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Contents

March 2015 VOL 04 ISSUE 02

Our tracks guide your path through DCD magazines and events

IT + Networks
Understand the implications of IT and network transformation on data center design and architecture.

App > Cloud
Managing blended infrastructures and delivering critical ICT applications through the cloud.

Design + Strategy
The big picture: organisational strategy and design issues for on-premise data centers.

Security
Ensuring reliability and protecting online data and services from the data center.

Critical Environment
Issues faced by professionals who manage the performance, efficiency and resilience of the critical environment.

Cover Story
From Thin Air

Innovators are still flooding into the data center industry - we meet some of the best

22

27

5
Meet the team
Who's who in our international media team

6
Seeding change
Peter Judge does some blue-sky thinking amongst the grassroots

7
Where are the racks?
Straight from the DCDi research hothouse - statistics on power

9
News
Our international team have scoured the globe for your news

16
LATAM news
How do you run a data center during a national drought?

18
IO's New Jersey facility
Drew Amorosi takes a tour on the New Jersey Turnpike

I - XII
GUIDE TO COLO &CLOUD
Our special supplement considers whether colo and cloud can cohabit

20
CEEDA goes global
Paul Mah tracks CEEDA's work on data center efficiency

22
From thin air
Peter Judge meets innovators who are taking a leap of faith

27
The VC cash is flowing
Bill Boyle looks at the nature of the present venture capital boom

31
I don't believe it!
Nick Chase takes umbrage at a certain research outfits' figures

32
Can you run hot?
Michael Kassner asks why we don't run data centers hotter

35
Cloud storage strikes
Bryan Betts says you may hate it, but you must deal with Dropbox

38
Is DCIM holding its own?
Eira Hayward finds out what remains of DCIM's early promise

42
Trading spaces
Max Cooter reports on the new spot markets for cloud

45
Dates for your diary
We take a look at the calendar of 'must attend' events for March

46
Open season
Bill Boyle examines the Open Compute movement

COVER PHOTO:
Cole Crawford, Vapor IO, relaxes in the skies over Silicon Valley

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Blue sky or grassroots?

Here's a paradox for you. Data centers make up one of the fastest-moving business sectors on Earth. There's a continuous stream of new ideas that regularly reshape the landscape. And yet, when you meet them, professionals in the field are pretty conservative.

Our cover feature (p22) looks at the kind of people who have big ideas and make them happen. It's a small sample of the great ideas we've heard lately, and there are plenty more where they came from.

Change is good, but is it happening? People pushing best practice tell us that there are savings to be made by increasing power density and letting hot aisle temperatures go up. But a recent survey of IT professionals, from sysadmins to CTOs, by Green House Data suggests that less than ten percent of racks will increase temperature or density in the next three years.

Last month Wendy Shuchart verified that power densities aren't increasing (Issue 1), and in this issue Michael Kassner found temperatures aren't shifting as much as you might expect (p32).

Why is this? It's not that no one is listening to the blue-sky thinkers. Far from it. They are speaking at our events this month in New York and Hannover, and it will be standing room only in their sessions.

It's just that while some people get to make a leap of faith and re-envisage the world, things are different at the grassroots.

Change is challenge, and data centers have to provide continuity. It's a basic requirement. New ideas have to be justified before they are implemented. And any changes have to be measured and checked.

At *DatacenterDynamics* we know that dogged deliberation is needed to actually build this stuff. And the determined implementors are our heroes, just as much as those creating new trails in the vanguard of the industry.

That's why we're delighted to celebrate a new step for CEEDA, the Certified Energy Efficient Datacenter Award. It recognizes the grassroots grunt work, building measurably better data centers, and the CEEDA story itself has been a long-running one.

This month, though, we can show you data centers in Latin America and Asia (p20) with CEEDA certification. After years of work, CEEDA has gone global.

So in these pages, we have blue-sky thinkers standing alongside grassroots activists. There's no conflict and we need you both. If we bring the two groups together, we couldn't be happier.

•

Peter Judge - *global editor*
@PeterJudgeDCD

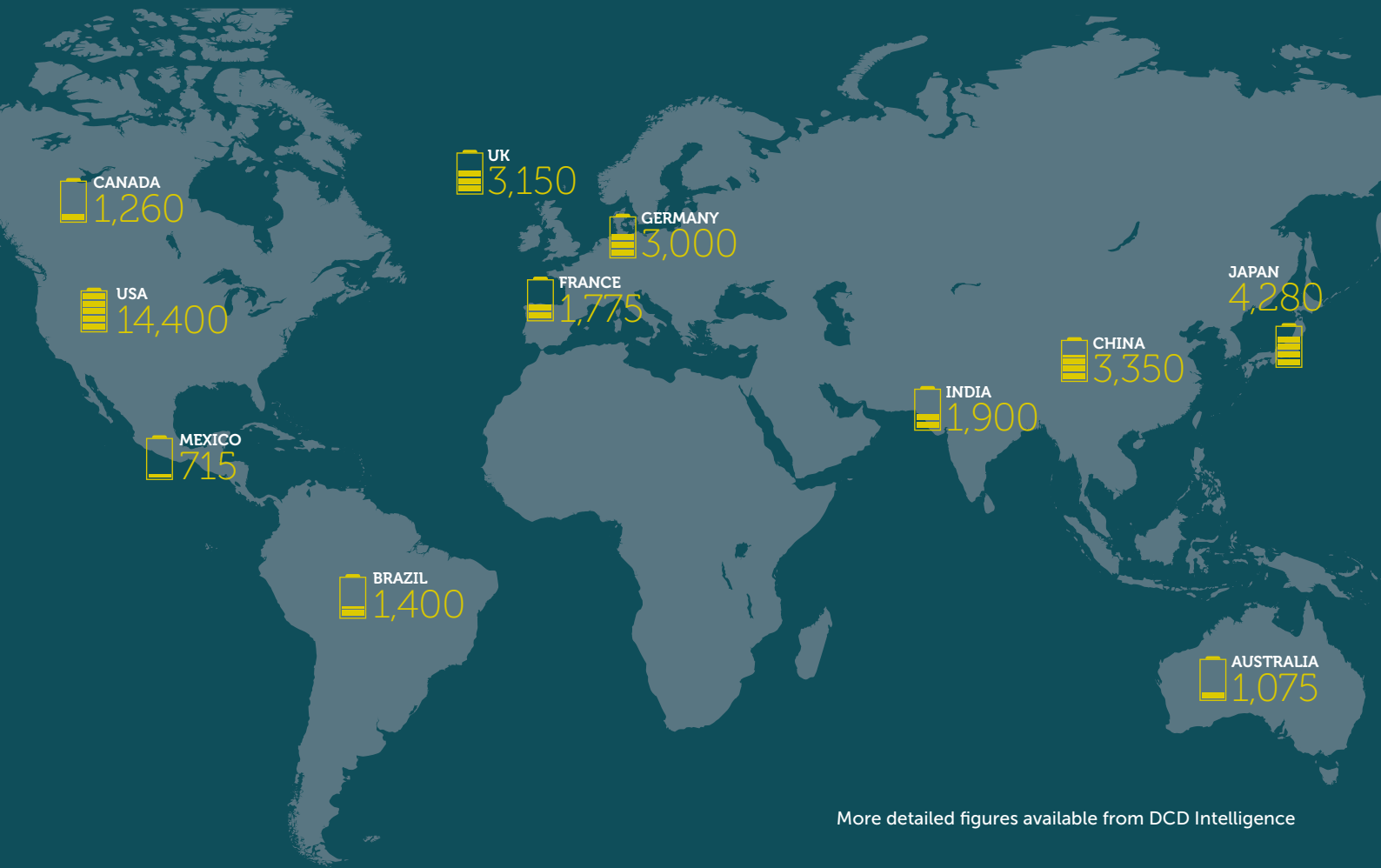
Implementers and trailblazers alike are our heroes. There's no conflict and we need both

10%

of racks expected to increase density or temperature in three years

Where are the racks?

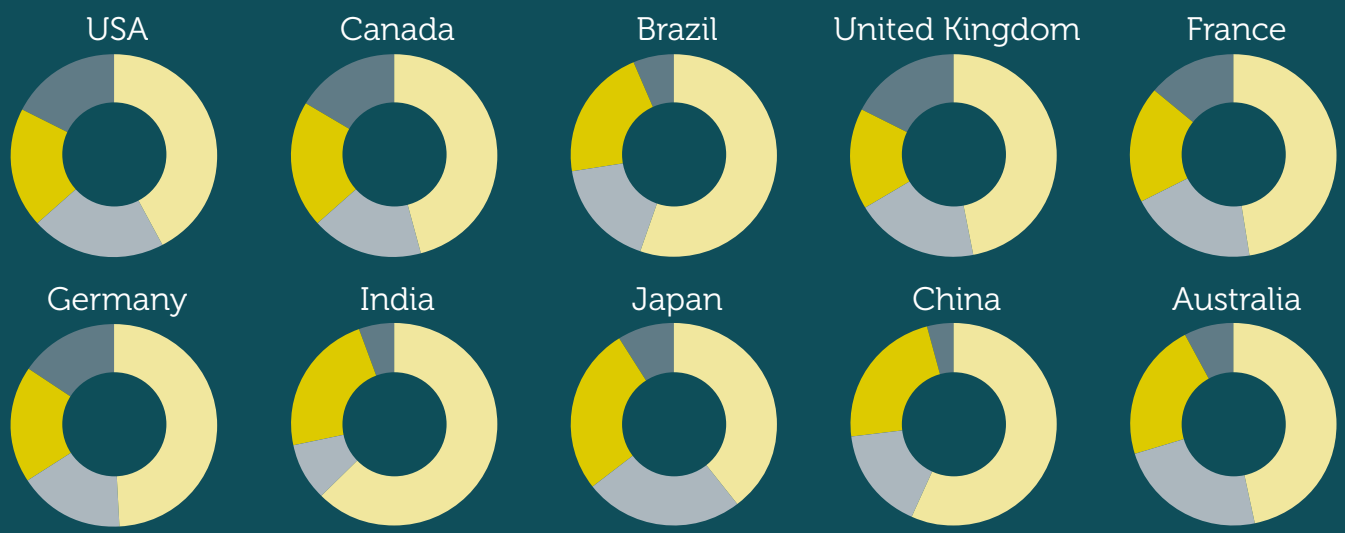
DATA CENTER MARKETS BY POWER CONSUMPTION, 2015 (MW)



More detailed figures available from DCD Intelligence

DATA CENTER RACKS: DISTRIBUTION BY LOCATION AND MANAGEMENT 2015

- Physical racks (in-house)
- Physical racks (located externally)
- Virtualized or cloud within firewall
- Cloud located externally



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*Compared to standard VRLA products

California to import 'cool' from Asetek

The California Energy Commission (CEC) is buying direct-to-chip liquid cooling for two supercomputing data centers from Danish cooling vendor Asetek. The large-scale facilities have a total of 90 racks of servers which will be cooled by RackCDU D2C systems.

Google suffers cloud failure

Google's Compute Engine virtual network stopped updating routing information late on Wednesday, February 18. Most of the service was down early Thursday as the system's cached routes expired. The service is running normally now and Google has extended the lifetime of the cache to stop this happening again.

Aussie storm causes Fujitsu DC shutdown

Recent storms in Australia, and a suspected lightning strike, brought down Fujitsu's Perth Data Centre, which suffered two back-to-back failures that resulted in an outage.

Inspur to build in Henan Province

Chinese technology provider Inspur has started work on a CNY3bn ($480m) data center at Yunhai Science and Technology Park near Zhengzhou Airport, according to *Henan Daily*.

Inspur describes this as a "fourth-generation" cloud computing data center – the largest ever built in Henan Province. The data center was first proposed by Microsoft, highlighting features including complete modularity, factory prefabrication, the use of outdoor air-cooling and virtualization software.

The park will have a floor space of 1.35m sq m (about 14m sq ft) and will consist of three functional parts, including a cloud computing data center, a cloud computing research and development (R&D) center, and an operation and settlement center.

Upon completion, it will provide outsourcing services to the Henan government and cloud services to small and medium-size enterprise (SMEs) in the province. The park will also be the location for a National Key Laboratory.

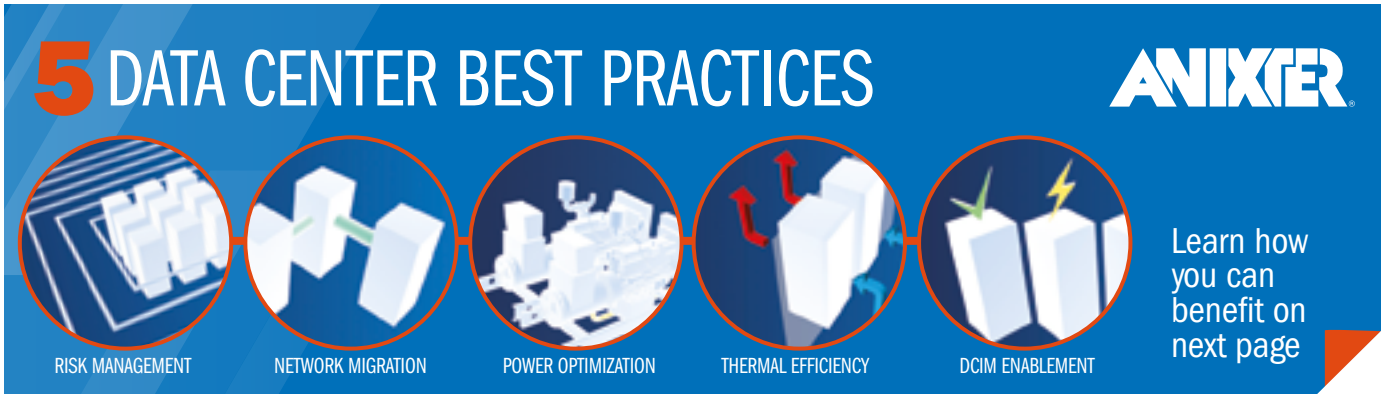
It plans to attract more than 1,000 science and technology enterprises, hundreds of R&D centers and enterprise technology centers. It is expected to generate CNY 10bn industrial output and CNY 1bn of tax revenue each year.

The cloud data center will adopt a modular design, which can avoid the impact of one failed module on other modules. It also deploys an intelligent monitoring and management system. In case of failures, the management system will enable automatic switch to the backup system to ensure smooth running of the cloud facility.

The facility uses fresh air as its major source of cooling, and by utilizing outdoor air as the sole source of cooling for 38 percent of the year, is estimated to save more than 30 percent of water and power resources.

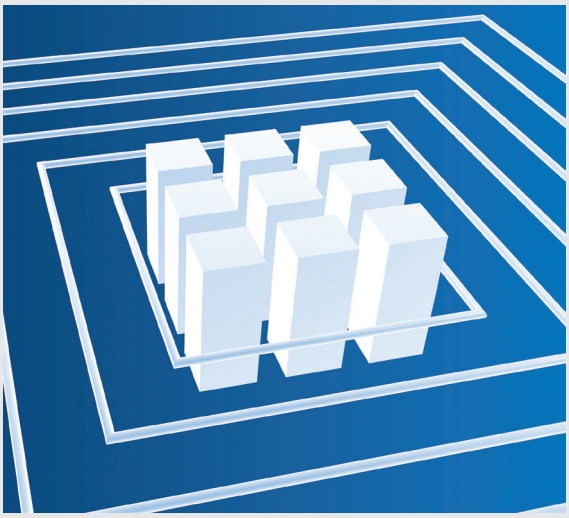
Inspur has built numerous fourth generation data centers across China – from Heilongjiang in the north to Hainan in the south. The new center brings the number to ten.

http://bit.ly/1BZFKUh



Data center risk management

Infrastructure as a Platform by Anixter.
Big data. Big risks.



Risk Management

Big data—whether from mobile phones or Internet-enabled devices—is changing the way companies operate and can be essential in making critical day-to-day decisions. However, data breaches are occurring more frequently and the media outlets are taking notice. This could create undesirable exposure and raise concerns with your valued customers. Safeguarding big data is necessary to business operations, continuity and, in extreme cases, national security.

Even though most attention on safeguarding data is centered on logical security, the risk of not implementing a solid physical security plan can increase exposure, and in many cases, governments and industry associations are mandating that data centers meet certain physical security requirements to protect against these risks.

As such, there are ways to protect a data center from a physical intrusion. But to do so, it's important to understand:

- The reasons for implementing a physical security risk management plan
- The risk in the physical environment
- The current industry standards associated with physical security.

Benefits of a Physical Security Risk Management Plan:
Implementing a risk management plan can help you:

- Protect the company's image
- Achieve regulatory compliance (HIPAA, PCI-DSS, SOX, GLB)
- Balance investment in both physical and logical security
- Stay one step ahead of adversaries with technology
- Execute policies and procedures specific to the data center
- Minimize disruption to business operations and continuity.

Risks in the Physical Environment: Assessment and Management
Assessing risk in the data center requires an understanding of where and how data center breaches usually occur and that internal threats are often greater than external ones. Within an organization, assessing risk usually differs from the Chief Information Security Officer (CISO) to the facility manager. Many times, it's not entirely clear who owns the physical security budget—IT or facilities—or even how much to budget for physical security. As organizations continue to align IT and physical security, they will need to address how to incorporate physical and logical security to minimize these damages. It's important to follow basic risk management philosophies:

- Reach an agreement on balancing physical and logical security budgets
- Identify threats, including ones from the inside and outside
- Maintain sound policies and procedures and implement them consistently

Current Standards: Bench Marking Physical Security
Creating and executing a risk management strategy isn't just good internal policy, it's increasingly becoming a requirement for both industry and governments. Important industry standards:

- SSAE 16
- PCI DSS
- HIPPA and HITECH
- Gramm-Leach-Bliley Act
- ANSI/BICSI (002-1014: Data Center Design & Implementation Best Practices)
- TIA 942-A: Telecommunications Infrastructure Standard for Data Centers

Another related issue is how sites are audited and the inconsistency in format, documentation and action planning.

Implementing Your Physical Security Plan
Data center operators need to implement plans that successfully manage the risk associated with hosting this data. By implementing several layers of protection, data centers can best protect themselves from physical threats. In the next article, Anixter will cover these strategies and the best practices for implementing them.

Next issue:
Managing risk with a layered security approach

ANIXTER

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Climate positive data center to be built in central Sweden

Swedish venture EcoDataCenter has started building what it calls the world's first climate positive data center, expected to produce a negative carbon dioxide footprint over the course of the year.

The facility in the town of Falun, central Sweden, will be powered exclusively by renewable energy sources and feed the waste heat from the servers into the district heating system to help keep local residents warm.

Infrastructure for the project is supplied by Schneider Electric, and EcoDataCenter is a joint venture between local energy company Falu Energi & Vatten and recently the established data center operator EcoDC AB.

Falun is a quiet town that used to be famous for its copper mines – places so unique they were declared World Heritage sites by the United Nations.

The campus will consist of three buildings with a total of 23,250 square meters. It will be built to Tier IV and LEED Platinum specifications, with a projected power usage effectiveness (PUE) of 1.15. Once complete, the data center will offer 18MW of power derived from sun, wind and water, as well as secondary biofuels.

The Falun facility will also repurpose heat produced by the IT equipment. Sweden is famous for its district heating systems, and the new data center will use heat pumps to deliver warm water to Falu Energi & Vatten, which will then forward it to local homes.

In the summer, cooling equipment will be powered by excess steam from the local electricity plant.

In line with its green credentials, even the roof of the facility will be planted with flowers to help cool the servers underneath.

http://bit.ly/1wpyXfx

HP sidelines Mickos

Mårten Mickos has stepped down from the senior role at HP's cloud operation, only five months after he was put there when HP bought his firm Eucalyptus.

An internal email said he will concentrate on "customer engagement and advocacy", and hand over the lead to three HP executives, who were on HP's cloud before he arrived. Bill Hilf will handle strategy, Kerry Bailey will deal with sales, and Mark Interrante will run engineering.

The move is certainly an abrupt turnaround. HP CEO Meg Whitman had named him as the person who would lead the cloud in HP's enterprise business after the firm splits into two entities. Mickos previously ran open source database firm MySQL, which Sun Microsystems bought for $1bn back in 2008.

At HP, Mickos was leading a cloud platform based on OpenStack, an open source technology he was not 100 percent happy with, while HP still makes virtually all its cloud revenues from its proprietary offerings. "I'm a critical friend of OpenStack," he told us in November when we spoke to him. But his firm Eucalyptus attempted to build something similar around the proprietary tech of Amazon Web Services, and Mickos once described OpenStack as "the Soviet Union of the cloud".

Mickos told us HP would play nicely in the OpenStack community. But the promise was a little double-edged: "When it comes to community, we have endless empathy and love," he said. "We kill them with a smile."

http://bit.ly/1zllq8T

Sumerian to offer capacity planning

While some may have hoped that cloud computing would obviate the need for capacity planning, UK-based Sumerian is offering a more realistic idea – a cloud-based service that does your capacity planning for you.

The service allows customers to upload their current IT estate and any projected changes, getting back capacity projections and "sunburst" visualizations of their future IT infrastructure. It is based on 12 years of consultancy work by Sumerian, which was founded in 2002.

Although cloud computing was presented as a new era in which capacity could be accessed on demand, this has not emerged in reality, said CTO Peter Duffy in a call with *DatacenterDymamics*. "No one knows how many resources they have, and if you don't know, you can't manage it."

Luckily, he said, "cloud is a good fit for capacity management," as it involves expertise that can be accessed as what Sumerian is calling capacity planning as a service (CPaaS), without installing new local software.

"We take data from customers and pull it into our environment," explained Duffy. "There are no new agents required – it is a light-touch approach."

The system can draw in information about multiple environments, including VMware and HyperV, as well as linking to existing tools such as CA Unicenter and Tivoli.

It addresses "what-if" questions, such as, "I am moving to Cisco UCS, how can I streamline my IT?" or "My supplier is ending support for my mainframe, how can I consolidate the loads elsewhere?"

http://bit.ly/1BlM3As

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Lenovo optimizes ARM servers

Lenovo is working on energy-efficient servers based on ARM processors, thanks to a research partnership it inherited when it bought IBM's x86 server business.

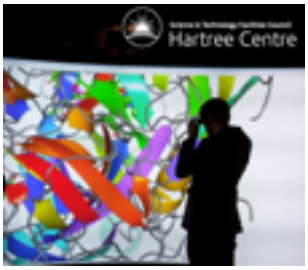
The project at the national Science and Technology Facilities Council's Hartree Centre will look at ways to build high-performance computing systems based on low-energy processors using designs from ARM Holdings. Lenovo will develop a prototype ARM-based server within its dense computing NeXtScale platform, using 64-bit ThunderX processors from Cavium.

While ARM technology has shown promise, the biggest hurdle to overcome is the build-out of an ecosystem to support a production environment," says the center, explaining that the project will look at scale-out versus scale-up systems given a defined power budget.

"The Hartree Centre will be developing a robust software ecosystem encompassing compilers, linkers, numerical libraries and tools – all of which are fundamental to the adoption of these types of technologies," said Neil Morgan, program manager of energy efficient computing at Hartree.

With help from the University of Manchester, the project will develop compilers and linkers for the Cavium chips. It will also work on running supercomputing loads on the system, and monitor the energy performance compared with running the same loads on the IBM Blue Wonder supercomputer at the center.

The ARM-based prototype will be a module for the NextScale platform, a dense server system sometimes seen as a competitor



to HP's Moonshot, which is used in HPC, cloud and analytics.

The Hartree Centre in Warrington is a research collaboration between STFC's Scientific Computing Department and business, partly funded by the UK government.

http://bit.ly/1821GAU

Netrality buys Houston data center as part of strategic link to Gulf

Netrality Properties, which was formed in January 2015, has bought a 25-story data center and carrier hotel in Houston, Texas. The venture is a partnership between property speculator Amerimar Enterprises and Allied Fiber chief executive Hunter Newby, who is investing privately. The two parties have jointly speculated for 15 years, but this deal is the first under the auspices of a formal agreement.

The buyer has unveiled plans for additional carrier-neutral meet-me rooms and the building of 100,000 sq ft of additional data center space.

The Houston facility at 1301 Fannin Street – a 1.1m sq ft building that includes around 400,000 sq ft (around 40 sq m) of data center space and access to a dozen network carriers – is described as a strategically important networking hub with immediate proximity to the region's economic foundation – the US oil and gas industry. It also has established direct network links to the emerging economies of Mexico and the Gulf of Mexico.

The new owner has inherited a customer base that includes Exxon Mobil and Internap. Exxon, whose data center is in the Netrality-owned building, is the second-largest publicly traded company in the US.

Hunter Newby said this is a critical location for network operators. "[Houston is] the fourth largest city in the United States. Its proximity to Mexico and the Gulf make it a global gateway, and strategic for us and our customers," said Newby.

The acquisition is the latest in a long line of speculations by Newby and Amerimar, which now owns many of the carrier hotels catering to US data centers, with existing properties in New York, Philadelphia, Kansas City and Chicago.

http://bit.ly/1Duv6Tz

95%

of private cloud implementations fail, according to Gartner

We beg to differ (see p31)

Apple looks to create a 'global command center' in Arizona

Apple is to invest $2bn in a new data center in Arizona that will become its global command centre. The site in Mesa was formerly home to GT Advanced Technologies (GTAT), which was forced to vacate the buildings after it went into bankruptcy. The company collapsed after a major failure in oversupplying iPhone 6 display covers.

Apple has said its new data center will be a 'command centre' for its global networks. It will be powered entirely by renewable energy, and could help create up to 500 temporary construction jobs and 150 permanent positions.

Millions were invested in the facility under the terms of Apple's original partnership with GTAT to make sapphire displays. The investment made to create a sapphire production facility could be put to good use, according to Apple, but it's likely this will be limited to using the existing building, since no sapphire manufacturing is planned on the site. Having launched with great fanfare early in 2014, the sapphire idea bit the dust before the end of the year.

"We couldn't be more excited about it," said Arizona Governor Doug Ducey. "The command center is a historic expansion from one of the most iconic, successful companies in the world."

In 2013, Arizona created the conditions for major inward investment when it adjusted its local laws to accommodate tax breaks for data center operators that set up in the state. Previous Governor, Jan Brewer's, budget pushed through the tax incentives, which are meant to benefit both mega-scale single-tenant projects and companies that provide colocation services out of multi-tenant facilities.

http://bit.ly/1FyfaiM

Modular data center survives arson attack

A Danish firm has suffered an arson attack that left its building a blackened shell, but its IT equipment escaped unscathed, thanks to a protective modular IT room.

Criminals set a fire at the un-named commercial company, igniting flammable accelerants in a space that contains the IT room. The fire raged for 60 minutes, destroying everything in the outer space, but the IT equipment and data survived, inside a free-standing computer room built within the space.

Once the fire was out, the firm found it could reconnect the servers and network, and continue as normal, even though its building was trashed.

After what "could have been a catastrophic event," the firm's CEO said, "we were able to be up and running again after just three days, including the fire investigation period."

The IT equipment was contained in a room from RemTech, built with phenolic foam panels designed to resist fire, and fitted with fire suppression equipment. However, the blaze destroyed everything in the outside space, including the power and data cables.

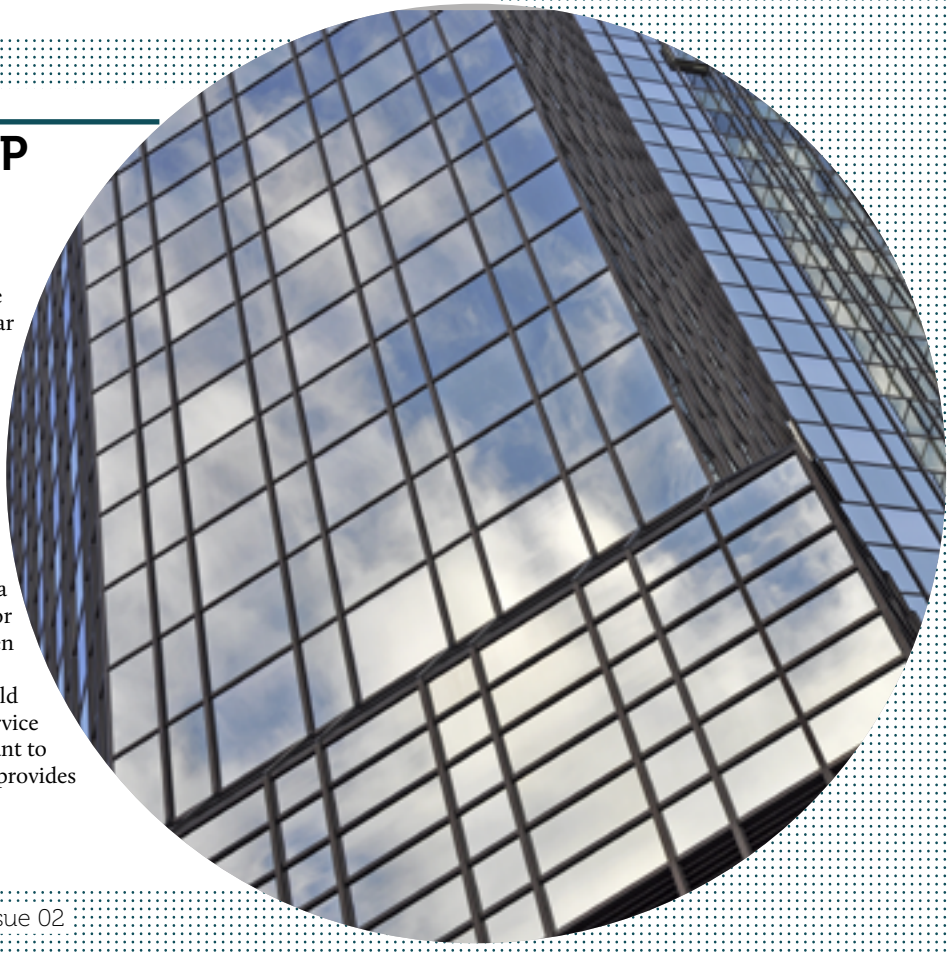
When the fire was put out, the outside ceiling had collapsed, but the free-standing data room remained intact. The outside walls were so hot the fire service drilled a hole in the door to see if there was a fire inside. When the room could eventually be opened, the IT equipment was intact... it was soon up and running again."

http://bit.ly/17DfYYL

Colo demand on the upswing

According to CBRE, Amsterdam was responsible for 22MW a third of the total demand for colocation in Europe in 2014 (see supplement page V and page 7) statistics). The take-up of colocation in the region remained similar to 2013. There are indications that the growth of colocation services in Europe is slowing. In contrast, Synergy Research Group reported in December that the same market in China is growing at 20 percent. The same month, 451 Research estimated that the global colocation market now brings in revenues of more than $25bn a year.

Deutsche Bank picks HP for ten-year cloud deal



Deutsche Bank is to outsource much of the wholesale banking division's IT infrastructure to HP in a ten-year multibillion-dollar deal. IBM, meanwhile, will retain the job of managing the retail banking arm.

HP will host Deutsche's operations using its own computing, storage and networking capacity. Deutsche is to remain in control of key compliance-regulated areas, however, such as IT architecture and information security. Among the ideas mooted in its restructuring plans, Deutsche Bank is considering selling its retail banking arm, including Postbank.

Deutsche Bank wants to divest itself of IT and data centers, according to analyst Clive Longbottom, senior researcher for Quocirca. "This is something we've been saying has to be the case for years," he said.

"IT workers who are very technically focused should be looking to get employment with an HP, IBM or service provider company," said Longbottom. "Those that want to stay working for a company that uses IT, rather than provides it, need to re-skill to become business advisors."

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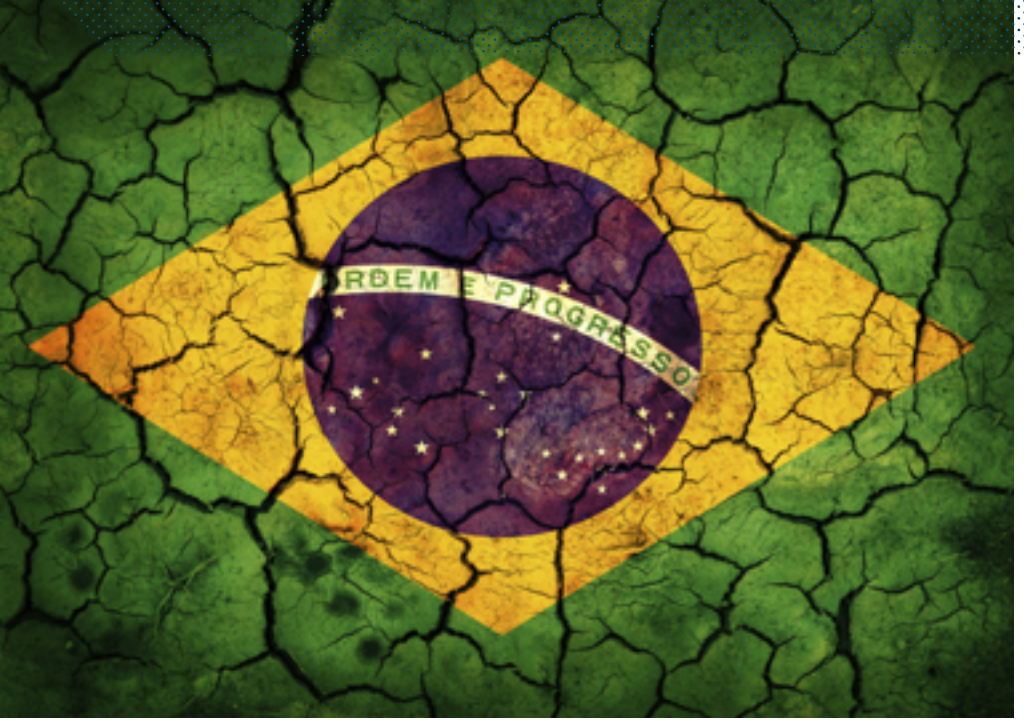

Running on empty in Brazil

A drought in Brazil could leave the country's data centers short of electricity, warns *Sidney Modenesi*

Brazil has a water crisis. It started in São Paulo, the richest, most developed state in the country, and spread to almost all the states in the southeast. Lack of water is a crisis in itself, but also a huge threat to the generation of hydroelectric power, which provides most of Brazil's electricity (see box, Key points).

The southeast of Brazil will start its next 'dry' period in 2015, with much less water than it had when the current dry period started in 2014. This could have major consequences for data centers. In general, facilities require three main components to operate adequately: electric power, water and people. All of these are seriously threatened by the water crisis.

Electric power: This is the basic need of a data center. Infrastructure and IT kit do not work without electric power, nor do pumps, stabilizers, compressors, servers, monitoring systems, alarms and controls.

Data centers with Uptime Tier III or Tier IV certification should have solved the requirements of electric power availability, but this is not the reality of many data centers in Brazil. It's not uncommon to find data centers whose generators are absent or poorly maintained, or can only provide a couple of hours of backup. Many managers say: "If needed, we will rent more generators," but this may not be the best solution.

Generators are a finite resource, which will be scarce and expensive in a crisis, even if you manage to rent or buy a new generator. Can you install it in the building? If so, how quickly? Some buildings are too small, and some are protected as national heritage sites.

Extended use of diesel generators will also cause noise and pollution, so data centers in high-density neighborhoods or near schools or hospitals may have trouble here.

Water: Again, Uptime Tier III and Tier IV data centers should have a guaranteed water supply, but others may not. In many data centers, water is used in the air-conditioning system. It is recommended that data centers in shared buildings should have their own cooling system, but not all do. A few minutes of air-conditioning downtime can cause a significant temperature increase in the white space and damage IT systems.

Most air-conditioning systems have a closed circuit, so the same water runs through it many times. But what if there is a leak and the system has to be refilled?

Many data centers have large water reservoirs, and some may even have their own artesian well. But in a severe water shortage, private artesian wells may be requisitioned by the authorities to provide water for the population.

Facilities require three main components – electricity, water, people

People: São Paulo authorities have threatened the public with rationing: four days without water and two days with water. But that may be even worse, as after four days with no water it may take two days for the water to arrive in the most extreme parts of the network.

Schools, hospitals and prisons have been promised priority, but the authorities have not explained how this will be achieved. It is hard to predict how people will react in this sort of crisis. Will staff come to work when their kids are at home because the school has no water? Brazil has never faced a calamity such as this, so it's impossible to know.

In countries with a high probability of natural disasters, the safety of the workers and their families is factored into business continuity plans, as organizations can't run without qualified people. This is threatening, but this is what business continuity is for. It is defined in the international standard ISO 22301:2012 as "the capability of the organization to continue delivery of products or services at acceptable predefined levels following a disruptive incident". This delivery capacity relates closely to the level of risk an organization is willing to tolerate. So, an organization has to define two main things:

1. What level of continued service is acceptable in a crisis – 100 percent, 50 percent, or some other level? Does your organization want to keep 100 percent of its electrical power supply capacity for long periods without interruption? If so, do you have enough generators and UPS systems? More generators will increase your capex and opex costs.

2. What qualifies as a disruptive incident? Is a one-hour interruption a disruption? The answer depends on your organization but, normally, data centers will not tolerate unavailability for more than one hour. An unstable electricity network can also suffer from phase inversion, energy in the wrong phase, or noise, which may not be detected by older UPS systems. If UPS systems aren't co-ordinated, this can damage IT systems. If the definition of a disruption is broad, this can increase the expense of upgrading to UPS systems. ●

Sidney Modenesi is forum leader of the Business Continuity Institute, Brazil

Key points

1. Analyze your infrastructure
2. Fix critical gaps
3. Build risk scenarios
4. Analyze your system's response
5. Check your suppliers' capacity
6. Develop a command infrastructure
7. Assign and train staff accordingly
8. Check with HR
9. Keep a contact list
10. Repeat and refine

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IO's roadtrip to New Jersey

Drew Amorosi takes us on a tour of IO's colocation facility in Edison, New Jersey – the world's largest modular data center

Drew Amorosi
US Correspondent
@drewamorosi

If you head north on the New Jersey Turnpike, somewhere between exits 9 and 10 the scenery begins to transform from tree-lined monotony to industrial grit. Here you will see brownfield settings worthy of silver screen mobster meets. Off exit 10 in Edison you will find a large steel monolith to industrial manufacturing – one that blends with the landscape of warehouses and oil refineries. The building, formerly a printing plant for *The New York Times*, is now a symbol of the region's industrial transformation.

IO operates data centers on three continents, but with 718,000-sq ft of floor capacity, its colocation facility in Edison is the world's largest modular data center. It went live for customer use in April 2011 and is IO's largest facility to date. From finance to media, the list of clients that contract space in this sprawling facility includes some of the most recognized brands operating in the New York metropolitan area. Ryan King, a sales director at IO, gave me a tour.

Power, cooling and connectivity – it's what IO provides to customers at its co-location facilities. "That's it," King contends.

IO is known for its prefabricated data center modules; however, a few weeks before my visit, it announced it would split into two companies in early 2015, spinning off a new brand called BaseLayer that sells the IO.Anywhere modules. Rebranded as BaseLayer Edge, the new firm manufactures prefab units for IO's facilities and elsewhere.

The New Jersey data center is divided into quadrants. The available floor space in one of these sections is already filled out, while the active quadrant, DC2, is slightly above halfway from maximum occupancy. King says the entire facility would be contracted out in about three years, at the current sales pace.

Setting up the initial infrastructure in each module is one of the few times customers visit the facility. "Once they move in, we don't see them often, because most of this stuff is remotely accessible." Customers on its preapproved list of visitors are given 24/7 access to the facility. Because IO doesn't monitor customers' equipment, the company's responsibilities comprise the four basics: power, cooling, network and security. "I don't need a bunch of people behind a desktop monitoring servers," he says. "We can run a pretty lean crew based on our OS."

"It's a build-on-demand model," says King, as we continue our aerial survey of DC2. All the components a customer needs to run a data center are built into each module, and when those customers need to expand capacity, additional modules can be added on "like a giant Lego kit," he explains.

New modules are built and shipped from the company's BaseLayer factory in Chandler, Arizona, and are the only prefabs used in IO's modular data centers. The units are cooled via a bi-directional chilled water loop that runs around the bottom of the units. When compared with its flagship Phoenix, Arizona, facility, which is a combination of raised-floor and modular, the company found it could lower its power usage effectiveness (PUE) to 1.3-1.4 versus a traditional raised-floor PUE of 1.7. "You are talking about saving hundreds of thousands of dollars on cooling just by using this modular approach," he says.

The facility is powered by local utility PSEG, and IO has its own 100MW-capable dedicated substation located behind the building; it is also connected by redundant loops from a nearby switching station.

The facility was operational when Hurricane Sandy struck in the Autumn of

When customers need to expand capacity, additional modules can be added on - "like a giant Lego kit"

2012, and King says it had "zero issues," despite widespread power outages in the region. Although the juice continued flowing to the data center in the storm's aftermath, King says IO pitched in when its utility asked it to switch to generators to help ease demand.

At the end of each row of prefab units are modules that deliver power from cables running along suspended trays over each row. Network fiber cables are also delivered along the same overhead tracks.

A customer's newly purchased BaseLayer module would appear, upon delivery, a rather barren closet on the inside, as King takes me through a unit devoid of IT kit. It comes equipped with a few standard features, such as surveillance cameras, built-in power distribution unit, fire-suppression system, early warning smoke detectors, power outlets, LED lighting, and leak-detection for air handlers. A customer would bring in their own gear, cabinets and racks.

King points out that, unlike the traditional raised-floor data center, the module is a six-sided, self-contained box. It cannot be accessed without authorization from above or underneath. For the purposes of water damage, if IO's building had a ceiling leak, it would not penetrate the module. And fire hazards are self-contained within each module and will not spread to others. "From a security perspective," he adds, "it's the most secure solution available on the market."

When it comes to network security, it's up to the client, but IO does provide some monitoring for distributed denial-of-service (DDoS) attacks. This was confirmed by Lenin Aboagye, IO's director of IT, cloud and product security. "We have implemented an analytics engine within our facilities that will monitor network activity at all points of ingress," he says. IO monitors traffic at each of its facilities to establish a baseline of what's normal. "This helps us increase our response time to any potential DDoS-related attack by measuring any spikes against traditional network performance trends," Aboagye says.

One reason for locating in New Jersey is because "it's not New York," says King, "and it's close enough to the exchanges that we can still get high-latency bound customers." Two of those customers are Goldman Sachs and the US Securities and Exchange Commission (SEC). Another reason is the cost of power, which is much more expensive in Manhattan and the surrounding boroughs.

"A lot of customers have no idea exactly what they want; they just know they need to do something. Some of them have a closet full of gear coming up on a refresh, and they need to figure if they are going to refresh that gear, outsource it to the cloud, or co-locate," he explains. "So, a bit of consulting work goes into getting a client into our facilities."

451 Research defines a prefabricated data center module (PFM) as a technical facility that is created using one or more standard structural building blocks prepared in, and transported from, a factory-like environment for final on-site integration. The analyst firm's research predicts a 52% CAGR for the PFM market between 2011-15, increasing from $460m in 2011 to $2.465bn in 2015.

Historical questions about the reliability of modular have lingered, says Daniel Bizo, a senior research analyst with 451. He says, however, that mission-critical deployments without a record of major issues have been operating for years. In 2000 there were two or three vendors in the prefab market; today there are approximately 50, offering hundreds of designs, many with a proven track record through years of operational experience.

"Prefabricated modules are nothing new in the industry, as they have been around for almost a decade, but they are just recently gaining momentum with data center operators," he says. "Now they are focusing more on efficiency. Historically, it's been about speed, but I would also point out benefits such as predictability of operational performance, faster commissioning, and better cost controls. IO is focusing on prefab for these reasons."

Bizo points out that IO was an early mover in the prefab market. "What makes them a leader is that when they compete against data center operators using the traditional approach, with monolithic sites, their modular colocation model allows them to manage their cash flow more tightly and expand into new markets more quickly. The modular product lowers the risk of their business plan. They don't need to build out their sites based on a forecast for the next three or four years; they can instead build for the next 12 to 18 months given that their sites have available capacity to absorb additional units."

The analyst concludes that IO has done a superb job raising the profile of the modular trend. "While this might seem a lightweight reason why IO has an advantage, you must realize that this segment is still immature, and even the large vendors are failing to use sophisticated marketing around the products, opting instead for more of an engineering focus," he notes. "They are not as good at articulating the finer points around modular, and this is where IO got a jump on many of its competitors," says Bizo. "451 thinks that prefab – along the lines of what IO is doing – is the first generation of the industry."

CEEDA goes global

The CEEDA accreditation scheme aims to make the world's data centers more efficient. *Paul Mah* tracks its progress

Paul Mah
South East Asia Correspondent
@PaulMah

Green IT and energy sustainability are coming to the forefront of corporate awareness around the world. Coming with that is a need for schemes to improve on energy use – and the CEEDA scheme has begun a global expansion.

Initiated in the UK, the Certified Energy Efficient Data Center Award (CEEDA) has already issued certification in the US and Australia, but has now extended into new territories – Asia and Latin America. The first Latin American certification has gone to Kio Networks in Mexico (see "CEEDA in Mexico", opposite), while in Asia, CLP Power in Hong Kong got the first Asian CEEDA Gold.

Identifying the green data centers

In a bid to differentiate themselves from competitors who may have made less effort towards implementing energy efficient practices, data center operators are seeking to get their facilities certified under relevant accreditation schemes.

Alongside CEEDA, other schemes include the IDA-BCA Green Mark scheme for data centers, along with LEED and BREEAM for efficient buildings, but CEEDA stands out for a specific focus on data centers and operational efficiency.

One recurring topic brought up in discussions on green IT is the dichotomy that exists between facility managers who operate data centers and IT professionals managing

the IT hardware and software stacks that operate within them.

Specifically, the priority of the former revolves around ensuring that the physical data center can efficiently and reliably deliver power and cooling to the relevant aisles, while IT professionals are concerned primarily with the uptime of their services, with scant concern for topics such as power consumption and the energy impact of the underlying software.

Yet the way most data centers currently operate offers little or no incentive for the two disparate groups to collaborate, and IT departments don't typically take factors such as energy efficiency or sustainability into consideration when comparing different service providers.

Moreover, many of the existing standards that touch on energy efficiency measures stop at the infrastructure level.

CEEDA seeks to change that by adopting a holistic view of energy efficiency, including mechanical engineering and electronics, as well as the full spectrum of underlying IT hardware and software.

And with prerequisites that include coherent communication between IT and engineering, it could perhaps even be a step towards bridging the yawning gap between these two historically hostile departments.

Focusing on what matters

One thing that stands out about CEEDA is how the framework seeks to cater to all, including large data center operators, as well as smaller colocation providers and even individual enterprises.

A small organization operating within a mixed-use premise is not disadvantaged either; CEEDA offers advanced assessment criteria to take energy saving measures into consideration - such as when heat generated by the data center is applied to reduce the heating load elsewhere in the building.

It's widely recognized that data centers can be run at higher temperatures, and most servers can continue functioning without detrimental effects in such an environment, but few operators have actually carried this out in practice.

Where other frameworks often do not directly address this facet of energy saving, an extension of operating temperature and humidity ranges is actually recognized within the CEEDA framework.

Indeed, this was precisely what CLP Power Hong Kong (CLP) did at its data center. "Despite the fact that Hong Kong is located in the hot and humid subtropical region, CLP Power's data center has successfully demonstrated the exemplary use of free cooling," said Andre Blumberg, director of information technology. CLP is the first in Asia to be awarded a Gold level under CEEDA.

Finally, the extensive list of criteria also ensures that it is not just another certification that can be obtained by a select group of specialists toiling away behind the scenes. With requirements that ran the gamut from IT to MEP (mechanical, electrical and plumbing), CEEDA necessitates participation from multiple levels of an organization, automatically making it a company-wide effort to go green.

"The internal impact of the CEEDA program on general management and the CIO has been very positive," noted Daryl Yeoh, the data center chief engineer at Westpac Banking Corporation, in a report seen by *DatacenterDynamics*. "Development of a coherent energy efficiency policy has been raised to the highest levels of the company."

Aside from CLP, it is understood that at least two other organizations are in the final stages of obtaining their CEEDA certification in Asia. Elsewhere, a couple of organizations have been awarded a certification in Europe. ARM Cambridge and the University of St Andrews each having attained a Gold level result, and both have since re-certified.

Where going green used to reside squarely within the domains of the data center operators or the largest cloud service providers, organizations are increasingly recognizing the role that IT plays in energy efficiency. This means that the onus is now on individual organizations to do more in reducing their energy expenditures, and by extension their carbon footprints.

"Data centers are extremely energy-intensive facilities," said Keith Murray, the regional vice president of data center solutions, APJ for Schneider Electric in response to a query from *DatacenterDynamics*.

According to him, electricity accounts for more than 50 percent of the operating expenditure in a typical data center in Singapore.

"CEEDA and other similar certifications and standards such as BCA-IDA Green Mark and SS546 will definitely help companies save operating costs, hence, more incentives for them to opt for greener data centers and to maintain the sustainable operation," s aid Murray.

CEEDA in Mexico

Mexican service provider Kio Networks has won the first CEEDA awards in Latin America. A Gold plaque was awarded to Kio 5/6 in Sante Fe, while DataPark Tultitlán, Phases 1 and 2, run by Kio subsidiary redIT, received a Silver award.

After thorough checks by independent assessors, Kio is the first provider to win Gold on its first try.

Both awards were presented at a ceremony in Mexico City, where Kio's director of data center infrastructure, Dax Simpson, said that the awards would allow Kio to demonstrate availability, efficiency and customer value.

"Kio Networks is very concerned with efficiency issues," said Simpson (left) "Where many talk about it, we decided to act."

What is CEEDA?

Compared to internationally recognized standards such as LEED, BREEAM, ISO 50001, CEEDA stands out for its single-minded focus on operational energy efficiency. In fact, an overwhelming 95 percent of the assessment criteria are devoted to operational energy efficiency, compared with around 35 percent for LEED.

At its heart, CEEDA is an assessment framework that comprises energy efficiency best practices in IT, MEP and management, and a set of validation procedures for various performance metrics. It enables organizations to improve the energy efficiency of their data centers and demonstrate their commitment to constraining carbon emissions.

CEEDA consists of a series of progressively more advanced energy efficiency best practices, which are authenticated by an assessor. The certification period is two years, with an impact assessment occurring one year into the cycle. Meeting successively higher levels of compliance culminates in the attaining of Bronze, Silver and Gold certifications respectively.

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It takes courage to re-imagine the data center. *Peter Judge* meets people who are doing just that

FROM THIN AIR

There are a lot of cool things to do with heat reclamation - and eventually water reclamation

At *DatacenterDynamics* we like new data center concepts. There are established ways of doing the job of racking and stacking IT kit. They work well enough. But there are people who want to do it differently.

Some of these ideas fly and some don't, but we love to hear the concepts and meet the people who want to tear up the rulebook.

Take Vapor IO. A start-up with its roots in the Open Compute community, Vapor wants to do away with rows, take your racks and arrange them in rings. Instead of a hot aisle, you have a hot column.

Sounds crazy? Maybe, but Vapor is led by Cole Crawford, whose credits are enough to get our attention. Crawford helped start Openstack, the open source platform which is reshaping cloud services, and immediately prior to Vapor he was Executive Director of the Open Compute initiative, which is redesigning data center hardware, and sharing the results with the whole industry.

He's also no stranger to the idea of a leap of faith: his hobby is free-fall parachuting.

So what is Vapor up to, and why should an industry so heavily invested in rows of racks believe in it?

The cylinder or "Vapor chamber" emerged because a row of racks creates a problem. One side is hot, the other is cold, and it's a tough job to manage those temperatures and marshal the airflows. Reconfigure those racks in a ring, and the heat output is automatically contained in a vertical column. Add one fan at the bottom, and you control the rate air is drawn through the system.

Vapor's first products bring together six 25kW racks, in a cylinder that can be placed on a concrete floor. It's marginally taller than a 42U rack, but has no great environmental demands. It doesn't need a raised floor, but is designed on a base plate so existing floors will bear its weight.

Sumerian:
capacity planning in the cloud

Finally, cloud computing may have solved capacity planning - and not by replacing your data center with fairy dust. UK-based Sumerian has a more realistic idea - a cloud-based service that does your capacity planning for you.

You upload details of your current IT estate, and you get back capacity projections and "sunburst" visualizations of any "what if" variations you want to run. All without having to use a lot of in-house expertise, promises Sumerian CTO Peter Duffy: "Our CPaaS shows customers exactly what capacity headroom they have now across their IT estate and makes it easier to accurately forecast for future IT spend."

The system can draw in information about multiple environments, including VMware and HyperV, as well as linking to existing tools such as CA Unicenter and Tivoli (See p11)

Rex Computing:
tiny supercomputers

The most striking thing about Rex Computing may be its 17-year-old founder - till you look at the technology. Thomas Sohmers is 18, and dropped out of high school to build ARM-based supercomputers.

Rex's 3W Neo chips have 256 cores, 128k of scratch memory and 16Gbps links to neighboring cores. Sixteen Neos fit on a single 1U node, and 90 nodes fit into one Open Compute rack, giving a 369,000 core, 360GFlops supercomputer that burns only 7.2kW.

Coolan:
big data predicts failures

Data center hardware can have strange performance tics, but you won't see the patterns unless you have thousands of servers and hard drives in your site. Coolan thinks everyone can gain access to reams of performance data, if we share the data.

A software agent checks your hardware, monitors the performance of the whole data center, and uploads anonymized data to create a huge analytical resource, which can predict failures, and rank vendors according to their hardware's performance, in different situations.

"Understanding failure is the first step in building better hardware" says founder Amir Michael.

Iceotope
solid future for liquid cooling

In years to come everyone will be doing liquid cooling, says green IT maven Peter Hopton of UK-based Iceotope.

Iceotope's recently-launched Petagen system immerses the electronics in inert coolant, with each blade carrying its own sealed tank of a heat absorbing fluid.

The racks contain a pluggable water circulating system that removes heat, which can then be used to heat offices.

"Most liquid cooled systems can only handle mid-low density IT, the kind which simply isn't suitable or used by the most advanced HPC or data centre facilities," says Hopton.

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"We prefer a greenfield site, with a slab floor, but people with a raised floor can adopt this without fear of damage," says Crawford.

This idea is based on efficiency, and Crawford promises the chambers will give anyone a PUE of less than 1.1.

But almost incidentally they also solve the modular data center conundrum, he tells us: "It's one thing to take a shipping container for additional capacity. In my opinion it's a far better prospect to add 150kW at a time in 9ft squared of space."

And the cylinder is just part of the picture. The real secret sauce is what Vapor calls a data center runtime environment (DCRE), a software and hardware combo, including bus bars and connector designs, to manage the physical structure.

Crawford doesn't use the term, but DCRE could be a new approach to the problem that DCIM (data center infrastructure management - see p38) has been trying to solve for many years. True to its roots, Vapor IO will release a free-to-use open source version (Open DCRE) while developing its own licensed version, called CORE.

"We've created what we believe is the world's first and most open out of band management framework," says Crawford.

Open DCRE will be released under the Foundation's reciprocal licence. "Anyone who modifies it must contribute those modifications back," says Crawford.

CORE and Open DCRE are not limited to Vapor chambers or Open Compute hardware.

By licensing a design, Crawford hopes to get other manufacturers involved. In some ways it's like the model adopted by silicon chip designers like ARM Holdings.

More importantly, Vapor has orders. The first products will ship to Union Station Technology Center in South Bend, Indiana.

Another early backer, Vantage Data Centers, is placing Vapor chambers in its traditional data centers. COO Chris Yetman says: "We were surprised to discover that there is very little retro fitting required to support all the advantages it brings."

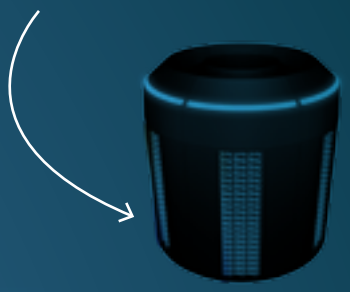
The first systems will be built with "Wedge" Open Compute racks, but in future chambers could be built with any system that allows all I/O and connections to be placed on the front panel. No one is climbing inside the hot cylinder to rewire or configure anything.

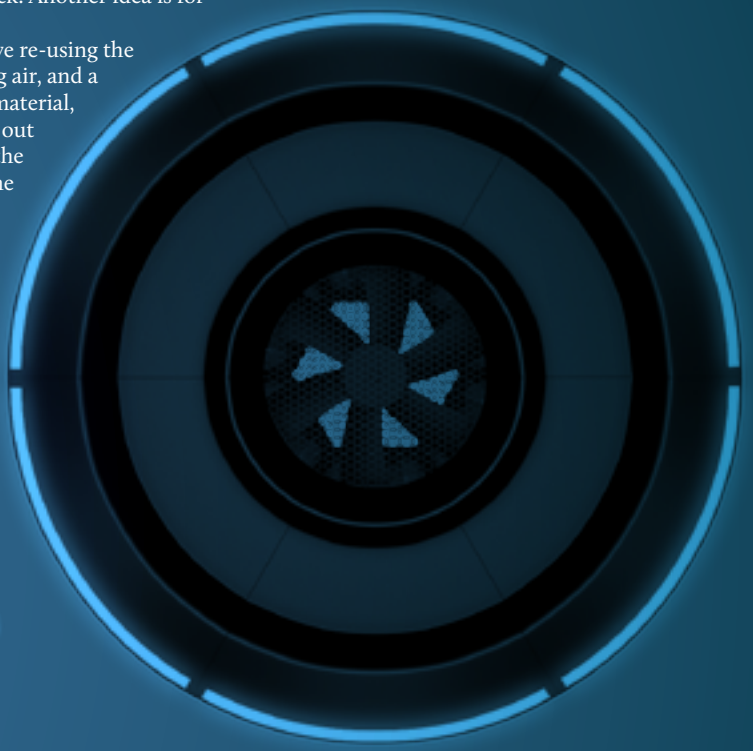
The next rack design to be tested will be VMware's EVO Rack. Another idea is for higher-power racks.

Other plans involve re-using the heat in the circulating air, and a novel hydroceramic material, which will pull vapor out of the air, managing the humidity as well as the temperature.

"Your plenum can pull the hot air to a greenhouse, in winter," says Crawford. "There's a lot of cool things to do with heat reclamation - and eventually water reclamation."

The Vapor chamber





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Lively up yourself, Mr VC

Bill Boyle asks if we are floating in another bubble and if venture capital firms are risking our money once again...

It is hard to recount to those who weren't personally involved in the horror of those short months between 1999 and 2000 just how traumatic the dot-com bust was.

I was a director of a go-getting communications agency bursting to the Soho seams with dot-com clients who we had chased down and begged to work for. We were so cocky and flush with fictitious money that we flew all of our staff to the Amalfi coast in Italy, where we had a weekend kick-off event that made a Rastafarian rally seem like a High Church wake. Two days after we got back, the crash began. Two thirds of our clients went bust by Wednesday, and we were up to our rolled-up shirt sleeves in redundancy notices.

> *We had a weekend kick-off event that made a Rastafarian rally look like a High Church wake*

The money being pumped into startups today is growing. I'm thinking of startups such as Splice Machine, the Hadoop transformer, which raised $19m from Mohr Davidow Ventures; Igneous Systems, which raised $26.6m, led by New Enterprise Associates (NEA), which is going to blow apart data center and cloud storage; and Tintri, which raised $135m on a $600m valuation. Tintri offers flash-based enterprise storage for the data center.

Or how about Ener.Co, which pulled in a modest $500K in seed money last year. The New York-based company already brought home $2.6m in four rounds from SPK Partners and Odin Trust of Bermuda. It is going to be a leader in environmental and energy optimization for existing buildings.

The amount of investment made by European venture capital firms hit a 12-year high as €7.9bn was invested in 1,460 deals in 2014, up one percent in dollar value from 2013, according to a new report from VentureSource. This was the highest amount invested since 2001, the end of the US tech bubble, when €10.6bn was invested. The two top winners for VC funds this year so far are Adyen BV, a payments company from the Netherlands, which raised €199.6m, and Verne Global, a developer of energy-efficient data centers from Iceland, which raised €78.2m. According to Vatornews, when grouped by country, the UK came out on top of VC largesse this year, with 21 percent of the deals, and 30 percent of the amount raised in Q4, followed by Germany, which saw 20 percent of deals and 18 percent of funding. France had eight percent of deals and 12 percent of funding.

The majority of investments made in 2014 came from seed or early stage rounds, accounting for 858 of the 1,460 deals, or 59 percent. Only 249 were later stage. At the height of the bubble, we were toasting US venture capital awards of $100bn. During the past decade, that figure has been no larger than $30bn per year. This year they may exceed that by $10bn. While that's a good year for venture capital, it is nowhere near the levels of 1999 and 2000. So while Marc Andreessen (remember him?) has been complaining about startup burn rates, others are saying that fewer startups are failing completely.

But the fundamental truth is that there are more startups than ever and, as I demonstrate here, they are producing real products and real value. The US still dominates, but Europe is making a big effort to innovate.

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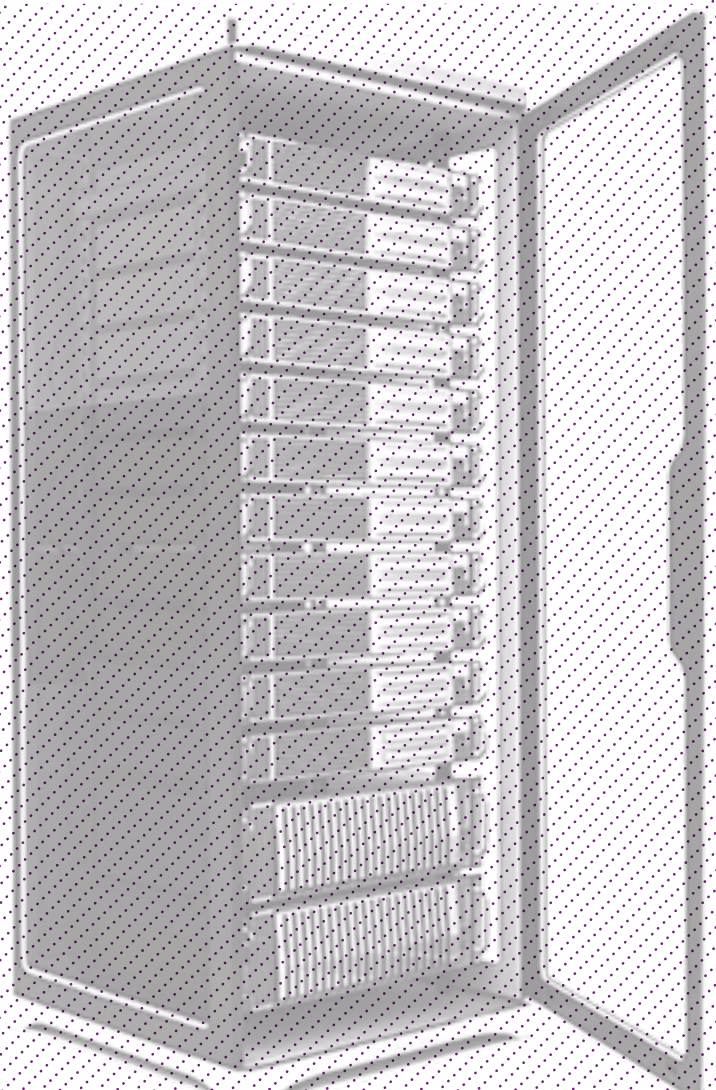
DatacenterDynamics

Guide to

Cloud & Colocation



Inside

III Intro

IV Cloud & Colocation

IIX Telecity & Interxion

Data center solutions for cloud & services providers

Growth of the Co-location Market

Today enterprises are turning to cloud and co-location providers under increased pressure for data centers to be fast to deploy and flexible to adapt to changes. For this reason, the colocation market is expected to grow around 15 percent globally for the next 3 years.[1]

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[1] 451 Group, Research estimate - August 2014

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Bill Boyle
Global
Managing Editor
@BillBoyleDCD

Surface tension

This cloud and colocation supplement examines the tension between a final step many corporates used to take – that of moving out of the corporate data center in the basement into an off-premises facility—and a new potential step away from that—locating all data in a cloud. The reply shows strong support for colocation but cloud is the goal.

The total number of data centers deployed worldwide, according to best estimates, will peak at 9m in 2017 and begin to decay slowly. This shift has been caused by the decline in both internal data center server rooms, which started in 2016, and internal server closets which started in 2017.

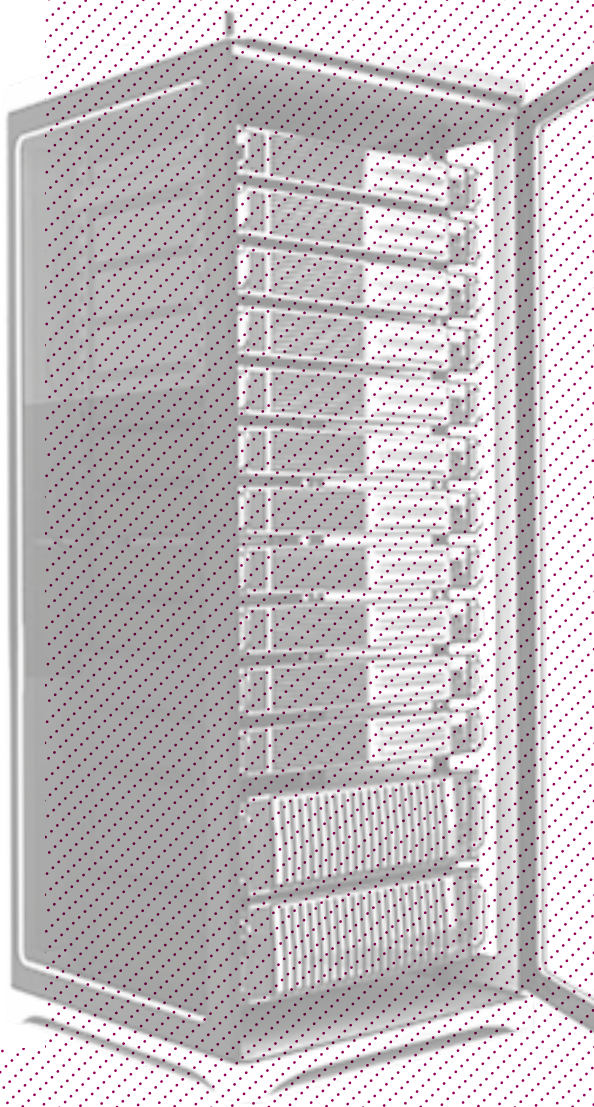
IDC estimates that total worldwide datacenter space will continue to increase, growing from 1.58 billion square feet in 2013 to 1.94 billion square feet in 2018.

The low-end data centers will be the first to dry-out and die as more and more organizations stop managing their own infrastructures because of cost pressures from their boards. They will make more use of on premise and hosted managed services for existing IT assets, but turn to shared cloud offerings in service provider data centers for new services. The slow, inevitable tramp to the cloud has begun, staved off by medium-sized companies who will keep Hybrid-IT alive.

DCD Converged is making efforts to explore the major data center verticals with its new US conference programs in 2015. On 27/28 October we are holding *DCD Services in Chicago*, a conference squarely aimed at the Outsourced Infrastructure Services (OIS) ecosystem. This event will pull together senior business and technical representatives from the world's major colocation, cloud, telcos and other data centre and managed service providers to discuss the direction of this rapidly growing data center segment. The agenda will focus on operational efficiency, investment, interoperability and customer needs. More details at *www.dcdconverged.com*

•

Bill Boyle - *Global Managing Editor*
@billboyleDCD



Here comes the rain again

Cloud has introduced fundamental change. But does that mean 'cloud first' is the ultimate goal? *Bill Boyle* asks where this leaves colocation

39.7%
Growth in outsourcing since 2012

97%
Growth in power sold in Amsterdam since 2013

153
Increase in MW availability across Europe last year

No matter which side of the cloud versus colocation debate you are on, colocation is still an expanding market. DCDi analysts estimate a growth of 18.3 percent in the number of facilities available since 2012, a growth of 39.7 percent in the amount of space dedicated to outsourcing, and a growth over the same period of 43.1 percent in the use of power. Peter Feldman, CEO, Datagryd Data Centers, says: "The colo world is in good health. Cloud ascendency only fuels the growth as clouds have to form somewhere first before they ascend."

Global real estate advisor CBRE claims that 22MW of customer IT power was sold in Amsterdam during 2014 (see pages 7 & 14), a 97 percent increase on 2013. This figure also represents a third (33 percent) of the European total for the year, the highest across the major markets, and the first time any market has outperformed London since 2004.

Mitul Patel, associate director of research, EMEA data center solutions, CBRE, says: "Amsterdam experienced a record year for colocation take-up in 2014, underpinned by many larger transactions. New occupiers, namely from the technology, media, telecoms (TMT) sector, have been responsible for bringing most new requirements to market" (see p14).

> *The colo world is in good health. Cloud ascendency only fuels the growth as clouds have to form somewhere first before they ascend*

Growth in cloud technology continues to impact the market, with 80 percent of transactions deriving from the technology, media, telecoms industries alone. This, alongside improving corporate confidence, is driving new interest for data centre services from the sector as dedicated cloud providers require more capacity.

Andrew Jay, EMEA head of data center solutions at CBRE, says: "Last year ended with a record 153MW of availability across the major European markets. This growth can be attributed in part to new facilities opening, most notably in London and Frankfurt. London remains the most sustainable market in Europe with its position as a global financial hub, and Frankfurt remains the Eurozone's financial powerhouse, providing high levels of connectivity. It is leading the way in data protection across the EU.

We expect this growth trend to continue in 2015, with a number of new data centers in the pipeline, including Infinity's proposed scheme at London Stratford and Gyron's campus at Hemel Hempstead.

He continues: "At a time of increased competition in the market, the recently announced acquisition of Interxion by Telecity is a timely consolidation of two major players in the industry."

In the UK cloud adoption is still sluggish, according to KPMG's 8th annual *Service Provider and Performance Satisfaction* survey, which reveals that 71 percent of UK organizations are spending a mere 10 percent or less of their IT budget on cloud services. Many organizations are also continuing to rely on tried-and-tested outsourcing models, and the survey shows that favored destinations for IT support services remain as follows: India (51 percent); South Africa (eight percent); and Poland (eight percent).

The top three reasons cited by UK C-suite respondents centered around data location, security and privacy risks (26 percent), concerns over regulation and compliance (16 percent) and cynicism around the ease with which cloud services can integrate with legacy IT systems (15 percent).

However real these concerns are, they are all superceded by the overwhelming economic advantages that cloud adoption provides. Jason Sahota, director at KPMG's Shared Services and Outsourcing Advisory team, says: "Despite widespread acceptance that cloud services offer access to the latest technologies, and make IT more accessible, adoption remains relatively sluggish. While concern about the security risks surrounding new technology is understandable, it may also be disproportionate, as the cloud option is just as safe as other outsourcing solutions. Of course, investors and stakeholders will welcome caution on the part of the buyers, but they also want to see innovation."

The emergence of the cloud player

Three types of players are likely to emerge in the cloud market.

1

Market leader
This provider has a dominant market position, to the point that it is widely estimated and accepted that it has multiple times the capacity of the combined next dozen and more competitors.

2

Contenders with load
These providers are in the cloud business, either by the nature of their main business, or by business divisions that are native to the cloud or need the cloud to operate. These vendors have a natural growth engine to their cloud capacity, thanks to the underlying dynamics of these businesses.

3

Contenders with little or no load
These providers are typically either "pure" cloud providers, operating with the sole purpose of growing their cloud business, or they are the traditional suppliers of IT resources to enterprises from a server, networking, storage and connectivity perspective.

The continued use of owned data centers will normally be for strategic reasons, notably if the company feels it needs to have full control of the asset and everything in it for reasons of security. However, this will be increasingly rare.

The gradual shift away from owned to colocated data centers is bound to continue apace, particularly given the growth in service quality at the big colo players. Meanwhile firms will drift to the cloud, including public cloud, as international and European regulations tighten up on usage and transparency of data, and security issues are solved. Outsourcing will not stop while economic pressures continue.

Mike Hagan, vice president Schneider Electric, says: "We see some interesting market movements at the moment. There is an accelerating trend for a mix of clients in the middle of the market to move to off premise providers. This movement drives all providers (both large wholesale and retail) to look at the type of data centers they build. The result is many multi-tiered data center (MTDC) organizations are asking Schneider for highly flexible and granular designs that allow them say "yes" to any prospective client regardless of what their risk profile may be. The fact is not everyone needs 2N. We see trending to environments where N+1 or even N works. Additionally some wholesale providers are adding more managed services offerings to broaden their appeal to the mid-size users. This reflects increased competition."

Power and space are still very much in demand by large enterprises. The colo world is not in crisis

Schneider's data center service provider team sells to owners and operators of cloud and MTDC data centers. This market segment remains strong for Hagan's team with North American revenue of $500m in 2014. The division has seen 15 percent year on year growth since its inception in 2013.

Hagan emphasizes the breadth of offerings vendors now have to provide: "Our objective is to continue to provide our clients with solutions and services that lower cost, enhance speed of delivery and improve flexibility and granularity while aligning with uniquely different risk profiles."

Sandra de Novellis, director, Telehouse said: "Colocation and cloud can complement one another, colocation networking is enabling new business models and supporting the move to the cloud and hosting". Although she sees a continual ascent for both cloud and colocation, she warns: "Security issues have slowed down the rate of adoptions. From our global perspective, power and space are still very much in demand within the large enterprise environment so clearly the colo world is not in crisis"

Hybrid cloud allows enterprises to utilize some of their existing pieces of IT infrastructure. Hybrid cloud will be attractive to those enterprises still rolling out IT with the need to run infrastructure that cannot be written off until its accounting value is zero.

Michael Boccardi, president and chief executive, Cervalis LLC said: "From our perspective, hybrid IT, a model that incorporates colocation to cloud and every service in between, is what today's and tomorrow's solutions look like. Cloud can support business growth since it can scale quickly. However, there will always be a need for colocation. And while there's no shortage of colocation providers, there are few that can deliver end-to-end Hybrid IT well."

Holger Mueller, principal analyst at Constellation Research, said in a recent report: "Given the overwhelming leadership of one cloud vendor, whose capacity is ranked at multiples of the combined capacity of its competitors, the market reality for all other cloud vendors will be challenging in 2015."

Mike Hagan is suitably careful about predicting cloud growth: "I suppose it depends on what you mean by cloud. Cloud means different things to a lot of people. Regardless of what it means to individual users, cloud can be delivered both on and off premise."

As an example, he makes the usual link between cloud and a reduction of capital expenditure: "Many mid-size cloud providers use third party MTDC sites rather than build their own facilities. This reduces capex expense and allows cloud companies to focus on their core value rather than building data centers."

All IT roles will change significantly in coming years, many disappearing in the

15%
Year on year US cloud growth

same way punch card reader technicians, tape operators, data entry specialists and typists did. "Perhaps IT will disappear and become a strategic function that surveys the internal IT landscape, overlays it with general trends and formulates an encompassing strategy. Database administrators will no longer operate onsite, but become database architects making sure the enterprise information is stored and operated in the right databases. Network engineers will largely disappear as enterprises will operate vanilla TCP IP networks, most likely wireless networks, and the operation of these networks probably will be outsourced."

Some of these professionals will become procurement specialists who find, procure and negotiate network contracts for the enterprise. Storage specialists will undergo a similar radical transformation, which could take the form of increasing specialization within the field.

With data stored offsite, database admins will become architects, and some will become 'data retention experts', as it will get more difficult but at the same time more strategic for enterprises to be sure where and how they store and purge their data.

The most drastic change will be for today's hardware infrastructure and virtualization staff. As there will be no more hardware onsite, these roles will no longer be required, and professionals in these areas are likely to continue their work only at cloud providers – or they will have to switch their expertise.

The IT function in 2025 will be leaner on the headcount side, but overall IT spending as well as the strategic importance of IT will both grow. Whether today's' IT leaders have vision to plan for the future without huge disruption is another matter.

Mueller is adamant: "The cloud is ushering in fundamental changes to the way organizations create, operate and consume enterprise software. And the influence of the cloud on next-generation business models and next-generation applications grows from year to year. The year 2015 may well mark the year when all major enterprise software vendors will adopt a "cloud first" strategy, delivering innovation to the cloud first – and maybe stopping the delivery of innovations to on-premise systems. It appears unlikely that on-premise net new installations will play any significant role outside of the public sector."

The future is cloud, the ultimate integration of compute power and strategic management. It is growing, and like other major disruptors it looks like we are not fully prepared.

We may be left singing in the rain once more. ●

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Telecity-Interxion: A Winning Combination?

Telecity and Interxion have announced they plan to tie the knot. *Sacha Kavanagh* thinks it's a match made in heaven

Three days before Valentine's Day, on 11 February 2015, European data center operators TelecityGroup plc and Interxion Holdings NV announced their intention to merge – subject to agreement and approval from directors, shareholders and regulators.

Both firms were founded in 1998 and are competitors with an equal number of data centers in the same number of countries. Interxion is present in one more city than Telecity and has a higher level of capital expenditure (although the latter does not reflect Telecity's acquisition costs), but in terms of other indicators Telecity is the larger of the two companies (see table, next page).

Both companies have a rolling program of expanding existing data centers and building new facilities at existing sites or in cities already served, in order to meet customer demand. However, while Interxion has been content to stay in its original 13 markets and has grown purely organically, Telecity has expanded into new markets via acquisition, in addition to building out capacity at its own data centers.

Both companies are maturing in a growing market, and both need to formulate strategy to capitalize on current market trends and drive future growth. They view a merger as the best way to accomplish this, as it will enable them to respond to and take advantage of the transition to cloud services and enable their customers to do the same. At the same time delivering sustainable returns to their shareholders. The merged company will have fresh leadership to take it forward, which is particularly important for Telecity, which has been effectively rudderless since the announced departure of its CEO, Mike Tobin, in August 2014.

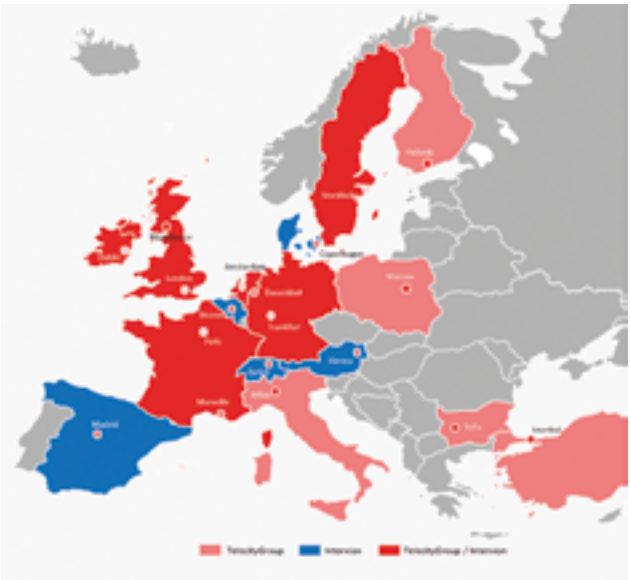
	TelecityGroup where content meets connectivity	interxion
No. of data centers	39	39
No. of customers	2,500	1,400
Available customer power	112MW	96MW
Fitted out space	110,000m2	89,000m2
Market capitalization	€2.34bn	€1.73bn
2014 revenues	€476m	€373m
2014 adjusted EBITDA	€224m	€161m
2014 EBITDA margin	47%	43.1%
2014 capital expenditure	€167m	€237m

Source: DCD Intelligence based on data from Telecity and Interxion

The proposed transaction is structured as an offer by Telecity for Interxion, with Telecity shareholders owning 55 percent of the combined company, and Interxion shareholders 45 percent. The two companies have agreed not to solicit or discuss alternative proposals until 4 March 2015, at which time they expect to enter into a binding transaction agreement.

Customers of the merged company will benefit from an expanded footprint and enhanced service offering. Telecity customers will gain access to Interxion's gateways in Madrid and Vienna, while Interxion customers will benefit from Telecity's coverage in Helsinki, Istanbul, Milan, Sofia and Warsaw. A combined Telecity-Interxion will be the largest data center operator in Europe, in terms of both revenue and geographic footprint.

Telecity and Interxion both focus exclusively on Europe, which in DCDi's opinion is at the same time a strength and a weakness. While it gives them broad coverage and in-depth knowledge and understanding of the markets in which they operate, the lack of a global presence limits their ability to attract multinational and foreign customers, and provide intra-region connectivity services. The same will be true of the combined company, which will still be far smaller than its competitors with global operations. However, it will have greater access to capital markets and a lower cost of capital, which will put it in a better position to move beyond Europe and compete more effectively with rivals Equinix and Telehouse.



International coverage

The merged Telecity-Interxion should be able to deliver new, better and more services more effectively than either company could individually, potentially enabling them to offer services at better rates than the competition and to roll out services more quickly. The merged company will also have a greater focus on managed services than either of its predecessors, delivering more services to customers and a profitable service offering to the company. Whether the removal of a large competitor from the market will lead to price rises for basic colocation services remains to be seen.

Telecity customers will benefit from Interxion's 'communities of interest' approach, whereby businesses, suppliers and customers are brought together in its data centers, enabling them to locate infrastructure close to their partners in order to improve performance and drive down costs. Interxion customers will benefit from the broader Telecity customer base being in these communities. The merged company will be able to build on the best practises of the individual companies, enabling a higher EBITDA margin than is currently achieved by Interxion, and a higher revenue per customer than Telecity can claim.

Customers will have a single partner across multiple markets, and we anticipate that the merged entity will adopt and build on Interxion's customer service model, including a single master service level agreement (SLA) across all its operations, a single log-in customer portal and the London-based European Customer Service Centre (ESCS). This should mean a better level of customer service, for Telecity customers in particular.

In brief, the combined company will have eliminated a key competitor in Europe, be able to expand more cost effectively, and have a strong leadership and strategy for future growth – both within and beyond Europe. Telecity has a long acquisition history, auguring well for a smooth transition. Assuming the merger goes ahead and the merged company executes on its promises quickly and effectively, it would seem to be a win-win scenario for the customers and shareholders of both companies. ●

Sacha Kavanagh is an associate analyst with DCD Intelligence. This article is an edited extract from ***Telecity + Interxion = ?****, a DCD Intelligence report analyzing the deal and its implications for customers, shareholders and the competition*

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Don't believe cloudy statistics

You can use figures to prove anything, warns *Nick Chase*

In February, research firm Gartner came out with a survey that "proved" that 95 percent of private clouds are failing. But the survey asked a loaded question: "What is going wrong with your private cloud?"

Gartner was "a little surprised that 95 percent of the 140 respondents (who had private clouds in place) said something was wrong with their private cloud."

Right there at the top we have a problem. Just because something is going wrong doesn't mean that a private cloud is failing. Let's look at their results (see bullets below).

Take, for example, "failure to change the funding model"; a cloud can be wildly successful at providing benefit to the business, but nobody's figured out who's paying for it. Or, "focusing on the wrong benefits"; maybe your developers are suddenly 500 percent more productive (since they now don't have to wait for resources), but you're focused on the fact that it's still costing you money to run the cloud.

Maybe your problem is a 'failure to change the operational model' and you have a cloud that's doing fine but that could be spectacular if you could just get your people to move to an agile model, or use DevOps.

My point here is that just because something can be better (and you prompted your survey to say what's wrong) does not mean that it is "a failure." And it's irresponsible, or at the very least, disingenuous, to say so.

The fact is, I could just as easily come up with a chart that says that 95 percent of private clouds are successful.

Since I'm making a point about semantics here, I don't have the time to survey 140 people, but let's assume that I asked them, "What benefits are you seeing from your private cloud?" We might come up with an identical chart but with all slices labelled with benefits.

If I used the same "methodology" as Gartner, this chart would "prove" that 95 percent of all private clouds were successful.

All of this is not to say that the Gartner survey isn't useful — it is. It tells us where private cloud — and, more specifically, companies that are using private cloud — can see improvement.

Companies should think about the following:

- Getting out of 'proof of concept' mode
- Reviewing financing, including chargebacks
- Consider hosted or hybrid cloud rather than a massive private cloud
- Focus on automation and DevOps

Private cloud is still a fairly nascent industry — it's natural for companies to take time finding their way. And no matter how hard traditional vendors try to fight it, it's coming. Make the most of it.

Nick Chase is technical marketing manager of Mirantis

> *If I used the same methodology as Gartner, I could prove that 95 percent of clouds are successful*

Why aren't data centers hotter?

Research says IT equipment can run warmer. *Michael Kassner* wonders why data centers aren't raising temperatures to save money

Michael Kassner
US Contributor
@MichaelKassner

Running a successful commercial data center is not for the faint of heart. With increased competition, profit margins are creeping downward. So one might assume data center operators would take advantage of something as simple as raising the equipment operating temperature a few degrees.

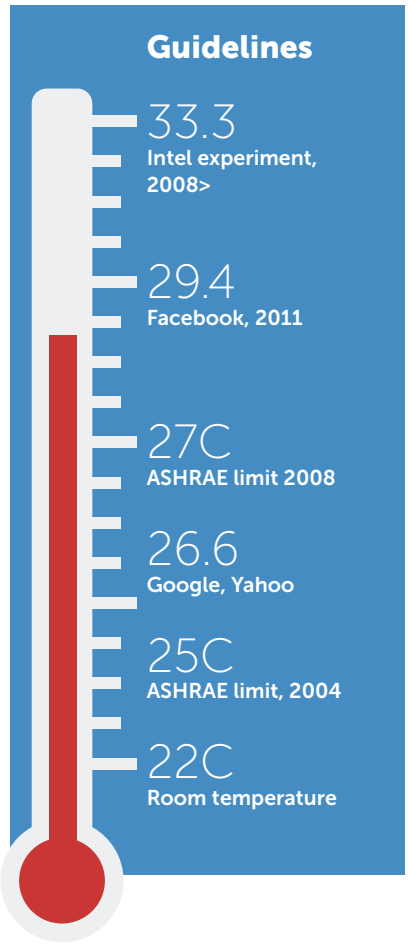
Letting the temperature climb can reap four percent energy savings for every degree increase, according to US General Services Administration. But most data centers aren't getting warmer. Why is this?

For years, 20°C to 22°C (68°F to 71°F) was considered the ideal temperature range for IT equipment. In 2004, ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) recommended the operating temperature range of 20°C to 25°C (68°F to 77°F) based on their study and advice from equipment manufacturers. Seeing the advantage, engineers raised temperatures closer to the 25°C (77°F) upper limit.

ASHRAE shook things up in 2008 with the addendum Environmental Guidelines for Datacom Equipment, in which the organization expanded the recommended operating temperature range from 20°C to 25°C (68°F to 77°F) to 18°C to 27°C (64.4°F to 80.6°F). To ease concerns, ASHRAE engineers mention in the addendum that increasing the operating temperature has little effect on component temperatures, but should offer significant energy savings.

Also during 2008, Intel ran a ten-month test involving 900 servers; 450 were in a traditional air-conditioned environment and 450 were cooled using outside air that was unfiltered and without humidity control. The only recompense was to make sure the air temperature stayed within 17.7°C to 33.3°C (64°F to 92°F). Despite the dust, uncontrolled humidity, and large temperature swings, the unconditioned module's failure rate was just two percent more than the control, and realized a 67 percent power saving.

In 2012, a research project at the University of Toronto resulted in the paper *Temperature Management in Data Centers: Why Some (Might) Like It Hot*. The research team studied component reliability data from three organizations and dozens of data centers. "Our results indicate that, all things considered, the effect of temperature on hardware reliability is weaker than commonly thought," the paper mentions. "Increasing data center temperatures creates the potential for large energy savings and reductions in carbon emissions."



Heading for the cool aisle...

Between the above research and their own efforts, it became clear to those managing mega data centers that it was in their best interest to raise operating temperatures in the white space.

By 2011, Facebook engineers were exceeding ASHRAE's 2008 recommended upper limit at the Prineville and Forest City data centers. "We've raised the inlet temperature for each server from 26.6°C (80°F) to 29.4°C (85°F)...," writes Yael Maguire, then director of engineering at Facebook. "This will further reduce our environmental impact and allow us to have 45 percent less air-handling hardware than we have in Prineville."

Google data centers are also warmer, running at 26.6°C (80°F). Joe Kava, vice president of data centers, in a YouTube video mentions: "Google runs data centers warmer than most because it helps efficiency."

That's fine for Facebook and Google to raise temperatures, mention several commercial data center operators. Both companies use custom-built servers, which means hardware engineers can design the server's cooling system to run efficiently at higher temperatures.

That should not be a concern, according to Brett Illers, Yahoo senior project manager for global energy and sustainability strategies. Illers mentions that Yahoo data centers are filled with commodity servers, and operating temperatures are approaching 26.6°C (80°F).

David Moss, cooling strategist in Dell's CTO group, and an ASHRAE founding member, agrees with Illers. Dell servers have an upper temperature limit well north of the 2008 ASHRAE-recommended 27°C (80.6°F); and at the ASHRAE upper limit, server fans are not even close to running at maximum.

29.4c
Facebook's upper temperature limit

All the research, and what Facebook, Google and other large operators are doing temperature-wise, is not influencing many commercial data center managers. It is time to figure out why.

David Ruede, business development specialist for Temperature@lert, has been in the data center "biz" a long time. During a phone conversation, Ruede explains why temperatures are below 24°C (75°F) in most for-hire data centers.

For one, what he calls "historical inertia" is in play. Data center operators can't go wrong keeping temperatures right where they are. If it ain't broke, don't fix it, especially with today's service contracts and penalty clauses.

A few more reasons from Ruede: data center operators can't experiment with production data centers, electricity rates have remained relatively constant since 2004, and operator concern about usage surges may adversely affect contracts.

Both Ruede and Moss cited an often overlooked concern. Data centers last a long time (10-25 years), meaning legacy cooling systems may not cope with temperature increases. Moss mentions: "Once walls are up, it's hard to change strategy."

Chris Crosby, founder and CEO of Compass Data Centers, knows about walls, since the company builds patented turn-key data centers. That capability provides Crosby with first-hand knowledge of what clients want regarding operating temperatures.

Crosby says interdependencies in data centers are being overlooked. "Server technology with lower delta T, economizations, human ergonomics, frequency of move/add/change, scale of the operation... it's not a simple problem," he explains. "There is no magic wand to just raise temperatures for savings. It involves a careful analysis of data to ensure that it's right for you.

"The benefits when we've modeled using Romonet are rounding errors," adds Crosby. "To save 5,000 to 10,000 dollars annually for a sweatshop environment makes little sense. And, unless you have homogeneous IT loads of 5+ megawatts, I don't see the cost-benefit analysis working out."

Some people are warming: Hank Koch, vice-president of facilities for OneNeck IT Solutions, gave assurances there are commercial data centers, even colocation facilities, running at the high end of the 2008 ASHRAE-recommended temperature range. Koch says OneNeck's procedure regarding white-space temperature is to sound an alarm when the temperature reaches 25.5°C (78°F). However, temperatures are allowed to reach 26.6°C (80°F).

So why aren't data centers getting warmer when there's money and the environment to be saved? The answer is, it's not as simple as we thought. Data centers are complex ecosystems and increasing operating temperatures require more than just bumping up the thermostat setting.

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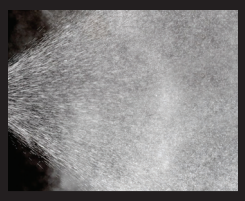

Bringing home the sharing

You might think that data shared in the cloud is someone else's problem, but *Bryan Betts* says it will impact your data center

You may have heard corporate IT people worrying that BYOD (bring your own device) means they have to support consumer devices. Now data center people have a tougher problem: BYOC, or bring your own cloud.

Anyone charged with securing an organization's data and intellectual property could be forgiven for having nightmares at the thought of all the business information spilling over into consumer-grade cloud storage such as Dropbox, iCloud, Microsoft OneDrive (formerly SkyDrive) and Google Drive.

There are inherent security risks to such services, such as the serious authentication bug on Dropbox in 2011, and the 2014 leak of celebrity photos allegedly stolen from iCloud. But there is also the matter of ownership and control: quite simply, once it is on Dropbox or an equivalent, you have neither of them.

Alongside the obvious issues of confidentiality and IP, consumer-grade file synchronization services also present all sorts of legal and regulatory compliance dangers. Generally, compliance with the likes of HIPAA in the US, or the EU data protection rules, will require encryption (among other things), and very few consumer-grade services enforce this as standard. These services also tend to lack an audit trail for file sharing, as well as strong access control and authentication.

In addition, consumer services include no intrinsic data backup, instead declaring backup

Save your data

Enterprise services include Box, Druva Insync, SpiderOak and TeamDrive. Box provides granular file access controls and the ability to integrate with a range of other enterprise software, such as NetSuite and Salesforce. Druva supports custom group sharing policies with external restrictions and audit trails, and offers the ability to geolocate and remotely wipe clients. SpiderOak uses encrypted cloud storage and client-side key creation and encryption. TeamDrive uses AES-256 encryption, plus automatic versioning and change logging, and allows customers to control where their data is stored.

1

Enterprise versions of consumer services, most notably Dropbox for Business. Dropbox has native clients for every major mobile and desktop platform, and APIs that enable a wide range of other applications to use it as their storage back-end. Its Business edition adds audit logs, remote wipe, admin tools for onboarding new users, and strong encryption. Many users will already know how it works, and if they already have an account, it will keep their personal and business files separate.

2

Run local services in-house, such as AeroFS, Cornerstone MFT and TeamDrive. You either operate the service yourself on a server in your data center or a colocation, or farm the job out to a managed service provider. Either way, there would be none of the capacity and bandwidth limitations that are commonly applied by third-party services, and far fewer issues around ownership and control.

3

File transfers to remote folders; for instance, with SRT's WebDrive. We may still employ local synchronization, albeit with the option of remote-wipe. If even that is unacceptable, consider running a file transfer client that presents remote folders as a network drive. Some such software can also integrate remote folders so they appear to be part of the local file system. File downloads are still possible, but local caching also means that files stored in the cloud can be edited without explicitly downloading them.

to be the user's responsibility. So while there may be some limited protection against user error, for example allowing you to recover old versions and deleted files for up to a month, the user's data is not protected beyond that time, nor will it be protected against disaster at the cloud storage company's data center.

As a result, where once you might have focused on preventing people from copying confidential data onto unencrypted CD-ROMs or USB sticks, now you have to stop them copying it onto any of a multitude of cloud storage services. To make matters worse, they could also be copying it to and from a variety of devices, including the smartphone or tablet they use to work on the move.

Cloud storage is typically object-based, so file-based applications will not work directly

There are many problems with flatly saying No to Dropbox & Co, as well. For a start, the services themselves can be extremely agile and adept at getting past blockages, because they are designed to work well over just about any connection, whether it be home broadband, office wireless, mobile broadband, with or without NAT (network address translation), etc.

More importantly, though, the reason people use these services is that they work, and for many uses they work extremely well. This is because they were designed with the individual and with ease of use in mind. They make it especially easy to synchronize files readily from one device to another, for example, to help users share files with friends and family.

Synchronization makes cloud storage easier to work with, but there's a problem — cloud storage is typically object-based, which means that standard file-based software applications cannot directly work with files in the cloud. Instead, they must either use an intermediary device or service that provides file-based access (such as a hybrid cloud storage gateway), download the files to local storage (or cache), and then upload them again once edited, or use web-based apps instead of local ones like Google Apps, for example.

The advantage of file sync is that it takes care of the downloading and uploading, transparently synchronizing work in the background. This works well for individuals and is extremely useful when it comes to automatically saving photos from your phone to your PC.

Sync is much less appropriate for sharing enterprise data. Data ends up in local storage on devices that can be lost, stolen, or simply taken away by their owners (by someone leaving the company, say). It also lacks the controls and checks needed for enterprise use.

The more likely requirement here is collaboration; for example, enabling a team to share a project folder, with revision tracking and true file sharing in place. If file synchronization to mobile devices is allowed — and it can be very useful for a subset of users and activities — then you also need file locking to avoid multiple updates to the same file from overwriting one another.

Yet when you look for enterprise-grade alternatives, they must also be just as effective and easy to use as the consumer services, because otherwise your users will not switch. No longer can the data center or IT department dictate to the user departments — the arrival of software-as-a-service (SaaS) and of cloud platforms means that local users and managers can too easily circumvent troublesome red tape by implementing their own local solutions, funded out of petty cash.

IT therefore needs to be inclusive on file sharing, offering a strong alternative that both meets users' needs for collaboration and file sharing, and at the same time meets the organization's needs for security and compliance. This alternative must be just as easy to use as the free services, and it must be accompanied by clear policies and training, spelling out the risks and liabilities to make sure the users understand why they must use this enterprise-grade service.

Fortunately, there are options that could fit the bill. There are three approaches (see box): file sync and sharing services that were designed for business use — with security in mind. There are enterprise versions of the consumer services, and you can run the storage locally in your data center.

The problem is real; luckily so are the solutions.

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DCIM progress report

Eira Hayward thinks DCIM efficiency and delivery is improving, but progress is slow and there seems to be a lack of sparkle in its performance

Three or four years ago, market forecasters first began to take notice of the burgeoning data center infrastructure management (DCIM) market, making all sorts of positive predictions about its potential. Data centers were getting bigger and more complex, demand for IT services was rising, and demand for tools to monitor equipment and infrastructure would surely rise too.

The 451 Group estimated the market was worth $321m in 2011 and predicted compound annual growth rates of over 39 percent through to 2016. Gartner published a "cool vendors in DCIM" report in 2012, and IDC put out an overview of the DCIM landscape. Predictably, there was lots of hype as vendor after vendor claimed to have the next greatest thing and the analysts cranked up their market predictions.

The market was quickly very crowded, with many products touted as DCIM solutions but falling short of what was needed to properly document, track, monitor and manage the IT infrastructure. It was a confusing and difficult landscape for customers to navigate.

A few years later and things look more sane. There's a better understanding of the market, its drivers and the opportunities, and some commonality of definition as to what DCIM actually is. Rhonda Ascierto, data center analyst with the 451 Group, comments that "DCIM software helps managers track and analyze information about their data center's operational status, assets and resource use — space, power, cooling, etc — and can also include advanced features for cooling optimization, dynamic control and computational fluid dynamics."

Enterprises that rely on data centers to serve their customers want to monitor and manage a data center's critical systems, and need a comprehensive view of their physical and IT resources. The hype is not all gone of course - we still have a Gartner Magic Quadrant, but this attempts to impose order by requiring vendors to submit a portfolio of related components, which must enable monitoring down to the rack level at minimum. Building management systems are excluded.

The market is still growing, but analysts have downgraded their expectations. The 451 Group now predicts the total data center management software sector will grow at a CAGR of 27 percent through 2018 and reach $1.7bn in aggregate revenue. Gartner forecasts that by 2017, DCIM tools will be deployed in more than 60 percent of larger data centers in North America. DCD Intelligence, in its 2014 annual census, found big regional disparities in DCIM investment.

Chris Drake, research director at DCD Intelligence, comments that while North America and Western Europe see the highest penetration, countries vary. Penetration is 33 percent in the Netherlands and only 18 percent in Germany. In developing countries, penetration rates are typically around the mid-to-high teens, but even here there are big

There is a lot of opportunity for consolidation of the vendor and solution market

Matthew Larbey, Virtus

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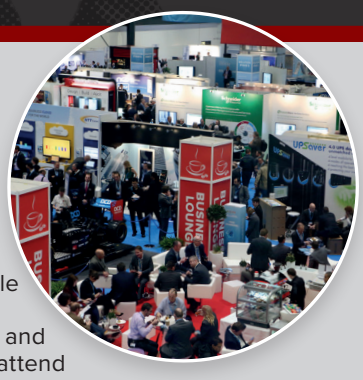

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disparities: while India and China both have penetration rates of 18 percent, Eastern Europe lags behind at only six percent, with Russia even further behind at a very low four percent.

At the end of 2014, 451 Group research director Andy Lawrence said that integration is a big challenge, even though it is crucially important for the future. "The complexity of modern data centers is making it impossible to manage without DCIM systems that aren't collecting and sharing information with other systems," he said.

Lawrence said this is because the landscape is more dynamic, now we are in a software-driven world. "Cloud is sweeping through the data center world, and underpinning cloud is automation. This means minimum delays and minimum human intervention, which can't then stop at the facilities layer."

The next phase of development is integration, so DCIM moves to a service optimization role, providing intelligence These data center service optimization (DCSO) functions, says the 451 Group, include business planning, costing, energy resource management and converged physical/virtual data center management. Lawrence says this means a holistic real-time integrated information-sharing approach.

His observations are echoed by a number of professionals. Richard Jenkins, VP worldwide marketing and strategic partnerships for RF Code, comments: "DCIM remains an effective tool in the fight against data centre inefficiency, but more progress is needed. Organizations require facilities to be software-driven, commercially sustainable and environmentally efficient. However, many DCIM solutions are just visualisation platforms and can't actually control systems unless they're integrated with other platforms. Without real-time data, DCIM lacks the ability to provide enterprises with the corporate intelligence for informed decision-making."

Dave Leyland, head of architecture at Dimension Data, says that cloud service providers are focused on making costs match revenues, and satisfying customers. A few years ago, these two factors were threatened by the rising demands of infrastructure management – companies had to lay out their own delivery mechanisms, resulting in large capex investments and workforce skills training demands.

"Now the landscape has changed," says Leyland. "Service providers are out-tasking roles and bringing in other companies. Data center infrastructure management is going through a period of rapid change. Trends like the Internet of Things (IoT) and big data put a strain on infrastructures and internal teams. There can be no growth if service providers fail to take advantage of the knowledge these organisations offer; in fact, they'll be going back to the dark ages of infrastructure management we saw just a few years ago."

Leyland says that security is also becoming a big focus for infrastructure managers, especially in regards to the IoT and big data. "We are entering a phase where we don't know what our enemies look like, and with different types of devices connecting to the network, it means access points to the internet increase. Security will become more systemic in the years to come as commercial threats are focused around the internet.

Matthew Larbey, director of product strategy at Virtus, comments: "DCIM functionality is just one component of a much more integrated and software-defined data center architecture which will provide a more cost and business service view of the data center - but over the nex three to ten years."

Larbey says that vendors generally have a strong offering in either facilities and infrastructure or in IT servers and applications, but few are able to combine both successfully. He says that around 50 percent of the vendors in the space are pure-play DCIM start-ups, with others coming from the power infrastructure and IT solution segments. "With this in mind, there is a lot of opportunity for consolidation and maturation of the vendor and solution market," he adds.

$1.7bn total data center management software sector

So we have a growing market that is meeting an obvious need but which itself needs to grow up a bit. DCIM must progress to be part of the framework of systems talking to each other as part of the "Internet of Everything," according to Lawrence. "Everything we're hearing suggests we are at that turning point. You can't manage modern data centers without good DCIM systems."

Trading cloud services

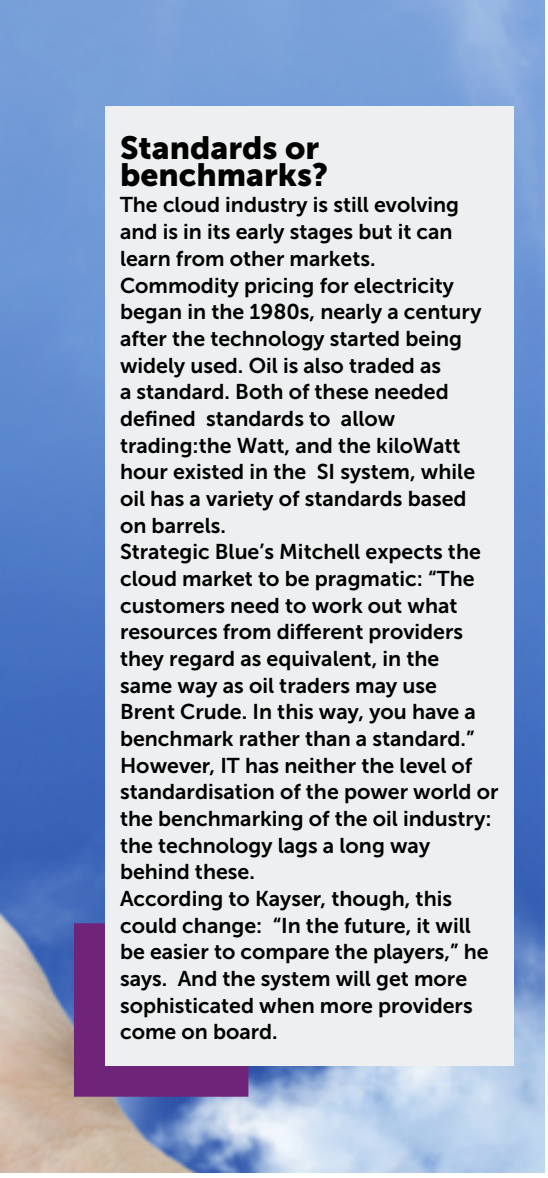
Germany has an exchange for trading cloud services. *Max Cooter* looks at its prospects

In 1531, Antwerp's stock exchange set up the first building for securities trading, allowing people to buy and sell new things, including stocks, bonds and debts. But the visionaries who established the stock market could not have envisaged trading in something as nebulous as cloud services.

But cloud computing, as it turns out, is a surprisingly natural fit for the world of trading. After all, increasingly virtual financial instruments such as debt options are being shuffled around in multi-million dollar electronic deals. These financial objects, at heart, are just as virtual as a virtual machine, a virtual network or a pool of storage.

A computing technology based on the idea of virtual workloads fits snugly into a world of virtual trading. It is only to be expected that companies which move electronic commodities around the globe, might wish to trade computing workloads too.

Any of the global stock exchanges could have looked at the option of going down this route but the one that dipped its toe in the water first was the German stock exchange,



Standards or benchmarks?

The cloud industry is still evolving and is in its early stages but it can learn from other markets.
Commodity pricing for electricity began in the 1980s, nearly a century after the technology started being widely used. Oil is also traded as a standard. Both of these needed defined standards to allow trading:the Watt, and the kiloWatt hour existed in the SI system, while oil has a variety of standards based on barrels.
Strategic Blue's Mitchell expects the cloud market to be pragmatic: "The customers need to work out what resources from different providers they regard as equivalent, in the same way as oil traders may use Brent Crude. In this way, you have a benchmark rather than a standard."
However, IT has neither the level of standardisation of the power world or the benchmarking of the oil industry: the technology lags a long way behind these.
According to Kayser, though, this could change: "In the future, it will be easier to compare the players," he says. And the system will get more sophisticated when more providers come on board.

the Deutsche Börse. (Deutsche Börse Cloud Exchange) DBCE was set up by Deutsche Börse in May 2013 in an attempt to create greater efficiencies between supply and demand. The scheme is currently still in a pilot stage but is set to go live sometime in 2015.

But why cloud? "Why not?" asks Thomas Kayser, business development manager with DBCE. "We have been doing this for centuries," he says, pointing out that there's little difference between trading cloud resources and dealing in oil or gas.

Commodities like these have been traded for more than a hundred years, once the quantity to be traded was available in a readily marketable form.

The key element of the DBCE offering is standardization (see Box above). This is necessary as cloud providers have different ways of handling workloads and have different pricing structures, among all kinds of variation.

"The focus was to make the products tradeable, the only way to do this is with standardization," says Kayser. "It doesn't make sense if each provider has a different approach."

There are three parts to the DBCE workload: the performance of virtual CPUs; virtual machine memory and block storage, traded in 100GB blocks. The consumer works out what his or her needs are and buys accordingly. The methodology that DBCE employs is measuring cloud workloads in Performance Units, providing a common framework for assessing cloud that is solid and enables useful comparison.

"We're not comparing data center A with data center B, but comparing performance units," says Kayser. " One PU is still one PU. We supply the standard that is being used, it doesn't make sense if providers offer their own standard."

Kayser explains this means that the consumer has a way of assessing how many PUs he or she will need to complete the workload. "We provide a set of benchmarks to measure, features like audio-video encoding, compression and mathematical coding. It's important to be transparent so the process is entirely handled by open source software," he says.

But it's not just about the technology; there's also a legal framework to ensure there's no comeback. Which could be a tall order. Anyone who has worked in the region wil know that doing business in Europe is bound to throw up a diverse and interesting set of problems.

Europe is discussing regulations for cloud providers, which will affect where data is stored, and this will have implications for the cloud exchange, says Kayser: "Yes, there are issues to be resolved when it comes to data governance." Since the Snowden revelations about surveillance he thinks customers will opt for resources based locally in Europe.

However, geographic constraints will add another level to the pricing: "Maybe we will see different views on the pricing. For example, we could see prices with Governing region "US", being cheaper than those with Governing region "Switzerland."

We could see prices for US cloud being cheaper than those with in Switzerland. – Thomas Kayser, Deutsche Börse

The pilot scheme only runs in Europe at the moment and DBCE is coy about the number of participants in the trial.

There is still room for improvement, says Kayser, particularly when it comes to helping consumers come to terms with the new way of working.

Kayser says there has been a mix of customers: "Some need help, some do not, In the finance community, for example, they tend to understand straight away."

He does see ways of improving the process, however. "We've concentrated on the provider side up till now," he says but DBCE is going to focus more on consumers in future.

"We will offer a new platform and with a new UI, it's our intention to improve the experience for them before we go live. For example, at the moment we have a limited service level agreement (SLA), but that will ultimately change."

He certainly sees the cloud exchange as the way forward. "It will take a bit of time for cloud resources to be considered a commodity," he says. "But we already have a lot of interest from large IT companies." He envisages a degree more sophistication in future. "At the moment, you're able to secure your demand – in the future, you will be able to resell your unused capacity."

It is this facet that may well interest CIOs. One of the problems with cloud and buying resources as a pay-as-you-go service, calling up cloud on demand, is that it can be expensive. The option to use reserved instances from the likes of Amazon Web Services cuts costs, but reduces flexibility. Even before DBCE, there was an attempt by Canadian company Enomaly to set up a spot cloud trading system where buyers could pick up unwanted capacity from suppliers: Enomaly was sold to Virtustream and the spot cloud service disappeared from view.

Cloud Options from Strategic Blue has taken a somewhat different tack: "The problem with the Deutsche Börse system is that you have to use specific software running on a federated cloud," says James Mitchell, CEO of Strategic Blue.

The Cloud Options approach is akin to commodity trading rather than working with technology. The company makes its money by working with the movements in the market. "Part of what we do is an educational process, where we share our knowledge of future cloud options, rather like [data provider] Platts in energy," says Mitchell.

It's still in the early stages but it seems that the Deutsche Börse Cloud Exchange is taking the first steps to a system that could revolutionize the way IT is sold. Customers have not previously had a way to calculate exactly how much of an IT resource they need and how much it would cost. DBCE offers a future where a firm can not only do that but actually trade on its unwanted capacity. ●

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Return of the Jedi

If you haven't been watching the progress of the Open Compute Project (OCP), then I suggest you start now. We have been interested, intrigued and focused on what the organisation has been doing for the best part of the past year. We are looking forward to attending and reporting the upcoming Open Compute Project Summit, in San Jose, in March — it promises to be a font of innovation for the data center industry.

OCP is one of the most interesting disruptors in the industry at the moment, which surprises many since the concept originates from Facebook. That has also given them a type of 'invisibility cloak,' making them appear very benign to some: "They're from Facebook — they're the establishment, but not the Dark Side." I shall reveal the suspected Jedi Knights later.

Facebook's work around scale and serviceablity has resulted in deliverables no one can ignore, unless you really want to be blindsided very soon. The OCP buffet menu of solid configurations, stripped down motherboards, servers that look like dragsters, and racks that look like they were built from dexion, can seem alien. Despite their less solid appearance, their build belies the OCP belief that it is software that will deliver real data center efficiency.

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Open Compute lets you get together with other folks in your industry and do massive supply chain buys says OCP: "We are seeing corporations line up and purchase gear together. To a provider, Open Compute is a delivery mechanism and a platform for driving next generation technology into the market faster and more efficiently. To the customer, this is open source," says the OCP.

To the customer, Open Compute is a way to make sure you're using community-based standards that are going to change with your requirements, and not vendor-less standards that are going to change based on supply chain capabilities or features that you may or may not support. That choice element is now essential to the data center architect.

When the big vendors started to join OCP, it looked to some as if the disruptors were about to be sabotaged from within, but the story is much more serpentine than that. Back in the early days of the Object Management Group, I used to hear complaints that sharing methodologies, secrets and efficiency gains was naive. But they drove the industry forward to where it is today. The Dark Side can produce unexpected spin-offs.

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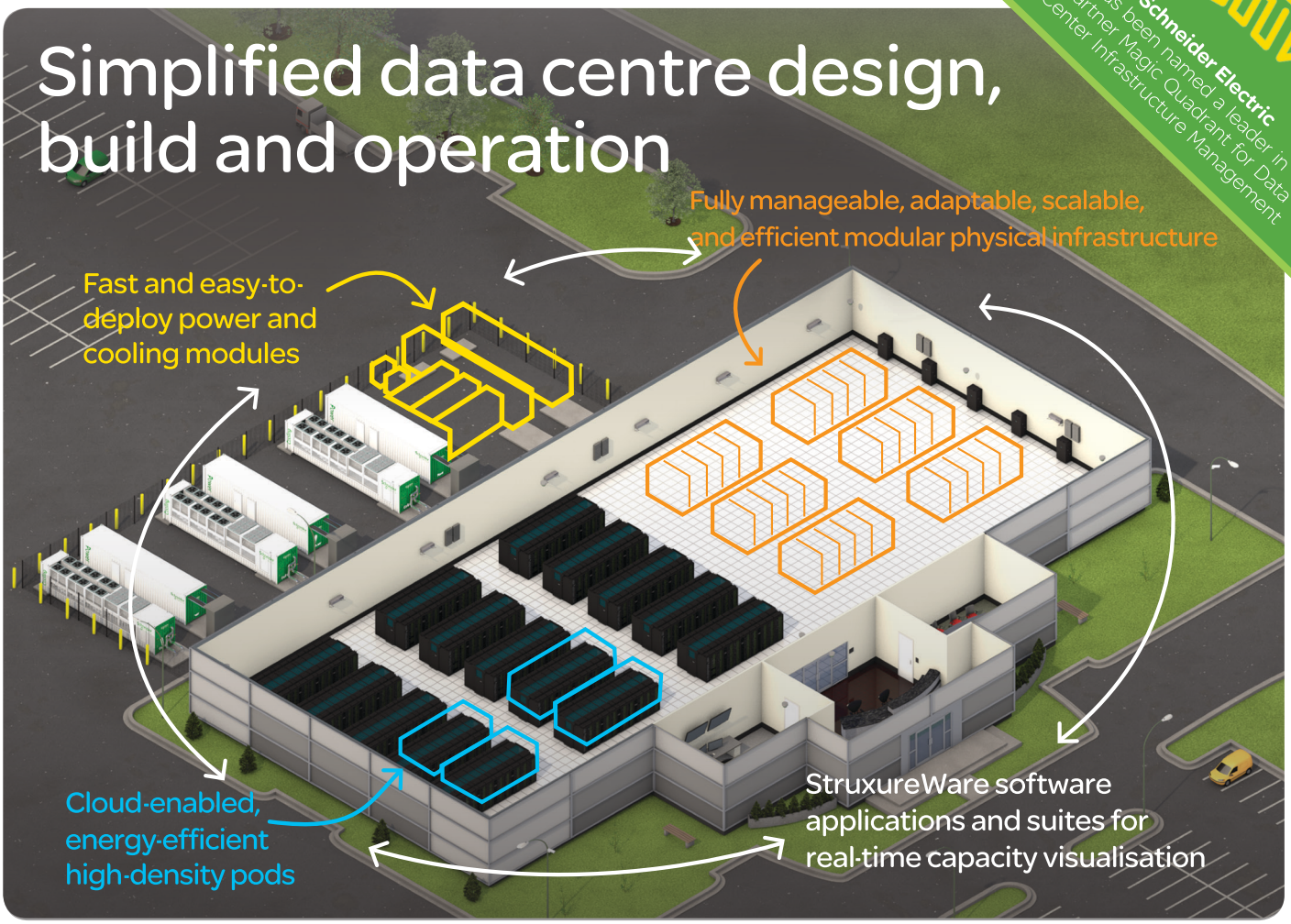

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