equipment that does not require redundancy for critical business operations does not consume more power and network than necessary. As environmental considerations gain focus, additional importance is being placed on centers that use alternative energy sources such as wind and solar.

Ineffective cooling units may create not only cooling problems, but if not serviced regularly may cause excessive vibration or other harmful effects. It is important to ascertain how often the unit filters are changed, how failover happens, service schedules, etc.

Pathways and spaces within the data center should be properly managed. There should be a standard within the facility for cabling placed in air spaces or overhead. It is worth checking to see what cable management policies are practiced and enforced, not just written. Improperly placed copper and fiber, either overhead or under floor, and overfilled pathways can create air flow and cooling issues either in your area or adjacent cages over which you do not have control.

A tenant should be allowed to use their preferred cabling and installation company provided that the installation company adheres to center's pathway rules. If the space owner requires the use of their own installation company, you will want a listing of credentials and test results upon completion of the work. As some facility owners do not see cabling as critical to core services, installations may be done by the least expensive bidder using the least expensive components which may not provide high quality installation and/or sufficient performance margins which can create issues and finger pointing with SLAs. Copper and Fiber trunking assemblies are an excellent choice in these spaces as links are factory terminated and tested and can be reused should a tenant relocate. Trunking cables also offer an easy cabling upgrade path as they can be quickly removed and replaced with higher category trunking cable assemblies of the same length. For example, Siemon's Z-MAX Trunks are available in category 6 and category 6A shielded and unshielded and any of these assemblies can be used within the Z-MAX 24 or 48-port 1U shielded patch panels, allowing cabling to be upgraded without changing the patch panel.

It is important to ensure that enterprise and campus copper and fiber cabling systems outside of the data center are robust and certified to the specified category. Some Cloud providers are requiring customers to have their enterprise and campus cabling systems tested, certified and even upgraded to a higher performance category to eliminate the possibility that SLA problems are not caused outside of their data center.

Future growth should also be considered. In some facilities it may be difficult or impossible to provide growth into adjacent spaces resulting in a tenant's equipment being located on multiple floors in multiple cages. This can have an adverse effect on higher speed applications that may have distance limitations which can result in cage reconfiguration, additional and/or more expensive equipment costs.

Growth potential in adjacent spaces may also create airflow and cooling issues in your space. This is particularly problematic if adjacent cages do not conform to hot aisle, cold aisle configurations that remain consistent throughout the floor. If the hot aisle, cold aisle arrangements are not maintained throughout all spaces, a company's equipment may suffer from the heat exhausted into their space from nearby cages. The best centers will have proper space and growth planning in place.

Many data centers today are moving towards shielded cabling systems due to noise immunity, security concerns and the robust performance of these cabling systems. As networking application speeds increase to 10 Gigabit Ethernet and beyond, they are more susceptible to external noise such as alien crosstalk. External noise is eliminated with a category 7A shielded cabling system and because of its noise immunity, can provide twice the data capacity as an unshielded cabling system in support of 10GBASE-T. Likewise, category 6A shielded systems eliminate noise concerns and are more popular than their UTP counterparts. As collocation facilities increase temperatures to save energy, tenants need to evaluate the length derating of their cabling systems. Hotter air provided to equipment means hotter air exhausted from equipment. Increased air intake temperatures are supported by active equipment. In the rear of cabinets where the hotter air is exhausted, is typically where cabling is routed. The derating factor for unshielded twisted pair (UTP) cabling is 2x greater than for shielded systems. Increasing temperatures provides a significant cost savings to the tenant and the facility owner.

Whether planning a shielded system or not, there is a requirement for bonding/earthing connections for your equip-

ment, cabinets, pathways and telecommunications circuits, the center's maintenance plan should include a simple check for voltage transients through the bonding/earthing/grounding system since you will be sharing the single ground reference with other tenants.

Ecological planning and options are becoming increasingly important to end users. Customers are demanding sustainable energy, better performing equipment, ISO 14001 certification and RoHS compliance from their vendors, and in some cases LEED, BREAM, Green Star and other Green building certifications depending on the country location. A service provider should be able to provide documentation for a tenant to determine if the site conforms to environmental sustainability expectations.

Finally, space evaluation should include a check to be sure that all of the telecommunications services are available that you currently use, or that there are suitable alternatives. This includes link speed, redundancy, carrier and protocol requirements, available IP addresses, and critical circuit monitoring.

Some end-users are moving to colocation facilities strictly due to lower power costs in some areas of the country, and some are moving due to increased bandwidth needs or better power and carrier infrastructures being available, while others are moving just to get away from their current mess. With all things considered, an outsourced space may be a good solution either permanently or in the interim. With some facilities providing administrative services, this may be an extra benefit to free up company personnel. Either way, the above guidelines should be considered when evaluating use of outsourcing space and services. If needed, Siemon can provide additional information and assistance with your outsourcing plans.

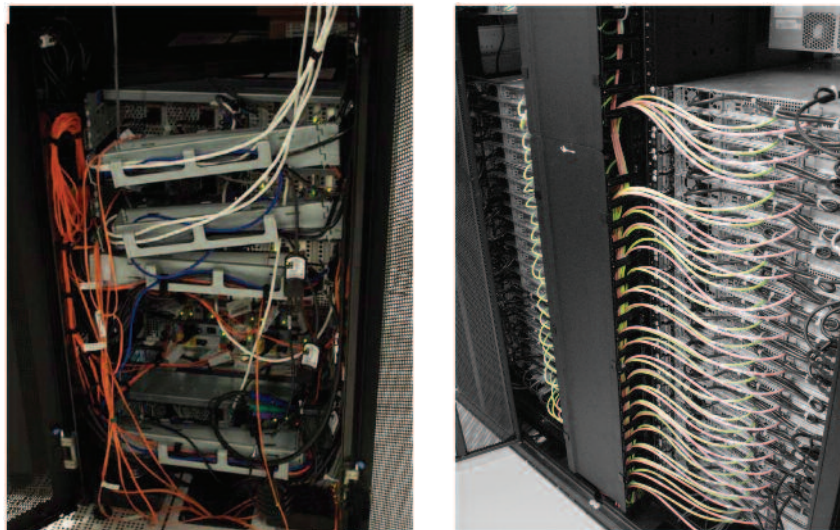
Additional Cloud Considerations for the End User

Business continuity depends on the reliability of the services you place in the cloud. While an email outage is unfortunate and disruptive, database disruptions can cause serious business harm. As an end user, you will want to ask pointed questions about the service, configurations, SLAs, suppliers, etc. While there is some level of confidentiality that cloud providers want to protect, they will be the custodians of whatever you chose to place in their cloud.

A cloud provider should be able to provide you with a listing of suppliers, typical design configuration in their facilities, and what their maintenance and monitoring procedures are throughout the facilities. If a Cloud provider is using outsourced space, then this same information from their provider should also be provided. It may be advantageous to review a site's SAS 70 (Statement on Auditing Standard 70). SAS 70 is a "Report on the Processing of Transactions by Service Organizations." It provides prospective clients an assurance that the service organization has been thoroughly checked and deemed to have satisfactory controls and safeguards for hosting specific information or processing information.

In several countries in Europe, due to data privacy laws, customer or any private data must reside in country. The cloud provider should be able to provision within a country and provide an assurance that the data will reside there. In country or not, security and monitoring is an important factor.

It is also important to ascertain whether or not a provider is operating via industry standard-compliant infrastructures (defined as cabling, networking, servers and software). Some providers are proprietary only meaning that once applications are developed in that cloud, they may not be able to be ported to another cloud provider. Bandwidth upgrade plans should also be part of the evaluation. Some cloud providers are already built out for 40/100G Ethernet in the backbone and 10G Ethernet in the horizontal. This means there will be less likelihood of downtime or reliance on other sites during upgrades. In short, if they are going to control all or part of your data center, you want to be sure they are using the latest technologies from the start, and that the facility conforms to the latest industry standards.



*Swing arm cable managers vs.
VersaPOD Zero-U vertical cable management*

Summary

As more companies look towards collocation/hosted/ and managed services for either their primary data center there are considerations, both short and long term, when selecting a provider. As this market grows continually more competitive, customers will demand long term planning to assure that their equipment and service is at least as good, if not better, than what they could provide in house. Higher performing cabling and space planning will differentiate providers and intelligent infrastructure monitoring capabilities provide a benefit to both the owner and the tenant. End-users must ensure their enterprise and campus cabling systems outside of their hosted data center have been tested and certified to eliminate finger pointing with SLA agreements in case of slow time or down time. The lines between the various types of providers and services are blurring giving end users increasing numbers of options for services and space. For detailed configuration assistance, aids for planning your move, and further discussion of these topics, contact Siemon Data Center Services or a local sales representative or visit www.siemon.com.

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