January 28, 2010

From London To Munich — Where To Colocate Your Data Center? And With Which Provider?

by Rachel A. Dines
for Infrastructure & Operations Professionals

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From London To Munich — Where To Colocate Your Data Center? And With Which Provider?

Colocation And Managed Services Providers In Western Europe

by Rachel A. Dines
with Simon Yates and Alex Crumb

EXECUTIVE SUMMARY

Are you running out of data center space or planning for a backup data center? Today, more companies are looking to colocation and managed services in lieu of building their own facility. Why? For many, the upfront capital required to build a facility is prohibitive and the lead time too long. Additionally, in areas like Western Europe that have limited power availability, negotiating with utility companies to provide sufficient power at a reasonable rate can be difficult. As a result, adoption of colocation and managed services in Western Europe is growing quickly, outpacing adoption in the US. This report will outline factors to consider when choosing a provider and location for colocation and managed services in Western Europe, including risk profile, cost, and availability of utilities, labor, space, and, of course, the regulatory environment.

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NOTES & RESOURCES

Forrester interviewed 24 colocation and managed services providers in Western Europe.

Related Research Documents

"Look To Managed Hosting As An ITO And Colocation Alternative"
February 2, 2009

"Don't Build Your Next Data Center, Colocate It"
October 21, 2008

"Checklist For Data Center Site Selection"
April 17, 2008

ADOPTION OF COLOCATION AND MANAGED SERVICES IS ON THE RISE IN EUROPE

No matter how you slice it, the colocation and managed services market is heating up. Companies are running out of space and power in their existing facilities and are choosing not to build new ones.[1] Over the past 12 months, the number of enterprises that have made the move to third-party data center management, whether it is hosting, server management, or facilities management, has grown significantly.[2] In 2008, 20% of North American enterprises and 31% of European enterprises told us that they were already using a third party for data center management (see Figure 1-1). In 2009, those numbers jumped to 34% and 42% respectively — an impressive gain considering that 2009 was a year when many projects were delayed or cancelled due to poor economic conditions. Firms use colocation and managed services to:

- **Provide an alternative to building a new primary data center.** Most companies that attempt to build their own data centers will end up spending too much on power capacity that they won't need for years and too much on infrastructure like uninterruptible power supplies (UPSes) and generators.[3] As the cost of power in Europe is very high, the former reason may be the driving force behind Europe's strong move toward third-party data center management.

- **Serve as a backup data center.** One of the most common uses for colocation and managed services is as a backup data center. When looking at the adoption numbers for colocation for this purpose, the numbers are trending upward as well. Seventeen percent of North American and 14% of European enterprises provisioned their backup data centers with colocation sites in 2008, and by 2009 the number had grown to 29% and 22% respectively (see Figure 1-2).

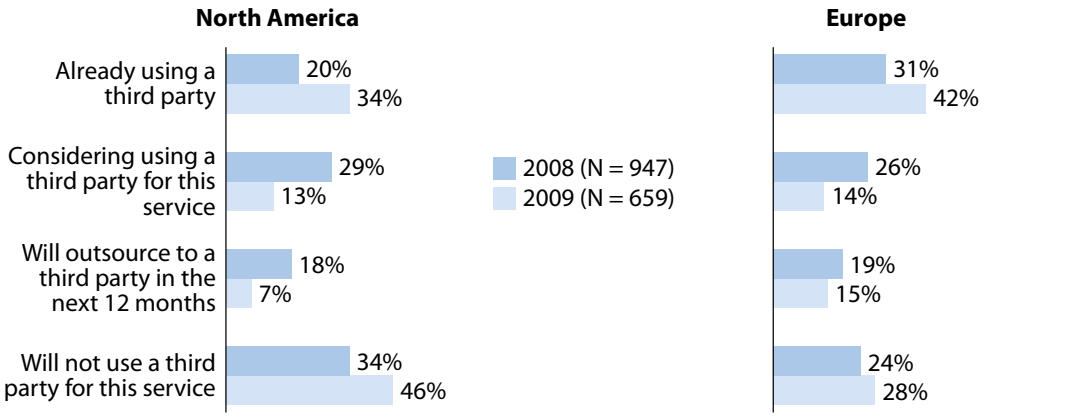
- **Host applications that need more bandwidth of closer proximity to users.** One of the original reasons enterprises turned to colocation and managed services was to take advantage of network connections and speeds. Additionally, companies that need to locate applications closer to users often use colocation to procure a local footprint.

Choosing A Data Center Location In Western Europe

For many European companies, the decision about where to colocate their data center is already made for them because they must stay within their country due to data protection laws or executive mandate. Most European countries only have one or two cities that have enough power and connectivity options to be viable data center sites, with Germany and the United Kingdom being the notable exceptions. Forrester surveyed providers in 15 top Western European cities and found the most raw data center space for colocation and managed services to reside in London, Amsterdam, Dublin, Paris, and Frankfurt (see Figure 2).

Figure 1 Use Of Data Center Services And Colocation Is On The Rise

1-1 "What is the status of your company's use of data center management services (including server and Web hosting, server management, and facilities management)?"



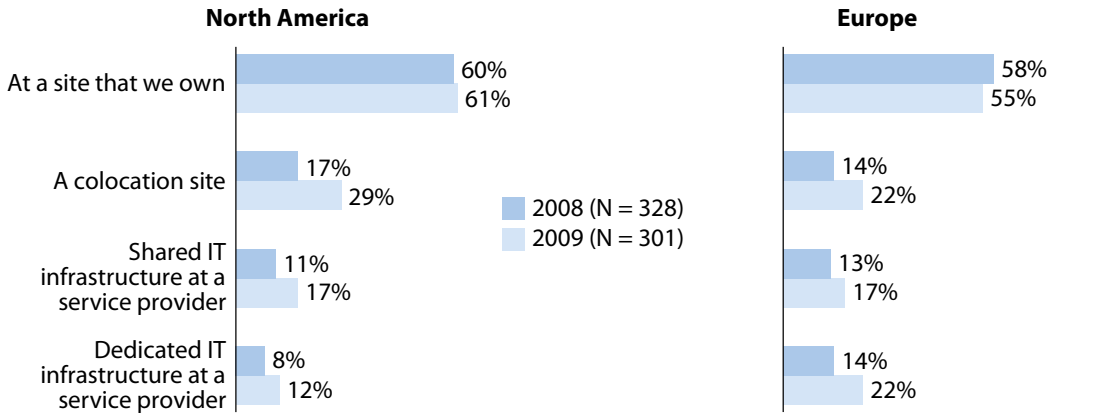
Base: IT executive and technology decision-makers at North American enterprises

Base: IT executive and technology decision-makers at European enterprises

(percentages may not total 100 because of rounding)

Source: Enterprise IT Services Survey, North America And Europe, Q2 2008 and Enterprise IT Services Survey, North America And Europe, Q2 2009

1-2 "How does your firm provision its backup data center(s)?"



Base: server, storage, and data center decision-makers at North American enterprises that have at least one disaster recovery site

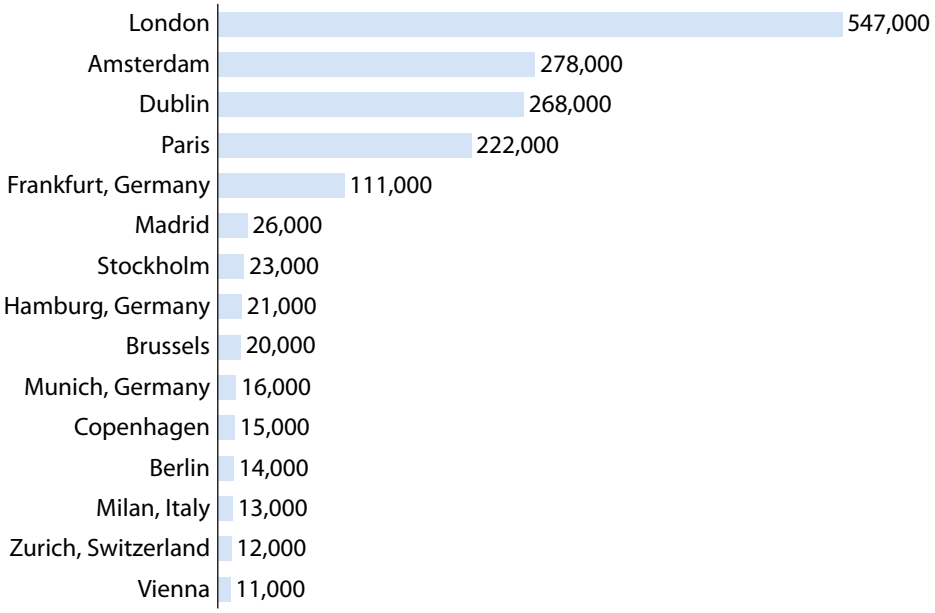
Base: server, storage, and data center decision-makers at European enterprises that have at least one disaster recovery site

(multiple responses accepted)

Source: Enterprise And SMB Hardware Survey, North America And Europe, Q3 2008 and Enterprise And SMB Hardware Survey, North America And Europe, Q3 2009

55975 Source: Forrester Research, Inc.

Figure 2 Much Of The Data Center Capacity In Western Europe Resides In London



In square meters. These numbers represent a Forrester estimate.

55975 Source: Forrester Research, Inc.

For those companies without the limitations of international borders, there are several major factors to consider when choosing your data center site:

- **Natural and manmade threats.** Natural threats, such as floods, wildfires, and earthquakes, and manmade threats, such as terrorism and industrial accidents, are all risks that should be evaluated when choosing a location. The European Spatial Planning Observation Network (ESPON) classifies Northeastern Spain, Southwestern France, Western UK, and large swaths of Germany and Switzerland to be at high or very high risk for natural hazards when considering all forms of natural hazards.[4] ESPON also categorizes technology risk, based on the locations of air traffic hubs; chemical plants; nuclear power plants; and oil handling, transport, and storage. Almost every Western European country has patches that are classified as high or very high hazard, with significant concentrations in Spain, France, the Netherlands, Belgium, and the UK. Threats like terrorism are harder to anticipate; the only sure way to mitigate this risk is to avoid major cities and colocate in smaller cities or outside major cities.[5]

- **Economic and political risks.** Although all of the countries discussed in this report are very financially stable, it is prudent to take a look at currency stability and other signs of long-term financial strength.[6] One indicator of financial stability is the size of the country's foreign exchange reserves relative to its external debt or imports.[7] Similarly, virtually all of the countries

in Western Europe are politically stable, but it is still important to be aware of potential civil unrest from riots or strikes.

- **Availability, stability, and reliability of power and space.** In many Western European cities, data center space and power are not easy to come by. Parts of London, for example, have very limited access to power, although network connectivity and space are plentiful. Paris, on the other hand, has limited data center space and network connectivity, but does have abundant power. When considering a colocation agreement in theses metropolitan areas, pay attention to the amount of space and power that the provider has access to, as providers may not be able to accommodate your expansion plans.

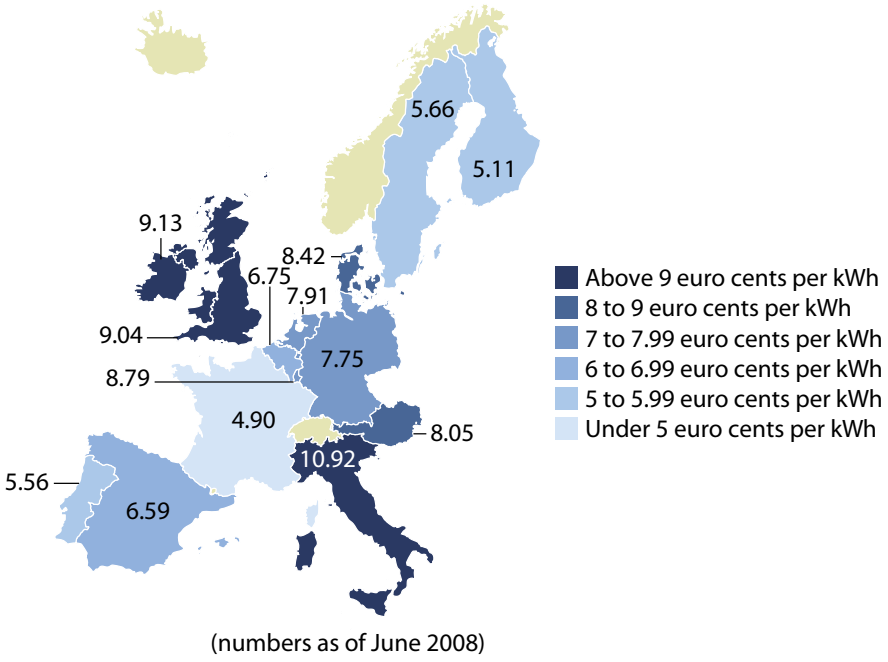
- **Cost of labor, real estate, utilities, and taxes.** Due to higher property values, colocation in London, Paris, and Amsterdam will be more expensive than in Madrid, Dublin, or Copenhagen. The cost of energy also varies widely by country, with the UK, Ireland, and Italy having the highest costs for electricity due to high taxes on electricity (see Figure 3). However, if you are concerned about the cost of having operations in a certain country, looking at labor costs and corporate tax rates is important. Ireland has the lowest corporate tax rate of any country in Europe, followed by Switzerland. Denmark, on the other hand, has some of the highest taxes in Western Europe, with one of the highest Value Added Tax (VAT) rates and the high tax on electricity for industrial users. When it comes to labor costs, Denmark tops the list once again at having the highest paid workforce in Western Europe, followed closely by Norway, Switzerland, and the UK.[8]

- **Regulatory environment.** Due to be phased in starting in April 2010, the UK Carbon Reduction Commitment (CRC) is a cap-and-trade scheme that introduces another cost for large power-consuming businesses.[9] In its current form, the CRC targets those businesses with annual electricity consumption greater than 6,000 MWh per year, which will include many colocation and managed services providers. Customers in UK-based data centers should expect their rates to go up to include their share of the CRC fees. For some, this will be an added line-item in their bill, treated like any other VAT. While the UK is currently the only country implementing CRC, the EU is taking the CRC into consideration and will likely roll out a similar scheme in the near future. In the meantime, the European Union Emission Trading System — which has also been joined by the non-EU members Norway, Iceland, and Liechtenstein — is still in effect. This regulation requires large emitters of carbon dioxide to monitor and report emissions, as well as return an amount of emission allowances to the government that is equivalent to their CO_2 emissions in that year.[10]

- **Data protection laws.** For almost all of the countries in Western Europe with significant colocation and managed services offerings, the laws with the most impact pertain to the European Union (EU) Data Protection Directive. The EU Data Protection Directive, which came into force in October 1998, is a framework that stipulates the minimum data protection

legislation that EU countries must put in place, but each country has its own specific laws regarding data protection (see Figure 4).[11] The EU Data Protection Directive demands that personal data not be transferred to non-EU countries unless the country in question has an equivalent level of data protection. This has proven to be an inconvenience for US-based companies, as the US is classified as a country that does not provide an equivalent level of data protection and to which personal data should not be transferred. To bridge this gap, the US Department of Commerce developed a Safe Harbor framework that organizations can join to demonstrate that they provide equivalent data protection.[12] Switzerland, Norway, and Iceland are not members of the EU, but all three countries have enacted laws consistent with the EU Data Protection Directive, and data can legally be transferred between them and EU countries.

Figure 3 Industrial Power Costs In EU-Member Western European Countries



(numbers as of June 2008)

Source: Eurostat Statistics in Focus

55975 Source: Forrester Research, Inc.

Figure 4 Relevant Data Protection Laws By Western European Country

Country	Law/Bill	Details
Austria	• Federal Act Concerning the Protection of Personal Data	Law enacted in January 2000. Implements European Union Data Protection Directive (EUDPD).
Belgium	• Processing of Personal Data Law	Revised law implemented in 2001. Implements EUDPD.
Denmark	• Act on Processing of Personal Data	Entered into force in July 2000. Implements EUDPD.
Finland	• Personal Data Act	Went into effect in June 1999. Implements EUDPD.
France	• Data Protection Act Draft Implementation Law	Originally enacted in 1978. Implementing legislation (pursuant to EUDPD) before French Senate.
Germany	• Federal Data Protection Act	Originally adopted in May 2001. Implements EUDPD, amended in 2009.
Iceland	• Act on the Protection of Individuals with regard to the Processing of Personal Data	Consistent with EUDPD. Iceland is a member of the European Free Trade Association (EFTA). Law covers automated and manual processing of personal information.
Ireland	• Data Protection Act Data Protection Amendment Bill	Law originally passed in 1988. 2003 Amendment Act brought law into line with EUDPD.
Italy	• Data Protection Act	Enacted in 1996. Implements EUDPD.
Liechtenstein	• Data Protection Act 2002	Enacted in 2002. Implements EUDPD.
Luxembourg	• Data Protection Law	Enacted in 2002. Implements EUDPD.
Netherlands	• Personal Data Protection Act	Enacted in 2006. Implements EUDPD.
Norway	• Personal Data Act of 2000	Entered into force in January 2001. Consistent with EUDPD. Norway is a member of the EFTA. Transborder provision prohibits transfer of personal data to another country without the permission of the Data Inspectorate. Personal data cannot be transferred to another country that has less protection than that provided by EUDPD.
Portugal	• Data Protection Act	Entered into force in 1998. Implements EUDPD.
Spain	• Data Protection Law	Entered into force in 2000. Implements EUDPD.
Sweden	• Personal Data Act	Enacted in 1998. Implements EUDPD.
Switzerland	• Federal Act of Data Protection	Originally enacted in 1992. Subsequently amended. Consistent with EUDPD. Switzerland is a member of the EFTA. In 1999, the Swiss law received "adequacy" from the EU. Transborder data provision requires data controllers to register transfers of data to other countries. Requires that other countries have equivalent laws.
United Kingdom	• Data Protection Act	Entered into force in 2000. Implements EUDPD.

55975 Source: Forrester Research, Inc.

SELECTING THE RIGHT VENDOR: WHOLESALE, RETAIL, OR TELCO?

European colocation and managed services providers fall into four basic categories: wholesale providers, international retail providers, national retail providers, and telecommunications providers (see Figure 5). Each type of provider is best suited for a particular kind of customer:

- **Consider a wholesale provider if you have a large amount of raw space and power.** Wholesale providers like Digital Realty Trust and e-shelter look for large customers with long-term leases and will often have a minimum amount of space or power that you can lease. They have very few services, if any, and they are mainly limited to basic remote services, like swapping a drive or rebooting a machine (see Figure 6).

- **Use a retail provider if you need space, power, network diversity, and some managed services.** Retail providers like Interxion and TelecityGroup are geared toward customers looking for smaller amounts of space and power and additional managed services. Choosing a local versus an international retail provider is only important if you plan to expand to other metropolitan regions, as a local provider will probably not be able to accommodate you abroad.

- **Call a telecommunications vendor for space, power, and extensive services.** Telecommunications providers are very similar to retail providers, except they often have fewer network providers in their data centers. Telecommunications vendors also *tend* to offer a more in-depth catalog of managed service offerings, up to a fully managed data center (infrastructure and applications).

Besides choosing between wholesale, retail, and telecommunications providers, there are a few other factors to consider when selecting a colocation vendor:

- **Telecommunications availability.** Having the option of at least two different telecommunication providers is critical for resiliency. All of the data centers in the metropolitan regions examined in this report have at least two providers. However, this may not be the case as you move into more rural areas. If network diversity is important to you, start with the retail colocation providers. Providers like TelecityGroup or Interxion pride themselves on the number of diverse network carriers they offer in their data centers, with some locations having almost 100 providers connected.

- **Use of green technologies.** Although this most likely won't top your list, how the vendor is utilizing green technologies is an important factor to consider, as it will affect your energy bills and any fees you may pay as a result of the CRC. Several colocation vendors, such as Digital Realty Trust, TelecityGroup, and EvoSwitch, have LEED (Leadership in Energy and Environmental Design) certified, EU Code of Conduct for Data Centre audited, or carbon neutral data centers that use outside air economizers, flywheel UPSes, variable-speed drives, and other green technologies. Some vendors, like TelecityGroup and EvoSwitch, also allow you to purchase renewable energy.

Figure 5 Major Colocation And Managed Services Providers In Western Europe

Amsterdam		
AT&T	Equinix	Interxion
BT	EvoSwitch	Level 3 Communications
COLT Telecommunications	Global Crossing	TelecityGroup
Databarn	Global Switch	TeliaSonera
Digital Realty Trust	IDC Global	Verizon
Easynet	Interoute Communications	
Berlin		
Carrier-Colo	IDC Global	LambdaNet Communications
COLT Telecommunications	I.T.E.N.O.S.	Level 3 Communications
e-shelter	Interoute Communications	TeliaSonera
Brussels		
AXS Datacenters	COLT Telecommunications	LCL
Belnet	Interoute Communications	Level 3 Communications
BT	Interxion	Verizon
Copenhagen		
COLT Telecommunications	Interxion	Verizon
Global Connect	TeliaSonera	
Dublin		
BT	Digital Realty Trust	Servecentric
CITADEL100	Hosting365 Facility	TelecityGroup
Data Electronics	Interxion	Verizon
Frankfurt, Germany		
Aixit	e-shelter	LambdaNet Communications
ancotel	Global Switch	Level 3 Communications
AT&T	globalnet	Mainlab
BT	IDC Global	NewColo
Cogent Communications	infuracom	NTT
ColoCenter	I.T.E.N.O.S.	TelecityGroup
COLT Telecommunications	Interoute Communications	TeliaSonera
Equinix	Interxion	Verizon
Hamburg, Germany		
COLT Telecommunications	IDC Global	TeliaSonera
Easynet	I.T.E.N.O.S.	Verizon
e-shelter	LambdaNet Communications	
Global Connect	Level 3 Communications	

55975 Source: Forrester Research, Inc.

Figure 5 Major Colocation And Managed Services Providers In Western Europe (Cont.)

London		
AT&T	Equinix	SAVVIS
BT	Global Crossing	Sentrum
C4L (Connexions 4 London)	Global Switch	SunGard
City Lifeline	IDC Global	Tata Communications
COLT Telecommunications	Internap	TelecityGroup
ControlCircle	Interoute Communications	Telehouse Europe
Coreix Limited	Interxion	TeliaSonera
DataPipe	Level 3 Communications	Telstra International
Digital Realty Trust	Lumison	Verizon
Easynet	NaviSite	
Epsilon Telecommunications	NTT	
Madrid		
BT	Interoute Communications	Terremark
COLT Telecommunications	Interxion	Verizon
Easynet	NTT	
Global Switch	Tata Communications	
Milan, Italy		
BT	Interoute Communications	TelecityGroup
COLT Telecommunications	KPNQwest Italia	Verizon
Easynet	Seeweb	
Munich, Germany		
BT	IDC Global	LambdaNet Communications
Equinix	I.T.E.N.O.S.	Level 3 Communications
e-shelter	Interoute Communications	TeliaSonera
Paris		
AT&T	Equinix	SunGard
BT	Global Switch	TelecityGroup
Cogent Communications	Interoute Communications	Telehouse Europe
COLT Telecommunications	Interxion	TeliaSonera
Digital Realty Trust	Level 3	Verizon
Easynet	NTT	
Stockholm		
Interoute Communications	SunGard	Verizon
Interxion	TelecityGroup	
IP-Only	TeliaSonera	

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Source: Forrester Research, Inc.

Figure 5 Major Colocation And Managed Services Providers In Western Europe (Cont.)

Vienna		
Interoute Communications	TeliaSonera	
Interxion	Verizon	
Zurich, Switzerland		
colozüri.ch	Interoute Communications	Verizon
COLT Telecommunications	Interxion	
Equinix	Layer One	

55975 Source: Forrester Research, Inc.

Figure 6 Major Colocation And Managed Services Providers Profiles

Vendor	Number of facilities in surveyed metros	Services offered
Wholesale providers		
AXS Datacenters	1	None
Digital Realty Trust	12	None
e-shelter	5	Remote/smart hands
International retail providers		
Equinix	15	Remote/smart hands
IDC Global	5	Remote/smart hands, managed services
Interxion	25	Remote/smart hands, managed services
SunGard Availability Services	6	Remote/smart hands, managed services, hosting
TelecityGroup	23	Remote/smart hands, managed services, hosting
Terremark	1	Remote/smart hands, managed services
National retail providers		
City Lifeline	1	Remote/smart hands
Data Electronics	2	Remote/smart hands, managed services, hosting
EvoSwitch	1	Remote/smart hands
Savvis	1	Remote/smart hands, managed services, hosting
Telecommunications providers		
AT&T	4	Remote/smart hands, managed services, hosting
BT	15	Remote/smart hands, managed services, hosting
Cogent Communications	3	Vendor did not disclose
COLT Telecommunications	16	Remote/smart hands, managed services, hosting in most locations
Easynet Global Services	8	Remote/smart hands, managed services, hosting
Global Crossing	2	Remote/smart hands, managed services, hosting
Interoute Communications	12	Remote/smart hands, managed services, hosting
KPNQwest Italia	2	Remote/smart hands, managed services, hosting
LambdaNet Communications	4	Remote/smart hands
TATA Communications	3	Varies by location
TeliaSonera	18	Remote/smart hands in most locations
Telstra International	3	Remote/smart hands, managed services, hosting

55975 Source: Forrester Research, Inc.

RECOMMENDATIONS

CONSIDER THE EMERGING METROPOLITAN AREAS

Although not traditionally considered major hubs of data centers, markets like Madrid, Brussels, and Munich are growing quickly. In many of these cities, you will find less expensive power, labor, and colocation and managed services prices. The robust network connections offered in these cities will keep you well connected to corporate headquarters. If you are a US-based company and want to colocate your data center on the British Isles, make sure to consider Dublin; it is becoming an ever-more popular alternative to London for the more abundant power, less expensive real estate, and climate suited for free cooling.

SUPPLEMENTAL MATERIAL

Methodology

Between Q3 and Q4 of 2009, Forrester interviewed dozens of colocation providers in Western Europe on how much total usable space and power they had in their data centers. Forrester defines a metropolitan area as the 20-meter radius around a city.

Companies Interviewed For This Document

AXS Datacenters
BT
City Lifeline
Cogent Communications
COLT Telecommunications
Data Electronics
Digital Realty Trust
e-shelter
Easynet Global Services
Equinix
EvoSwitch
Global Crossing
IDC Global Networks
Interoute Communications
Interxion
KPNQwest Italia
LambdaNet Communications
Savvis
SunGard
Tata Communications
TelecityGroup
TeliaSonera
Telstra International
Terremark Worldwide
Verizon

ENDNOTES

[1] The mentality around outsourcing data centers is changing — in 2006, only 22% of enterprises surveyed by Forrester were planning on or considering implementing data center outsourcing services including colocation in the next year. By 2007 this number had grown to 44%, and furthermore, the number of people who said they will not use data center services including colocation dropped from 58% in 2006 to 36% in 2007. In conjunction with this, the colocation market began to heat up, with more and more providers entering the space.

[2] Source: Enterprise IT Services Survey, North America And Europe, Q2 2008 and Enterprise IT Services Survey, North America And Europe, Q2 2009.

[3] Prices for power, construction, and real estate are on the rise. In addition, managing the environment, the physical facilities, and the network of a modern, resilient data center is a specialty in itself. If you are thinking of building a primary data center or a recovery site, it's important to do a full cost comparison between colocating and building it. Be sure to account for upfront construction costs, the higher electrical rates you'll pay for power, as well as higher network bandwidth costs. Unless you have security-related concerns to avoid shared facilities or require less than several thousand square feet, you'll find that it will be cheaper to colocate. Why? You'll spend too much on power. Attempting to futureproof your data center doesn't work. If you design your own data center for 400 watts/square foot today and are planning to grow into it, you'll end up wasting power and money. Furthermore, you'll be operating below capacity for a long time, which is electrically inefficient and requires large upfront capital expenses that won't be fully utilized for years. Colocation providers have much more purchasing power than you do. By purchasing megawatts from utilities, colocation providers receive better rates per kilowatt than you can negotiate. Similarly, they pay less (if anything) for infrastructure improvements like substation transformers and have relationships with major data center infrastructure suppliers for uninterruptible power supplies (UPS), generators, and computer room air conditioning (CRAC). Similarly, major carriers are already on-site — eliminating huge fees to get bandwidth delivered to your doorstep. You can purchase just the amount of space and power you need today. It's not all or nothing with colocation. You don't have to colocate your entire IT environment. Many companies use colocation to host just a handful of their servers: the ones that run computing-intensive or Internet-facing applications that suck up too much power, servers that run business-critical applications that require a higher level of resiliency than your primary data center can provide, and servers that need to be closer to major Internet peering points for the best possible network performance. See the October 21, 2008, "Don't Build Your Next Data Center, Colocate It" report.

[4] Source: Philipp Schmidt-Thomé, "The Spatial Effects and Management of Natural and Technological Hazards in Europe," 2006 (http://www.espon.eu/mmp/online/website/content/projects/259/655/file_1226/fr-1.3.1_revised-full.pdf).

[5] Manmade threats such as industrial accidents or terrorism should also be considered — one solution to this is to avoid major cities and colocate in smaller cities or outside major cities. Consult government agencies such as FEMA or your insurance company; both maintain maps of hurricanes, winter storms, earthquakes, and major transportation hubs. See the October 21, 2008, "Don't Build Your Next Data Center, Colocate It" report.

[6] In the past 10 years, only Belgium has greatly exceeded a difference of 1% in its credit spread, a measure that economists use to signify financial security and stability in a country. Source: Eurostat (http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/).

[7] In addition to increasing your costs, a radical exchange rate or market swings can result in high unemployment, massive protests, and political instability, as it did in the Russian financial crisis of 1998. You must consider whether the local currency is stable or prone to significant fluctuations and evaluate the country's primary trading partners. In the case of the Russian financial crisis, the economies of neighboring countries suffered heavily due to reduced Russian demand for their goods and a flood of inexpensive Russian exports. One indicator of financial stability is the size of the country's foreign exchange reserves relative to its external debt or imports. See the April 17, 2008, "Checklist For Data Center Site Selection" report.

[8] Source: Eurostat (http://epp.eurostat.ec.europa.eu/portal/page/portal/labour_market/earnings/main_tables).

[9] Legislation around climate change will affect IT indirectly, but still forcefully; for example, starting in 2010, the United Kingdom's Carbon Reduction Commitment will affect organizations consuming more than 6,000 megawatt-hours (MWh) of electricity per year (equivalent to £500,000 per year). See the June 12, 2009, "TechRadar™ For I&O Professionals: Green IT 1.0 Technologies, Q2 2009" report.

[10] To learn more about the EU Emission Trading System, visit the European Commission Web site: http://ec.europa.eu/environment/climat/emission/index_en.htm.

[11] What are the basic data privacy principles every organization should be aware of, and which are spelled out in EU as well as EEA data protection legislation? 1) Collection of personal data can only take place if it is either covered by legislation, or if the individual has given his or her active consent; 2) Data must not be processed for any purpose other than that for which it was originally collected, unless the data subject has given active consent; 3) Data must not be transferred to a third party without agreement from the data subject; 4) Data should not be kept longer than is necessary for the purpose for which it was originally collected; 5) Security measures must be put in place to protect personal data from accidental loss or destruction, unlawful deletion or modification, as well as unauthorized and unlawful access; 6) Data must be accurate, complete and up to date; 7) Data subjects have the right to access the data that is being held about them, and they have the right to request corrections and/or deletions of data (unless, of course, a correction or deletion would in itself be in breach of a regulation); and 8) Data must not be transferred to third countries that do not offer an equivalent level of personal data protection. See the September 17, 2002, "Data Protection in the European Union, Part 1: A Background Primer" report.

[12] More information on the Safe Harbor program is available on the Export.gov Web site: http://www.export.gov/safeharbor/.

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