DatacenterDynamics

The Business of Data Centers

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The guide to a
successful data center

GEIST
POWER

Built-to-order PDUs
Basic, Intelligent, Upgradeable;
Geist builds the PDUs you need

GEIST
COOL

Intelligent Containment
Sophisticated airflow management
for data centers of any size

GEIST
MONITOR

Environmental Monitoring
Minimize environmental
threats to your data center

GEIST
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Visibility & Management
A robust DCIM solution to manage
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the tools needed to run and protect critical equipment across multiple
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in Shanghai, also drives
our Chinese website.

DCD
MEDIA

With a little help from our friends...

If you weren't in New York for our Enterprise USA event, and didn't catch DCD at CeBIT in Germany, you missed out on two truly blockbuster events.

If you did miss them, fear not. We have a run-down of the top takeaways on p26. And we have more events to come. Our events list (p48) details some forthcoming attractions, but check our site for details of events in Jakarta, Dubai, Shanghai, Brazil, and more.

And make way for Stacking IT. A new track dedicated to open infrastructure, Stacking IT debuts in this year's other super-sized US events: DCD Internet in San Francisco in July, and DCD Services which comes to Chicago in October.

Back in Europe, we hit Paris in October before our big show in London in November. And plans are advancing for our return to CeBIT in 2016.

These events tackle industry issues, through networking, discussion and demonstration. Engineering—and actual engineers—are never far from the surface.

This issue gets practical with a close look at something close to the hearts of most data center people: cables. Will the much-vaunted technologies of SDN, fiber and silicon photonics change everything? Find out on p35.

We take the lid off Yahoo's famous chicken coop design (p32). We talk to the data center designers, obviously. But we also talk to a chicken coop builder.

Our news pages (p9), report on lawsuits, new builds and fresh tech, while from round the world we hear Equinix's plans for Asia (p20), and the rugged trek to efficiency of Peru's government data centers.

Everywhere we turn, it's obvious that this is an industry that is built on its people. DCD Intelligence, our research team, can measure the industry better than anyone, but we want to tell the stories—here, on our site and on social media.

Your are our friends, and quite literally we would be nothing without you.

•

Peter Judge - global editor
🐦 @PeterJudgeDCD

37.7m

sq m of data center space required in 2015 (DCD Intelligence)

If you missed us in New York and CeBIT, catch us in Dubai, San Francisco or Chicago

Euro money
DATA CENTER SPENDING IN THE EU

EU Data Center Spending by Offering and Major Country – 2014 – Total €48.8bn

UK
23%

Germany
22%

France
17%

Rest of EU
38%

Storage System
9%

IaaS/PaaS
14%

Networking
18%

Infrastructure Software
38%
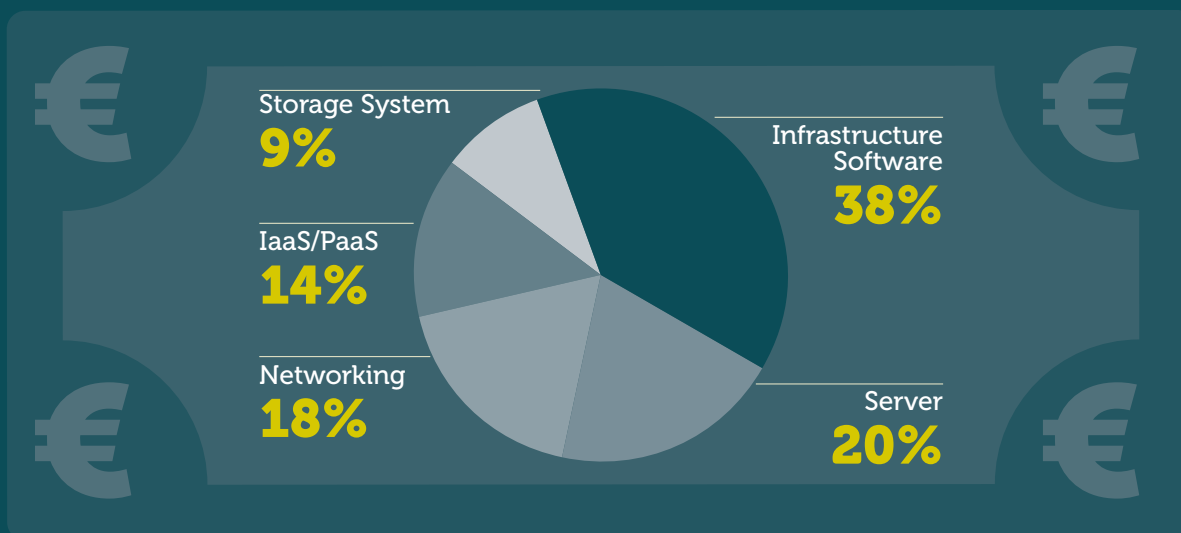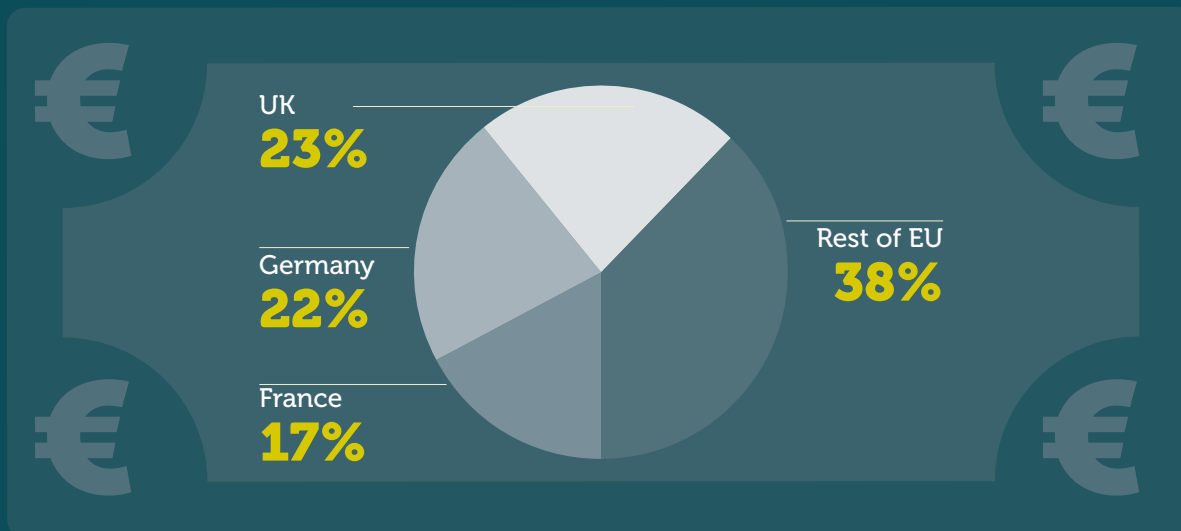
Server
20%

Tech Spending in top EU Countries

Germany

20%   9%   20%   38%

France

22%   9%   18%   36%

UK

21%   9%   19%   35%
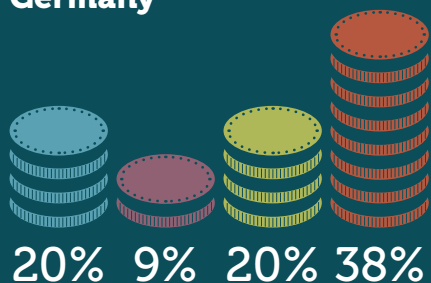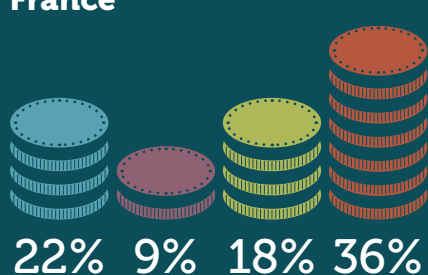
● Server   ● Storage   ● Network   ● Infrastructure Software

Data from DCD Intelligence

VCE's scalable VxBlocks

VCE, the EMC-owned converged infrastructure player, has improved on the vBlock range with extensible VxBlocks. Current vBlocks cannot be combined, but up to 1000 racks of VxBlocks can be used to build pools of storage and processing resources.

Tyan opts for OpenPower

The TN71-BP012 from Taiwan's Tyan is the first commercial server based on OpenPower, the licenced version of IBM's Power processor. Meanwhile, service provider Rackspace has a prototype combining OpenPower, Open Compute and OpenStack.

Interoute: a predator

Aleph Capital and Crestview are buying 30 percent of European cloud provider Interoute, which will help it expand. "This change in the shareholder structure means that instead of being potential prey, we can now turn to being one of the predators," CEO Gareth Williams told Reuters.
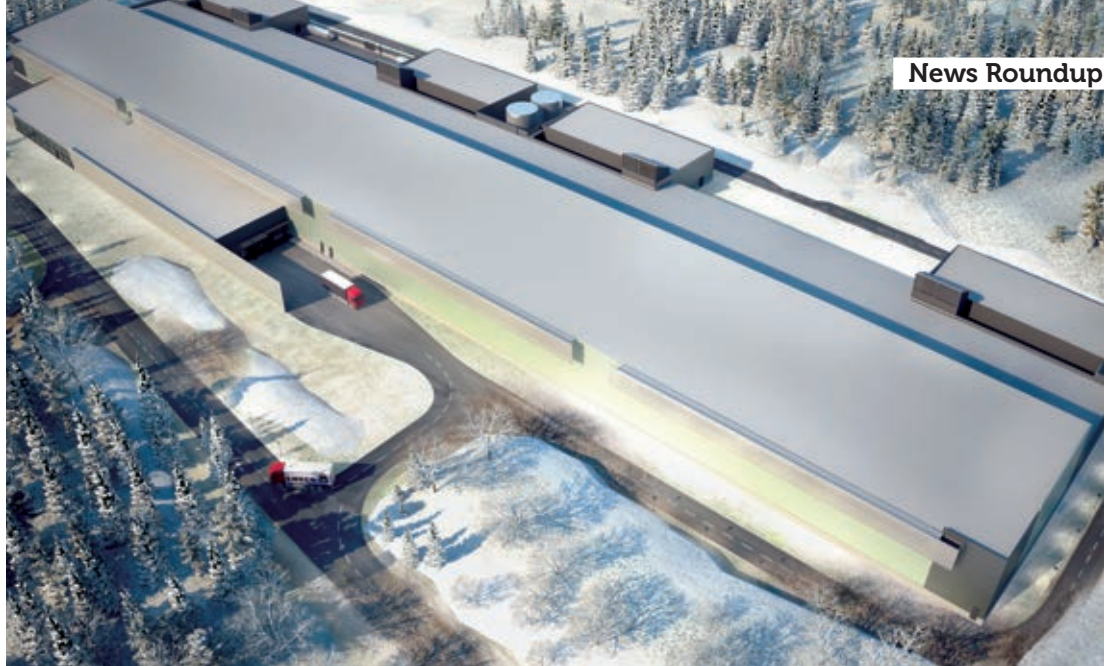
BladeRoom claims Facebook stole modular designs

British modular data center builder BladeRoom says Facebook stole its ideas, and shared them through the Open Compute Project, according to a lawsuit filed in California.

Redacted court documents claim that BladeRoom Group (BRG), whose designs are used in several data centers worldwide, offered its expertise to Facebook in 2011. BRG alleges the ideas were exploited in Facebook's Rapid Deployment Data Center (RDDC), which Facebook commissioned from Emerson Network Power to use in building the Lulea data center in Sweden.

RDDC was then allegedly shared with the industry through the Open Compute Project, the open source hardware group initiated by Facebook.

BRG says it developed rapid-build modular techniques for buildings with air-handling needs such as hospitals, kitchens and clean rooms.

In 2008, it began applying these ideas to data centers, and in 2011 contacted Facebook as a possible customer, as it was "confident in its growing global reputation."

What happens at this point is a four-page blank, at the end of which the complaint states: "BRG never imagined Facebook would end up stealing the BRG methodology and partnering with Emerson to construct its data centers using BRG's trade secrets and confidential information." BRG says Facebook used its trade secrets in the Lulea facility, and then shared them with the industry through the Open Compute Project.

The suit details various press releases from Facebook, and links to a YouTube video of Facebook's Marco Magarelli presenting RDDC at last year's Open Compute Project summit, as well as a blog post from Magarelli.

The complaint makes five key allegations: breach of contract, breach of fair dealing, misappropriation of trade secrets, unjust enrichment and unfair business practices. It demands punitive damages, and damages for any enrichment Facebook has gained through use of BRG's trade secrets.

The case will be hotly argued and very difficult, as BRG is alleging breach of "trade secrets," which are notoriously hard to define.

http://bit.ly/1ypWVIE ●

INFINITE POSSIBILITIES

The Future of Data Centers

COMING JULY 2015

CORNING

Intel's Knights Landing does 240 threads

Intel engineers have shown an internally built "Adams Pass" software development server sled based on just one of its forthcoming Knights Landing series of Xeon Phi processors, managing a simultaneous and even-flowing workload of 240 threads.

When you do the math, that's 60 cores per chip (Intel is promising more), with four-way hyperthreading. Although the sled server has a large heat sink that can fool you, there is just one big chip — the largest die that Intel has ever produced for a CPU.

As Knights Landing chief architect Avinash Sodani confirmed, all threads were being run on a single image of a single physical (non-virtual) operating system. Had this image been Windows, said Sodani, the OS would already have been able to manage all 240 threads just as evenly, without extensions to the operating system.

This means that with Knights Landing there won't be a "main core" backed up by 60 or more subsidiaries which the operating system activates when it gets around to it. "It'll look like everyone is at the same level," he said. "There's no master/slave relationship."

Intel was not ready to disclose which operations were running on those threads, though it did say they were independent calculations and not just strings of "no-ops." Our access to its laboratories was quite secretive, and reporters were even asked not to look in certain directions.

Knights Landing truly is a network on a chip. Not only does it maintain its own 48-port 100-gigabit network switches on-die, its microarchitecture uses a hub-based network as well. Unlike its Xeon cousin, Xeon Phi pairs cores tog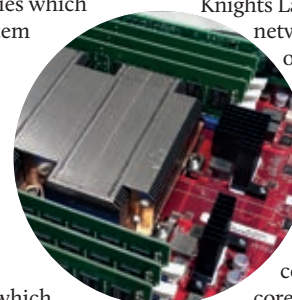ether into tiles. Cores on each tile share a single 1-megabyte L2 cache, and each core has access to two vector processing units, enabling the class of parallelism originally created for graphics processors.

http://bit.ly/1NucAPJ ●

Equinix invests $227m in five cities

Equinix has added the equivalent of five new data centers to its global estate of more than 100, investing $227m and adding some 4,200 new cabinets. The program will increase its data space by 10 percent, adding one million square feet (around 100,000 square meters) to the 10-million-plus square feet it currently has.

Additions include New York, Singapore, Melbourne, Toronto and London. All five have been designated as international business exchanges, facilities which allow Equinix customers to connect directly to each other.

Steve Smith, president and CEO of Equinix, said: "Equinix is the global interconnection platform for the world's leading businesses. Our rich history of interconnection, built over the past 16 years, makes us the ideal place for business to connect, and we believe these five new data centers will provide even more ways for global businesses to innovate."

This announcement comes at a time of consolidation and expansion. European providers Telecity and Interxion have announced plans to merge, creating a combined entity that will be bigger than Equinix's European business.

If the merger goes through, and is successful, Equinix will have tougher competition in Europe, and this announcement is clearly designed to take the sting out of that.

More than 100 enterprises and cloud service providers and/or networks have joined the Equinix Cloud Exchange, and new wins include Google, IBM Software, Tata and Telecom Italia. The company expects its international strength and ecosystem to keep it ahead, and this announcement is designed to underline that.

http://bit.ly/1HdJnVx ●

60
Number of cores per chip, with hyperthreading, that Knights Landing's series of Xeon Phi processors can manage

Nerdalize heats Dutch homes with cloud
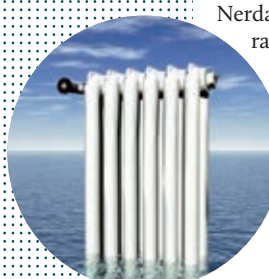
Nerdalize, a Netherlands startup, has joined the ranks of firms offering distributed cloud and heating, with a pilot deal in which local utility Eneco will offer free heating to a limited number of Dutch households.

The company's wall-mounted radiators contain water-cooled servers running high-performance computing jobs distributed over the internet. Nerdalize pays the electricity bill, and the home gets free heat.

The model is similar to that offered in France by Qarnot, which carries out bank risk calculations in sitting rooms (see page 13), and by Germany's Cloud&Heat, which offers an OpenStack cloud service, running in cabinets in flats and offices.

All cloud-heating offerings are based on the value of the heat from data centers. As heat is hard to transport, Nerdalize, Qarnot and Cloud&Heat (along with others we are hearing of) take the processing to the homes and offices where the heat can be used. Nerdalize chief executive Boaz Leupe acknowledged the work of Qarnot and Cloud&Heat, but said, "We are unique."

The Nerdalize system contains up to eight high-end CPUs with a 32GB solid state drive. The system carries out high-performance jobs and will offer cloud computing services on RAM-intensive applications for as little as 50 percent of the cost of comparable cloud services, Leupe said. Dumping the heat is not the best solution, acknowledged Leupe, and after the trial he hopes to find other ways to use it when room heating is not required.

Among the users already testing the system is the Leiden University Medical Center in the Netherlands, which carries out protein folding calculations on it.

http://bit.ly/1ONxmeO ●

Data center risk management

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

1 PERIMETER DEFENSE
2 CLEAR ZONE
3 RECEPTION AREA
4 SERVICE CORRIDOR
5 DATA ROOM
6 DATA CABINET
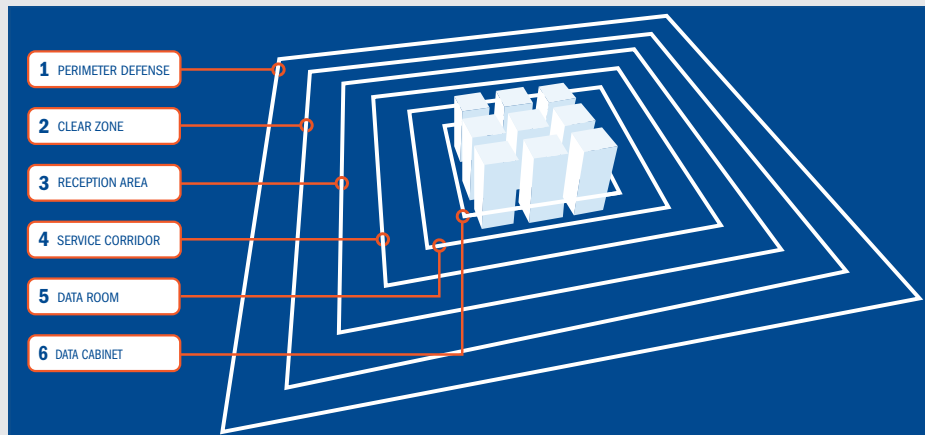
Risk Management

A physical security breach can cause immeasurable harm to a data center, and given the increasing reliance to protect critical information, any data loss, or even the inability to meet the mandatory regulatory requirements, can result in bad press, lost customers, fines and lost revenue. DatacenterDynamics and Anixter have partnered to properly define the best practices required for secure, compliant data center operations in the current environment.

The Necessity of Interoperability

To put it simply, interoperability is crucial for data center physical security. Manufacturers and integrators need to make sure their products work in a cohesive manner to provide a scalable, layered physical security solution. By establishing a strategic series of obstacles to protect against a potential physical incursion, it becomes increasingly difficult to gain access to the mission-critical data that an inside or outside threat is seeking. By supporting the five D's of perimeter security— deter, detect, deny, delay and defend—the six layers of physical security defends a data center by adding distance, time and scale.

Understanding the Six Layers

Layer Six: The Data Center Cabinet

The core of the data center is the notoriously insecure data center cabinet. Cabinet access control helps to prevent server theft, storage theft, monitoring devices, virus uploads, and interruption with power or connectivity. The ability to positively identify who is getting into those cabinets is now required for top-tier data centers and compliance regulations.

Layer Five: Data Center Room and White Space

To prevent unauthorized people from entering the white space, access control, such as dual factor biometrics, is essential to controlling authorized access to the data center. When combined with real-time video verification, a new element is added to further guard against unauthorized access.

Layer Four: Hallways, Escorted areas, and Gray Space

The gray space, hallways and escorted areas that lead to the data center floor are frequently an area where proper security measures are overlooked, which can lead to unauthorized access of critical mechanical and electrical infrastructure and to a disruption in data center operations.

Layer Three: Facility Façade and Reception Area

The visitor acceptance area is the first critical point within the building to control authorized and unauthorized access. Implementing sound security policies and procedures are a standards compliance requirement and fend off a potential physical security breach.

Layer Two: Clear Zone

The clear zone is a large area that contains critical infrastructure assets such as generators, fuel containment and main power feeds. This zone requires security measures that allow complete situational awareness.

Layer One: Perimeter Defense

The perimeter is the first layer where it's possible to control authorized and unauthorized access to the data center's property. When properly implemented, the perimeter defense can reduce the overall cost of a data center facility's security system and improve the effectiveness of the plan.

Learning More about the Layers

Every data center's security strategy will be unique. However, building a layered approach to data center security makes sure that the solution is tailored to each data center's needs. The first step in determining the right layered approach is talking to a trusted technical adviser to understand your current system, future needs and working environment.

To learn more about the layered approach to data center security, download the new white paper from Anixter and DatacenterDynamics, and join our webinar on **28/29 April.** Click here to register or visit ***www. datacenterdynamics.com/webinars/ anixter-riskmanagement*** for details

ANIXTER

Contact Details
Phone: 1-800-ANIXTER
anixter.com/datacenterdcd

China's Alibaba opens up new data center in Silicon Valley

Aliyun, the cloud subsidiary of China's e-commerce giant Alibaba Group, has opened a data center in Silicon Valley, aiming to compete in a crowded market dominated by players such as AWS, Microsoft and IBM. Ethan Yu, Alibaba's vice president for international cloud, told Reuters that the new facility will initially cater to Chinese companies with operations in the US, including retail, internet and gaming firms. Then it will go after US businesses wanting a presence in both countries.

Users of the Silicon Valley center will buy customized services via Aliyun's regular website. In addition, as the US facility is connected with the cloud company's data centers in China, customers will be able to manage applications running on clouds in both the US and China with one account, hence achieving unified deployment, operation and maintenance. Alibaba, chairman Jack Ma (left) has big plans. In the last quarter (ending in December), cloud computing and infrastructure was the company's fastest-growing business area, increasing sales by 85 percent.

The cloud provider still only accounts for about one percent of Alibaba's revenue, but it supports the company's core e-commerce operation and will play a pivotal role in the long run. Currently, Aliyun operates cloud data centers in Hangzhou, Qingdao, Beijing, Shenzhen and Hong Kong. In 2014, the cloud giant added three data centers – in Beijing, Hong Kong and Shenzhen – to accommodate the exponential growth in demand for cloud services.

http://bit.ly/1NyCSQS ●

Paris homes hit jackpot as risk calculations keep them cozy

French banking giant BNP Paribas has signed up with innovative startup Qarnot Computing, so some of its risk calculations will be carried out in radiators within homes in Paris.

Around five percent of the bank's risk calculations will be carried out on a cloud computing platform offered by Qarnot, which distributes specialized calculations to servers located in buildings within Paris, where the waste heat can be used to warm homes, schools and offices. Re-using the otherwise wasted heat will reduce the carbon footprint of these calculations by 75 percent, Qarnot's founder and CEO Paul Benoit (left) told *DCD* at CeBIT in Hannover, Germany.

Qarnot offers Q.Rad radiators, each of which contains multiple processors that work on calculations managed by the firm's distributed processing system. The heat from the Q.Rads is offered for free to the places they are installed. "Through this partnership, BNP Paribas CIB will reduce the energy consumed by its servers," said David Sibai, of the bank's financial engineering and quantitative research unit. "The heat generated by these heater/servers is used directly to heat homes, offices and public buildings efficiently."

Re-using waste heat from data centers has been a major theme at *DCD* at CeBIT. Yandex's Finnish data center manager, Ari Kurvi, said that using a district heat system to reuse waste heat is "more than a win-win – it's a jackpot!"

http://bit.ly/1a7ECCD ●

Microsoft kills off the UPS

Microsoft announced at the Open Compute Summit in San Jose that data centers no longer need uninterruptible power supplies (UPSs). The company delivered the latest version of its Open CloudServer specifications into the shared resources of the Open Compute Foundation for anyone to use. Those specifications make an apparently simple tweak: the server power supply now includes a lithium-ion battery, so each server can ride out brief interruptions of power.

Microsoft's manager of server engineering, Kushagra Vaid, said that this "distributed UPS," which Microsoft is calling local energy storage (LES), could replace the vast ranks of lead-acid batteries that consume up to a quarter of the floorspace at cloud data centers.

A key to this is integrating the battery inside the switch mode power supply in the server. This means there is no extra circuitry – the battery just keeps the bulk capacitors in that unit topped up.

Microsoft's LES is a step forward as the battery-equipped power supply module is a straight physical replacement for the vanilla module in last year's design. However, power engineers have raised doubts about the use of lithium-ion batteries.

Microsoft's answer is to go to the power tool industry and adopt the rugged and reliable battery units that are built into cordless drills – specifically the 18650 lithium-ion cells that are a similar shape and somewhat bigger than AA batteries.

Obviously, the idea needs to be thoroughly checked and tested. Google and others may be doing this in private, but Microsoft has put this out for all to take part.

http://bit.ly/1BIwRtz ●

GLOBAL DATA CENTER MARKET OVERVIEW AND FORECASTS 2014-2020

DCD Intelligence's *Global Data Center Market Overview and Forecasts 2014-2020* report provides the most comprehensive insight available today into the current state of the data center industry.

WHAT'S IN IT?

Available for the first time as a single global overview and including 5-year forecasts, the report provides a wealth of data on world-wide industry trends and market statistics, split by region, country and industry vertical.

Based on the findings of the annual *Industry Census Survey* (now in its 4th successful year and exclusive to DatacenterDynamics) it includes access to the original survey data, conveniently formatted into pivot tables for further research and analysis.

WHAT'S COVERED?

- **Key facility characteristics (white space and power consumption)**
- **Facility growth projections**
- **Market-by-market analysis**
- **Trends in outsourcing and colocation usage (public and private cloud, IaaS, PaaS, SaaS, retail and wholesale colocation, hosting and managed services)**
- **Investment growth avenues and drivers**
- **Outsourcing strategies and solutions investment**
- **Facility equipment & solutions investment**
- **IT equipment & solutions investment**

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www.dcd-intelligence.com

DCD INTELLIGENCE

China embarks on green data center catch-up

As data centers continue to spring up in China, the government has issued a new set of guidelines intended to cut their environmental impact, and launched a scheme in which 100 pilot projects will lead the industry's green journey.

As China's digital economy grows rapidly, data centers are rolling out one after another, with an estimated 400,000 new data centers consuming 1.5 percent of the power of the entire emerging economy. These data centers are falling behind international standards for energy efficiency, and face dual pressures on power consumption and environmental pollution by data centers.

To address this, three government bodies have got together to set up a scheme to get best practices implemented in a set of prototype data centers that will lead the rest of the industry onwards.

China's Ministry of Industry and Information Technology (MIIT), National Government Offices Administration, and National Energy Administration have issued a document called *Guideline for Pilot Projects of Green Data Centers* (GPPGDC), which sets out how to implement the energy saving advice of the State Council. It also demonstrates the government's determination to enhance energy efficiency and environmental friendliness of data centers.

The guideline has hit on the pilot project idea as a way to move China's data centers towards greater energy efficiency.

Currently, the average PUE of data centers in the US is 1.9, when advanced data centers can achieve a PUE lower than 1.2. Despite this the PUE of most data centers in China is around 2.2, which represents a huge gap with international best practices.

Alongside this, four national standards on green data centers will be rolled out, 40 advanced technologies, products and best practices of operating and maintaining green data centers will be promoted, and the Guideline for Building Green Data Centers will be formulated.

GPPGDC is just one of the Chinese government's guidelines for the data center industry.

http://bit.ly/1xeNtfG ●

2.2

The power usage effectiveness of most data centers in China

IBM backs the Dome project

IBM and Astron are working on microservers cooled with an innovative hot-water cooling system to process the vast amount of data that will be produced by the square kilometer array (SKA) radio telescope. The SKA will be the world's most sensitive radio telescope when it goes live in 2024, gathering 14 Exabyte of data each day to use in the process of sifting signals from 13 billion years ago. The Dome prototype uses system on a chip (SoC) designs using 64-bit processors based on IBM's OpenPower core.

Helium-filled hard drives

HGST has claimed that filling hard drives with helium instead of air makes them more reliable. After shipping more than one million drives based on proprietary technology, HGST has rated them as having 2.5 million hours Mean Time Between Failures. HGST is the world's only manufacturer of helium-filled HDDs — this unorthodox approach gave it an early lead on high-capacity 6TB drives, but critics question a hard drive's ability to maintain a hermetic seal that keeps hydrogen molecules in place.

$330m
Cost of Lontrue's new data center

Agriculture firm plans Chinese server farm

China's data center market will shortly have a new server farm – provided by an actual farmer. Agricultural company Lontrue from Shandong Province plans to raise CNY2.3bn ($370m) to build an internet-connected data center to provide hosted services. It plans to issue 245 million shares to around five investors. Lontrue will invest most of the money in a new data center, with the rest funding other projects. The new data center will cost CNY2.1bn ($330m); CNY1.8bn ($290m) will come from the money raised.

Lontrue is an agricultural farm with CNY832m ($134m) turnover, whose main business is growing, storing and supplying fresh fruit and vegetables, dried fruit, seeds and nuts. It has contracted 80,000 acres of orchard, and owns warehouses capable of storing 52,000 metric tons of goods, as well as three manufacturing plants covering about 380 acres of land.

The company said it is moving into the electronic information industry in search of more profits. Lontrue expects the new data center to generate CNY276m ($44m) income from operations each year, from equipment hosting and outsourcing services.

China's data center market is attracting plenty of entrants from other markets. China's steel giant, Baosteel, used a holding company, Shanghai Baosight Software, to provide data centers for the Shanghai subsidiary of China Telecom and the Shanghai subsidiary of China Mobile.

Raycom, a real estate company focusing on developing commercial and residential properties, is also developing a large cloud computing data center in northeast China. Built with CNY300m ($48m), the project is expected to have a floor space of 30,000 square meters capable of hosting about 50,000 servers.

According to IDC, there were more than 500,000 data centers operating in China in 2012, and the market is expected to grow at around ten percent by 2017, reaching more than $19bn.

http://bit.ly/1CzYoRG ●

VOX BOX / DCD VIDEO

Don Beaty
ASHRAE TC9.9
CEO, DLB Associates

ASHRAE has raised the temperature of data centers. What's next?
We've just finished a study that proves you can operate at a lower humidity, so we will be rewriting that part of the standard, and it will drop down to eight percent relative humidity.
We ran a test with different types of floor tiles and clothing. We found between eight percent and 20 to 25 percent – the difference in static electricity is insignificant.

http://bit.ly/1CHg7Xw ●

Mitch Nelson
VP sales and marketing
EDCS Power

How is the power path changing in data centers?
The traditional power path converts twice from AC to DC. An Open Compute Project (OCP) rack just hooks up to 12V DC. It's a subtle change but a massive one. You don't need to go to AC after your battery stack. Why not keep it in DC from the UPS right down to the units? Implementing OCP outside Facebook will be a big topic.

http://bit.ly/1EYn5V5 ●

Apple joins Open Compute Project

Apple, renowned for the secrecy surrounding its infrastructure, has joined the Open Compute Project, the body set up by Facebook to share low-energy and high-efficiency hardware specifications for data centers.

Apple was the biggest surprise in the list of new members for the non-profit group, announced at its Summit in San Jose in March. Other new members included Cisco and Juniper – proprietary network hardware vendors that stand to face a lot more competition as other vendors offer switches based on the Open Compute designs.

"I'm happy to say the OCP community's influence has gained a lot of momentum in the past year, with new contributions and membership from companies such as HP, Dell, Cisco, Apple and Microsoft," said Open Compute founder Frank Frankovsky.

"We have nearly 200 companies now participating in the project, and every day new technologies are being developed and contributed," he added.

In Apple's case, it seems the benefits of using the efficient hardware coming out of Open Compute overcame the gadget-maker's traditional reluctance to share anything about its operations.

Similar factors must have played for Juniper and Cisco, both of whom adopt open standards but have hitherto resisted actual commoditization of hardware.

None of the three appear to have announced any immediate moves to contribute hardware or software, or to adopt Open Compute specifications in the products they sell or use. They were also joined by flash storage maker NetBRIC, Open Compute's first member from China, and end-users including Bank of America and CapitalOne.

It has been reported that Apple is actually ordering Open Compute hardware, with Digitimes of Taiwan suggesting the firm is buying white-label boxes from a Taiwanese vendor. At the time of writing, we haven't had any further evidence.

HP, meanwhile, has stepped up its Open Compute commitment, delivering CloudLine servers designed for service providers.

http://bit.ly/1MkuabP ●

HVAC failure leaves hospital in chaos

A hospital in Northern California has admitted that its electronic health record (EHR) system was down for a week after its data center air-conditioning failed. Clinicians were unable to access patient records, and treatments were postponed or cancelled. Rideout Health in Marysville, CA, admitted the health system's data center crashed in mid February after two HVAC units contained in an off-site data center failed: one burned out, and the backup quickly overheated.

Telehouse is building new Docklands site

Carrier-neutral colocation provider Telehouse has announced additional technical specifications of its 11-floor data center, which is being constructed in London's financial district. The North Two facility in the Docklands area will feature a vertical indirect adiabatic evaporative cooling system that will help deliver an impressive PUE (power usage effectiveness) of 1.16. Meanwhile, electricity will be provided to the site using a power grid sub-station owned and operated by Telehouse.

Specially devised ProLiant Gen9 servers are basically "hardware-as-a-service." *Scott M Fulton III* takes a look at how HP can differentiate this service

HP offers its Helion cloud as a private rack

Ever since HP first announced its Helion platform for cloud services, it openly promised a line of servers geared toward OpenStack. But OpenStack, by definition, doesn't really need special servers, so how will HP distinguish its Helion-branded private cloud platform from its regular ProLiant servers?

The answer, Helion Rack, features not stripped-down parts but built-up service.

"It is a pre-configured, pre-tuned private cloud solution that is based on OpenStack technology and Cloud Foundry technology," said Ken Won, HP's director of cloud solutions marketing, in an interview with *DatacenterDynamics*. "It's really designed to help customers deploy a private cloud very, very quickly."

The basic building blocks of Helion Rack are servers based on ProLiant DL360 Gen9 and DL380 Gen9. These are 1- and 2-socket servers with the customer's choice of Intel Xeon E5-2600 v3 chips, and 768 GB or 1.5 TB of DDR4 memory in 24 DIMM slots.

But it's not the building blocks that HP is selling here. HP wants its customers to imagine a complete rack with the memory and storage necessary to run their desired applications on OpenStack.

You see, HP is only selling Helion Rack... by the rack.

"We design all of this using the best practices that we've learned by running this huge, OpenStack-based public cloud," said Won. HP representatives work out an estimate of how many VMs the customer needs. Given specific business objectives and constraints, HP then maps out a rack design for the variable workload.

Then HP will install Helion Rack servers, test them, and deploy services on them. The idea is to build competitive cloud data centers for customers who have never had data centers before.

Facebook launched the Open Compute Project to specify efficient designs. The OCP specifications are, to say the least, saying the least. They're Spartan systems that Facebook contends are easy to replace and scale.

HP is selling into that market with another completely new server brand, Cloudline, manufactured by FoxConn.

But even Cloudline won't meet the needs of customers seeking to deploy cloud services for the very first time.

"A lot of people don't know what mode to put on," said Won. "By looking at what all the customers are doing on the HP Helion public cloud, we can see what people typically do."

Intel has recently been reassessing the roles of its three lines of Xeon server processors, moving workloads from the lower-tier E3 series to the middle-tier, "workhorse" E5.

The most scalable workload Intel perceives is Hadoop, the operating system for big data. Other workloads include collaboration, multi-tenant hosting, and high-performance compute.

HP is positioning Helion Rack for the center of the E5 market, using E5 processors and OpenStack. A base Helion Rack configuration will service as many as 400 simultaneous virtual machines on 156 TB of object storage.

> *We selected the right size servers to support a good amount of VMs*
> **Ken Won, HP**

"We selected the right size servers to support a good amount of VMs," Won told us, "but we don't put so many in there it becomes too big."
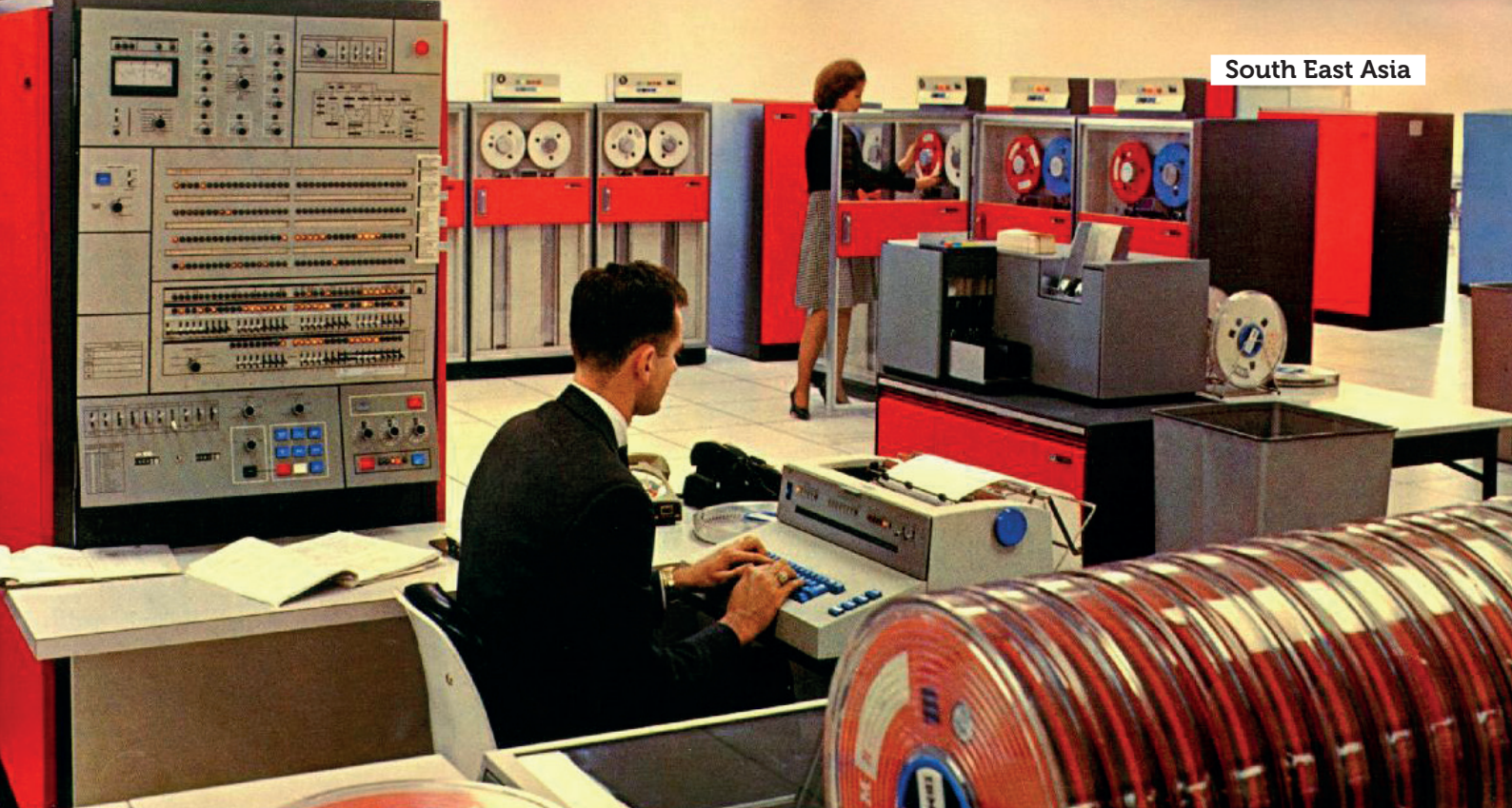
With Helion Rack, HP is downplaying the components of its servers as part of the sale, emphasizing instead the service element.

A rack will be built out with whatever the customer needs to get an OpenStack private cloud started, says HP.

What this customer wants is a promise, a cost estimate, and an SLA, not a bunch of parts. ●

The trouble with Asia's data centers...

Paul Mah takes a look at the state of the ageing data centers in the Asia-Pacific region and the impact this is having on the industry

Paul Mah
South East Asia Correspondent
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Citing a recent study that was undertaken in 2015, Simon Piff, the associate vice president of enterprise infrastructure at IDC Asia, told *DatacenterDynamics* that 20.9 percent of respondents indicate that a sizeable proportion of their data center estate has been in operation for close to a decade.

"The first major round of data center construction in Asia came to a halt at the end of the dot-com boom in 2001, and there was very little new stock built until the end of the decade," said Giles Proctor, vice president of data center services at Pacnet.

"When the dot-com bubble occurred in the 1990s, so did the boom of data centers. Those data centers that are still in operation are more than 15 years of age," confirmed Thiam Poh Goh, the director of operations at Equinix

for the Asia-Pacific region. "This, then, creates an issue with regards to the physical condition of those data centers and the infrastructure that has been put in place to operate them."

One major development in recent years would surely be the popularization of server virtualization and the rise of cloud computing, both of which contributed to a dramatic increase in processor utilization – increasing the average energy draw per microprocessor across the industry. This was followed by significant advances in energy efficient processors, which culminated in more compute capacity being packed into a much smaller volume of space than before.

Unsurprisingly, this has a significant impact on the data center, as the average power density requirement

goes through the roof. Older data centers are mostly designed for loads of 1-2kVA per rack, according to Proctor, which he says is not sufficient for most deployments today.

"When older data centers were built, they were not designed to accommodate the strain we place upon them today," said Tony Gaunt, the director of Internet data centers in Asia, Emerson Network Power. "With virtualization and IoT [the internet of things] becoming an increasingly popular trend, round-the-clock access has become a necessity and the power upkeep from cooling systems required to keep things running round-the-clock can be a massive drain for older data centers," he said.

Finally, older data centers are also less energy efficient than new data centers. This is typically due to older, less-efficient power and cooling design – a factor that cannot be easily overcome without an extensive retrofit.

Given that all data centers will get old eventually, are data center operators prepared for when the time comes to upgrade? "The days of shutting down a data center are long gone; operators and their customers now expect sites to remain always-on," notes Gaunt.

"So, upgrades are an important element of data center life, maintaining the successful operation while upgrading to current best practices."

In a nutshell, older data centers have no choice but to upgrade. ●

Equinix's Asia-Pacific ambitions

As Equinix opens its third data center in Singapore, its Asia-Pacific boss opens up to *Paul Mah,* our SE Asia correspondent

Cooling Tower

Paul Mah
South East Asia Correspondent

@PaulMah

Equinix has opened its third data center in Singapore – and *DatacenterDynamics'* Paul Mah got the background on the largest Equinix data center in the Asia-Pacific region from Samuel Lee, the president of Equinix Asia-Pacific.

Lee has close to two decades of experience dealing in the data center and telecommunications industry in Asia, and we were curious about his take on some of the challenges and opportunities in the region. Over the course of an hour, the senior executive gave his candid views of the regions that Equinix is currently operating in, as well as the countries that he is keeping a close eye on.

"Different countries have different challenges," said Lee. The region is made up of dozens of countries with very different cultures and stages of economic development – a fact that may not be obvious to outsiders. "Asia-Pacific as a region has lots of countries, with different business cycles, business practices and difficult cultures," he noted as he methodically stepped through each of the key markets in the region.

Importantly, he pointed to potential grey areas with the regulation surrounding the use of the land at Tseung Kwan O, Hong Kong, which he said is technically rented to end-users and hence cannot be subleased. "What happens if we resell a piece of space to a telco, and they package their own service?" asked Lee. "Is it legal under the current regulation?"

When it comes to mainland China, Lee explained that the telecommunications industry there is a heavily regulated one, while foreign ownership of a Chinese firm is capped at 50 percent. As such, Equinix competes by selling only white space and power, and gets around the strict internet regulations by being "a warehouse with lots of power," as far as the government is concerned.

For connectivity, Equinix partners with various local network providers – such as

**Top: light corridor
Bottom: generator**

China Unicom, among others – that establish a point of presence in its data centers that customers can hook up with.

"No one uses China as a regional hub," explained Lee when we asked about the absence of the company's vaunted Equinix Cloud Exchange service in China. "They have a presence in China because they have business in China and they want to support it." Of course, with the number of internet users in China already pegged at twice the entire population of North America as of last year, this is a huge market that few can afford to ignore, including Equinix, which has a data center in Shanghai.

"Singapore is the easiest place in which to do business, because the government is very business-friendly and very supportive," he said – even despite the scarcity of land.

Lee said that with most of the industrial land in the city state controlled by JTC Corporation, acquiring the requisite land for data centers is actually "pretty straightforward," with "no regulation issues." He said there seems to be "good momentum" going for Indonesia, though it is a small market as far as data centers are concerned.

Lee drew attention to the recent change in the data privacy law that gave local data center demand a boost, and noted that the mobile penetration and population means the market will likely evolve into something "bigger and more interesting" over time, though he cautioned that things are still in the early stages at the moment.

According to Lee, the sky's the limit when it comes to growth in the Asia-Pacific region. In our conversation, some of the markets mentioned include India, Taiwan and South Korea. India and South Korea are countries "you cannot ignore" due to their size and because they have among the best internet infrastructures in the world, while Taiwan is "interesting recently" as one of the cable landing points for submarine cables laid by the likes of Google and Facebook.

Lee has his sights on China, too, noting that it is going to be one of the biggest markets in the world. "We definitely want to get more scale in Shanghai. We want to expand in other cities," he said, while Beijing is "definitely on our radar screens."

Outside of China, Lee also pointed to how the new use of the internet and cloud computing means that even mature markets such as Japan, Australia, Singapore, Shanghai and Hong Kong can offer opportunities for growth.

And with just 20 percent of the global data center capacity outsourced to an operator such as Equinix, he sees a unique opportunity as enterprises shift to deploying public or hybrid cloud infrastructures in the years ahead.

Ultimately, the biggest shift of all is probably not in the data center itself, but how IT has shifted from something that was secondary in importance to something that is giving organisations an edge that can offer them critical opportunities for growth. Lee's final comment was: "The data center business is really evolving from a cost center into a real revenue opportunity." ●

> *The data center business is really evolving from a cost center into a revenue opportunity*

Quick facts

- **Foreign ownership of Chinese firms is capped at 50 percent**

- **Telecommunications in mainland China is heavily regulated**

- **The number of internet users in China is twice that of the entire population of North America**

Global Data Center Market Overview 2014

35.7 million

Global data center requirement 2014 – in square meters

31.9%

Proportion investing in in-house equipment, solutions and services in 2014 – DCIM

48.8%

Proportion investing in in-house equipment, solutions and services in 2014 – Network upgrade

$167.36 billion

Overall mount invested globally in colocation and outsourcing in 2014

20.4%

Proportion investing in colocation, outsourcing and cloud services – managed services

25.5%

Proportion investing in colocation, outsourcing and cloud services – IaaS

43.9 GW

Global data center power consumption 2014

36 million

End-user facilities accounted for 67 percent of the 36 million square meters of data center space in 2014

122.77 billion

In-house facility total of US$ investment globally in data center equipment and solutions in 2014

Information taken from DCDi Global Data Center Market Overview. Available here: http://bit.ly/1FhM7yG

Peru's public sector progress

Public sector data centers in Peru have stubbornly resisted change, but *Celia Villarrubia* detects signs of movement

Celia Villarrubia
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Even during the global recession, Latin America grew, and Peru emerged as one of its hotspots. According to LatinFocus, Peru is expected to lead the region until 2018, with an economic growth rate of 5.4 percent.

IT investment and infrastructure construction are accelerating even faster. The Chilean telecommunications company Entel reports that data center services are growing at 20 percent year-on-year.

Despite this, Peruvian public sector data centers are lagging. Like Peru's famous llamas, they are determined but not terribly efficient for modern practices. "Implementing data centers is a priority for the state, because the current facilities have serious shortcomings in terms of quality, performance, backup and redundancy," says Juan Dextre, CEO of data center design firm Goals.

Peru's government has a multitude of data centers, as each institution usually runs its own servers, mostly in small facilities with about 40 to 60 square meters of space and 30 to 250kW total power capacity.

The physical space limits their upgrade options, and these data centers are often on raised floors that are not designed to support the weight of denser racks. "It's a challenge, because institutions have no other physical space," explains Rocio Alberca, CEO of Critical Solutions. It is very difficult to migrate to new technology in a small space when your data center must keep working. These facilities suffer from bad design, neglecting efficient cooling and monitoring.

Around 2012, the government kicked off a $155m National Peruvian State Data Center project, intended to centralize government data processing and create a huge private cloud.

96%

Percentage of global llama population living in Peru and Bolivia

Two 10,000-square meter data centers were planned: one in Lima, with a back up in La Libertad. These were supposed to be built within 24 months, but the last change of government stalled the project, and that blockage is holding up other work, says Juvenal Arellano, data center manager at CIME.

Despite this, the project has had some results. It has improved networking by developing a fiber optic backbone linking Peru's provincial capitals, and promoted broadband.

There are some government projects adopting best practices, in particular small ones. For instance, since 2012, state telecoms regulator Osiptel has built a server room in San Borja, Lima, to replace an outmoded facility with no access control and an unstable power supply (see box, right).

"We had a server room that did not meet best practices," says Freddy Alvarado, IT manager for Osiptel. "Now we have become a benchmark within the public sector in modern data centers."

New data centers have been built for the Ministry of the Interior, Ministry of Agriculture, the Instituto del Mar del Peru (IMARPE or Peruvian Sea Institute) and the judiciary, which has an 80 square meter modular data center that has made a 40 percent power saving.

The latest government data centers already "consider using row cooling and water cooling, fire-suppression systems that do not alter the ozone layer, and the installation of DCIM tools," says Dextre.

Alberca agrees, saying: "They are beginning to use the latest technologies."

Gradually, government facilities are applying aisle containment, monitoring inlet air, and letting IT gear run at higher temperatures, but Arellano says bureaucracy sometimes delays these changes.

This year will be a big year, with several government data centers coming on stream. The National Customs and Tax Administration (Sunat) is renovating and building two data centers: it is remodeling a center at Miraflores, using a modular system certified to the EN1047-2 standard.

The National Bank is turning its existing 400 square meter data center into a backup site, and is due to open a new 700 square meter facility in 2015 that will use 20 percent less energy, according to engineering contractor Cosapi Data.

A new convention center in Lima is being built by OAS and Italtel in the district of San Borja. Due to open its doors in mid-2015, the 10,684 square meter building will have four levels of basement and four auditoriums – and include two Tier III data centers, each operating at 150kVA.

There will be other buildings alongside these. There is still a lot to do, because "the government is just learning the importance of information and protection of equipment," says Alberca. Future projects are likely to be small, between 40 and 250kW – and the public sector will have to improve its record of building alternate sites. At present, projects tend to focus on building a main data center (with a high concentration of these in the city of Lima).

Central government will play an important role, but it still has a long road ahead. It must promote laws that encourage better data center construction, siting them better to make use of free cooling.

Stay tuned. It may not be long before the stalled National Data Center of Peru comes into being! ●

Osiptel's new data center

- 40 square meters
- Second floor
- Redundant power supply
- 139 minutes of UPS protection
- Intelligent aircon
- Category 6A structured cabling
- Biometric access control system
- Sprinklers
- Surveillance cameras

THE CLOUD CROWD

Data centers are built by people, and we've been out to meet the data center community. *Bill Boyle* reports back from New York and San Jose, and *Peter Judge* from Hannover

To find out what's happening, nothing beats meeting the people, and this past month gave us a chance to do just that, as *DatacenterDynamics* launched new-style events in the US and Germany, and spent a couple of days with the Open Compute Project in San Jose, California. Back from our travels, we now have new friends, new ideas, and a new urge to explore and report on the doings of data center folk. ▶

MAKING IT IN NEW YORK

DCD Enterprise USA, the first of our consolidated, bigger-than-ever American events, took place in Times Square from 17-18 March. We learned that finance is taking data centers seriously, and the industry is working hard on security.

Compared with previous events, the show had a noticeably increased number of attendees from finance firms. Finally, the banks are putting their hands in their pockets and spending on data centers and infrastructure.

In a keynote, IBM vice president Mac Devine said he had never seen so much venture capital investment go into one industry segment in such a short space of time, driven by the internet of things (IoT). "I deal a lot with the venture capital community, and I've never seen so much venture capital money pouring into a space as I've seen with IoT," he contended. "It's because there is so much great potential, and so many ways to innovate."

Devine said: "People are making sensors, doing analytics to interact with sensors, and offering cloud-based security services to interact with these sensors. The companies that focus on providing real business value will succeed; the other ones will fall off," he added. "If potential innovators focus on just connectivity and messaging to a device – without a way to provide real business outcomes – they will not survive."

Mike Tighe, executive director at Comcast Business, called on the IT industry to speed up its adoption of open standards, reinforcing the message of the Open Compute Summit (see page 30), Tighe said: "Busnesses will have to get smarter and much more agile just to survive. In the current world, IT budgets are now being slashed by new C-suite executives because they know that the cloud can provide great Infrastructure as a Service (IaaS), Software as a Service (SaaS) and Platform as a Service

(PaaS). They are now forcing the pace of change since this part of IT has few standards.

He cited a company he knew of where across-the-board cuts of 40 percent were demanded of the IT department, with no loss of service over a three-year period.

The multi-track conference program had presentations from the industry's most forward-thinking practitioners and was a reference point for the data center market, while the exhibit hall convened today's top technology and solutions providers.

New security tracks were standing-room only, with delegates learning from the most sophisticated practitioners on the planet.

The response to the event – from sponsors, delegates and visitors alike – was unequivocally positive. There were more banks out on the floor of the conference keen to spend their money than there were left in the echoing trading floors of Wall Street. Well, almost!

14%

Percentage of total capacity in the US provided by New York

1.5m sq m

Data center white space in New York

7%

Percentage of global data center space provided by Germany

2.65m

sq m

Data center white space in Germany

CEBIT: A NEW EUROPEAN STAGE

As the world's largest tech event, CeBIT brings hundreds of thousands of visitors to dozens of halls in the Deutsche Messe fairground in Hannover, Germany. This year, one of those halls held a hangar-sized event for data center builders and users: DCD at CeBIT.

Efficiency topped the conference agenda, with speakers presenting a variety of ideas to an audience of aficionados, while the exhibition in the hall was open to all, enticing a new audience to learn more about the heart of the tech revolution.

Microsoft's server engineering manager, Kushagra Vaid, brought the Open Compute power supply design to Europe (p.13), leaving UPS vendors quaking in their boots. Google shared, but not quite so much: EMEA cloud head Barak Regev described Google's data centers, but the search supremo isn't ready to share its designs through the Open Compute Project.

Ari Kurvi of Yandex got a warm welcome from the conference. The heat from his data center in Finland is also welcomed by the local district heating system, effectively slashing the cost of providing the facility.

Another district heating outfit – Stockholm's Fortum Varme – showed off its relationship with service provider Bahnof.

Data centers can't always sell their heat, so Paul Benoit of Qarnot moved servers out from data centers into homes in Paris, and announced that these rooms are now heated by a percentage of the risk calculations of French bank BNP Paribas.

Qarnot moved servers out from data centers into homes in Paris

Not to be outdone, a similar proposition from Germany's Cloud&Heat warms buildings using the energy output of an OpenStack cloud, whose services will be available on another radical platform discussed in the DCD at CeBIT event: the Deutsche Börse Cloud Exchange.

As a content delivery network (CDN), Akamai needs to distribute its processing to the edge of the network, but network architecture director Christian Kaufman said that Akamai needs high reliability, so it's not going to risk new ideas like distributed cloud-heating until they are thoroughly proven.

Reliability is key to this industry, and the ASHRAE specifications from the US air-conditioning industry have a wide application in data centers. They have encouraged users and vendors to allow temperatures to rise, wasting less energy with cooling, which is unnecessary given the resilience of modern hardware.

Don Beaty, a former chair of the key committee, ASHRAE 9.9, said the group has a new campaign this year: having allowed temperatures to rise, it's now pushing for a wider range of humidity values.

The conference also heard of international standards: the ISO 30134 standard adopts PUE (power usage effectiveness) but, more interestingly, European standard EN 50600 promises to replicate a lot of the work of the Uptime Institute's Tier standards.

China was the partner country for CeBIT this year, and Huawei described its architecture, while other vendors including Rittal and Schneider reported on their latest modular approaches.

No European event can ignore data sovereignty – the idea that users need service providers that can keep their data in its native land in the hope of keeping it out of the hands of foreign security services such as the NSA.

The idea won't go away, a panel concluded, even though it is based on a somewhat flimsy premise – that geography is a barrier to international espionage. ▶

OPENING UP IN SAN JOSE

The week before Enterprise USA, *DatacenterDynamics* spent a couple of days at the Open Compute Summit in San Jose, where members of the Facebook-inspired Open Compute Project (OCP) shared some radical ideas to simplify data center design.

Facebook kicked off OCP in 2011, to share open source hardware designs for data center products, allowing the industry to build on ideas that would otherwise have remained in the hands of Facebook and its contract hardware partners.

This year's summit marked an expansion for the project, as three leading, and normally somewhat secretive, vendors – Apple, Cisco and Juniper Networks – signed up to the hardware sharing club. Others such as HP began their journey. The big names just cannot ignore Open Compute any more.

Among the top announcements, Vapor IO revealed its cylindrical 'Vapor Chamber' architecture for air-cooled data centers which do not require raised floors. Instead they are built in individual 'wedge' shapes which can be added when needed.

Facebook shared its Yosemite and Mono Lake system-on-a-chip compute server hardware, which allows four servers to run at a performance-per-watt superior to traditional data center servers for heavily parallelizable workloads.

Intel and Facebook collaborated for more than 18 months on Yosemite, which uses a server card, Mono Lake, based on the new Intel Xeon processor D-1500 product family – the company's first Xeon-based SoC. The Xeon D product family is the first Xeon line built on 14nm process technology, and the third generation of Intel 64-bit SoCs for microservers, storage, network and the internet of things (IoT).

HP announced the Cloudline Open Compute platform, designed to let service providers build differentiated services on standard hardware. (See p13)

OCP members unveiled a slew of networking ideas: Mellanox contributed OpenOptics MSA wavelength specifications to OCP; Broadcom delivered the Open Network Switch Library (OpenNSL); Accton shared two data center switch designs; and Hyve announced a set of OCP-based data center switch products – Open Rack v2, Leopard, Honey Badger and Wedge products.

Hyve also launched ARM-based volume servers, in partnership with Cavium, and storage moved forward: among others, Flash provider NetBRIC delivered OCP's first contribution from China. ●

STACKING IT
OPEN FOR BUSINESS

TRACKING THE **BIG** SHIFT

Stacking IT is a new conference concept the pulls together all management and professional disciplines responsible for the Network, Compute, Storage and Critical Environment and empowers them to develop more intelligent and free-flowing IT infrastructure that takes the industry closer to the promise of the integrated software-defined cloud and data center infrastructure ecosystem.

Inspired by the work of OpenStack, Open Compute, Linux Foundation and other major open-source efforts that have spurred innovation through true global collaboration, Stacking IT is a dedicated conference that runs in parallel to DCD Converged.

LAUNCH EVENT
DCD Internet, San Francisco, July 30/31, 2015

STACKING.IT USA
October 27/18, 2015
Chicago Hilton

STACKING.IT EUROPE
November 18/19, 2015
ExCeL London Docklands

STACKING.IT ASIA
September 15/16, 2015
Marina Bay Sands, Singapore

www.stackingit.com

Building the future... in Minecraft?

Zahl Limbuwala has a big idea. To move forwards we need to free our imagination. Luckily, he knows just where to do this

At *DatacenterDynamics'* Enterprise USA event in New York, I was lucky enough to be chosen to present a 'Big Idea.' Now I have to action it.

The event included a series of panel sessions. The grand finale had 13 panelists: a daunting line-up of CTOs, CEOs and tech experts – and, of course, me.

This was not a discussion. Instead, the panelists were asked to think 'outside the box' and bring a two-minute pitch for the next big earth-shattering idea.

Honored and excited to be involved, I tried to think of a big idea that would take not just technology but the human race forward. I came up with all sorts of ideas, but not a single one was original. I had used many before at conferences when asked about the future. Most were specific to data centers – the industry where I have worked for 20 years.

I was clearly not thinking outside the box. I thought back to when I was a child and my imagination would run wild with crazy, impossible ideas. Today, my own nine-year-old son is just like that. I asked him for help.

I didn't ask my son to solve any specific issue. Instead, we talked about what technology might impact his life. His answer was: "Minecraft!" Like many kids his age, my son plays Minecraft.

Adults often say they don't understand the point of Minecraft. I've joined my son in his virtual world, and it is amazing!

Minecraft lets kids recreate the boundless world of their imagination, and explore and live within it as if it were real. Like Lego, you stack blocks on top of one another, but Minecraft blocks represent the stuff of the real world: grass, dirt, stone, trees, tools. With a little programming knowledge, literally everything is available.

In Creative Mode, physical laws are reduced to a minimum. You can build a sailing boat in the sky.

Adults, as well as kids, are escaping the constraints of the physical world within Minecraft. An IBM researcher has made a working hard disk drive there, and other virtual worlds are so mind-blowing I don't know how anyone conceived them.

What happens when these worlds interface with the real world? Could we prototype in a virtual world? Or develop new science there? I have no doubt that's the direction we are headed.

In my youth, space was a new world where science could explore in a gravity-free environment. It cost billions of dollars. Today, Minecraft Creative Mode offers a gravity-free environment that resides on a $500 Mac Mini in my living room.

So, my two-minute pitch was, teach kids how to learn rather than force them to memorize facts, and have them use the technology we've created to imagine a future we cannot begin to fathom.

Now, how do I action this?

> *In my youth, space was a gravity-free environment to explore. It cost billions of dollars. Today, Minecraft gives my son a gravity-free environment on an old Mac Mini in my living room*

Yahoo's Compute Coop is not for chickens

Yahoo borrowed free-cooling ventilation principles that farmers have been using for generations. *Michael Kassner* investigates

Michael Kassner
US Contributor

@MichaelKassner

The similarity between Yahoo's data center in Lockport, New York, and FarmNyards' CapeCodder chicken coop (both shown opposite) is uncanny. And similar to the "chicken or the egg" debate, it begs the question, "Which came first?"

After some digging, I located Larry Kudlik, owner of FarmNyards in Beverly, MA, and the person who designed the CapeCodder. Kudlik was not surprised when I sent him a picture of Yahoo's Lockport data center. "The CapeCodder was designed to provide free-flow ventilation," explained Kudlik: "It's impossible for hot air to get trapped in the coop. The warmer the roof gets, the more draft is created. In my coop design, there are openings in the elevated floor," he added: "The air from below the floor is drawn up through the coop, keeping the chickens cool. The air movement also removes excess moisture."

As to which was first? "I've been designing and building CapeCodder chicken coops for more than 30 years now," explained Kudlik. "I have shipped thousands of them, some even

have solar power and self-cleaning floors."

If what Kudlik has said is true, it appears Yahoo decided to tap into a free-cooling concept already used by farmers for generations. I contacted Yahoo to see if that was the case. Brett Illers, senior project manager of sustainability and energy efficiency, was answered my questions.

To begin with, Illers affirmed that ventilating a data center using a full-roof cupola system is a great way to cool computing equipment. He then provided some historical background: the company started building data centers in 2007. The first design was standard fare, having a raised-floor white-space and forced-air cooling. In its second iteration, Yahoo Thermal Cooling (YTC), the white-space is considered the cool zone, and hot air exiting the server rack is forced up through an inter-cooler. What makes the YTC concept unique is the fact that server fans moved the air.

Yahoo decided to take the next step and attempt a ground-up redesign. A research paper, *YCC: A Next-Generation Passive Cooling*

(Top right) CapeCodder chicken coop. Image courtesy of Larry Kudlik

(Bottom right) Lockport, New York, Compute Coop data center. Image courtesy of Yahoo

Design for Data Centers, explains that Yahoo Compute Coop (YCC) set out to build a greenfield efficient data factory and to show that it can be used in facilities housing tens of thousands of heat-producing servers.

Yahoo engineers considered the entire building as the air handler: "The building shape was specifically designed to allow heat to rise via natural convection," says the research paper. "And the length of the building relative to its width (120 feet by 60 feet) provided easier access to outside air by increasing the area-to-volume ratio."

The design team created pre-engineered building components along with skid-based electrical systems to lower front-end expenses and operating costs. They tackled cooling next, well aware that the requirements eliminated most traditional forms of cooling.

The engineers designed louver systems to regulate air entering the data center, control the exhaust from the cupola, and adjust the temperature. They also designed five-horsepower, variable-speed fan modules, filter assemblies and evaporative (water) Inter-Cooling Modules (ICM) for summer days when free cooling is not enough.

The combination gives Yahoo data center engineers a lot of flexibility for cooling. The system can use unconditioned outside air cooling when the outside air is between 70ºF and 85ºF, and temper this with evaporative cooling when temperatures exceed 85ºF. Below 70ºF, mixed outside air cooling uses the heated exhaust air to warm incoming air.

After a few years of operation, Yahoo calculated that YCC saved 36 million gallons of water per year, cut electricity use by 40 percent and delivered a PUE of 1.08.
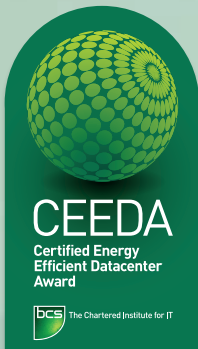
In 2011, the US Patent Office awarded Yahoo a patent for its design.

Now, we wonder if the engineers are working on self-cleaning floors? ●

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Guide to
Cabling & Connectivity

Fifty shades of cables?

Peter Judge
Global Editor

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At *DCD,* we love cable ties – not enough to go and see a certain controversy-courting movie that features them, though. These versatile and unfussy items are widely used outside the data center. We don't especially want to know how they are employed in *Fifty Shades of Grey*, but we do use them for household chores.

In the following pages, we explore their natural habitat – the racks of the data center, and the ever-changing structures of cables that connect them.

$350bn
What the SDN market will be worth in 2018

What is happening to cables and networks? Any data center will include a daunting number of copper and fiber cables – frightening to look at, but carefully managed to be dependable, repairable and upgradeable.

Big commercial data centers all have their own signature cabling style – think SoftLayer's bunches of red wires. Cables are important, and you need to be in charge of them.

The rise of software-defined networking (SDN, see page 37) might make you think you can disregard the physical network, but nothing could be further from the truth. SDN will handle networks differently, so the physical structure can, and will, change.

Meanwhile, fiber will offer increasing speeds, but at the same time copper-based technologies are evolving to deliver as much of that as possible, but without the need to change the communications medium (page 41).

Finally, we're often told that silicon photonics (page 44) will change everything by taking light signals right inside the server and switching kit. These are serious changes; the good news is, they are all being well-managed. The following pages should give you some pointers to get started. See you on the other side (page 47). ●

SDN:
Infrastructure Extreme Makeover

Think software-defined networking won't mess with your cables? Think again, says *Wendy Schuchart*

Whether you're feeling the crunch of bandwidth issues or starting to outgrow your space, it's time to consider whether software-defined networking (SDN) makes sense in your organization's data center. SDN may be software at its heart, but it's a big move and will cause changes to the physical infrastructure of the data center. It's an opportunity to future-proof the facility or address nagging issues with bandwidth or efficiency. Or you may be able to combine an Ethernet speed upgrade with SDN to improve operational efficiency.

"Traditional data center network architecture is built around predetermined paths with alternative back-up links that mimic a tree structure," said Andre Kindness, principal analyst at Forrester Research. "With traffic required to ascend/descend a tree structure to get to another section of the infrastructure, the links have to be increasingly larger as packets get closer to the core. In general, the overall network system becomes less efficient as the data center network gets larger."

Growing pains are something that most data center administrators will certainly commiserate with, but as the network expands, they will find that efficiency decreases exponentially. ▶

> *Weird appliance warts and wonky workarounds go away!*
>
> **Andre Kindness, Forrester Research**

APPLIANCE WART CREAM

"SDN provides the ability to optimize the paths and links since the system is choosing the best path per packet, taking multiple variables into account," Kindness said: "The network becomes a mesh of connections. The size and quantity of uplinks becomes less critical on switches too," and both switch and network architecture changes.

"Weird appliance warts dangling off the network and wonky workarounds go away too. This is especially true if the network leverages services such as virtual firewalls," said Kindness.

It comes down to the very fabric of the technology, but it could be enough to actually save money on infrastructure in the long run. "In an SDN, much of the intelligence is moved to a controller that is separate from the individual devices," said Andrew Lerner, research director of networking at Gartner Research in Stamford, Connecticut.

"In doing so, you need less robust capabilities (ie, features) in the hardware. Not that hardware immediately becomes a commodity, but differentiation shifts towards software. So it makes sense that network hardware expenditure goes down," said Lerner.

"This also changes the thought process around support and maintenance operations," Lerner said. "Perhaps it makes more sense to self-spare than to pay maintenance on all equipment. Further, more and more changes are made in software at the controller layer and programmatically, so you're doing less device-by-device configuration."

SDN will cut the physical footprint, said Sky Sharma, a CIO at the United States Air Force: "By allowing agility and programmable configuration, the infrastructure will be leaner in its physical footprint. SDN helps to achieve better allocation of critical bandwidth and decreases complexity of topologies by design."

And it's symptomatic of other changes: "As companies move from 1GbE to the server to 10GbE and beyond, they are replacing hardware anyway, so that also gets them

Will SDN change your cables?

Vendors like to say it's all plug-and-play, but the chances are you'll be ripping some cables in the process of implementing SDN. Whether for efficiency, bandwidth increase or basic incompatibilities, don't think you can get away with an SDN upgrade without pulling apart some racks.

According to Mike Fratto of Current Analysis, this might push a move to fiber, with attendant difficulties: "New cabling is needed when going from 1GbE to 10GbE and beyond. When you adopt or replace fiber for 10GbE and beyond, companies can't field terminate it any more. It all has to be done in a clean room. That explains the industry's efforts to prolong the useful life of copper (see page 41).

Cisco has a new technology called BiDi that runs 40GB over 10GB fibre cable, which can avoid a big and costly change to structured cabling – for a little while at least. However, BiDi is proprietary right now, so unless it meets your needs, most CIOs would be best advised to look for a more standards-based solution.

newer network operating system software supporting both APIs and SDN protocols like VxLAN and OpenFlow," said Mike Fratto, principal analyst of enterprise network systems at Current Analysis.

Even though SDN might seem to absolve you from hardware worries, it's well worth tracking the Ethernet specifications on which your network will operate.

When we think about future-proofing the data center, we need to consider that 10GbE will eventually go the way of the dinosaur. While 40GbE and 100GbE are already open standards today, there are proposals for 25GbE and 50GbE standards that may complicate the switching picture for your future data center upgrades (see box, opposite).

The new specifications are still under development and won't push the performance of data center networks in the immediate future, but they will offer choice when the standards are eventually signed off and implemented in products.

If you have enough network bandwidth and you're willing to accept a VMware-centric solution, VMWare's NSX can be simply installed and there's no impact, but there are a number of issues involving bare metal servers and the need for gateways on the network.

If virtual network separation is difficult in your site, you may need to physically upgrade the network to either OpenFlow or Cisco ACI, which should bring other benefits, including cutting cable clutter. A big benefit is predictability: "Networking is changing in data centers from N tier architectures (where performance was a bit less predictable) to two tier leaf/spine or one tier, in some cases (where performance is more predictable). Predictable architectures are simpler to use because the SDN doesn't have to think about performance differentials," Fratto said.

Of course, smart money builds a network at its core that can take care of your business needs now, and probably for six years, because you don't want to change your core network out. Consider how much bandwidth

you're using and how much you think you will use, and then buy an SDN platform that's expandable beyond that with simple upgrades.

But maybe we're getting ahead of ourselves. Despite the promises, not everyone is looking forward to the SDN revolution – and real-life adoption has been slow to date.

"I'm bullish on the opportunities and potential that SDN promises, but there are still only small pockets of adoption today that are quite limited in scope, or that address a specific need," said Mike Spanbauer, vice president of research at NSS Labs, a security analytics firm in Austin, Texas. "Traction remains sluggish for any general use cases."

While overall SDN could save cash in the long run, some data center professionals see the technology as yet another threat to their livelihood – a virtual offshoring of their responsibilities. "SDN fundamentally changes the way other infrastructure and operations professionals can leverage the network," said Kindness. "SDN can empower other teams. While SDN can lift a lot of manual and repetitious burdens off networking professionals, it also scares the daylights out of them because it 'appears' they aren't needed, when it's in fact the opposite."

"Networking professionals will be needed more than ever," said Kindness. ●

25GB and 50GB tangle Ethernet

Some day 10GbE will go the way of the dinosaur. But what will replace it? There are 40GbE and 100GbE standards, but 25GbE and 50GbE are also proposed.

The IEEE has only recently begun shaping the 25GbE specs and won't even talk about 50GbE yet, but industry analysts say the upstarts could be game-changers. Broadcom is pushing: it's in the 25 Gigabit Ethernet Consortium, and showed 25GbE in its StrataXGS Tomahawk Switch.

The specs are supposed to deliver 2.5x the performance of current 10Gbps and 40Gbps Ethernet linkages. This gives you choice – or you may be forced to adopt them eventually.

$3.67bn

SDN market forecast 2019 – Forrester

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Copper keeps data centers low-fiber

Standard UTP and structured DAC cabling will keep copper wiring relevant in server racks for the foreseeable future, says *Martin Courtney*

When it comes to data center cabling, fiber optic may have the edge in speed and length, but copper wiring and interconnects are still very much alive and kicking. What's more, they are likely to remain firmly embedded in some corners of data center infrastructure for many years to come.

"People may be trying to kill copper, but it is not dying off," says Shain Walsh, senior vice president of corporate marketing and development at Emulex, which manufactures a range of Ethernet adapters and fiber channel converged network adapters under its own brand and those of Cisco, EMC, HP, HDS, Huawei and others.

"The last data point we have is from a host connectivity survey from Crehan Research, which showed that just over 20 percent of the host 1Gbps ports are still copper. The cost and the proven nature of the Category 6 (CAT6) cabling continues to be in demand by data centers, and the cost delta between dealing with small form factor (SFP) [fiber transceivers] and optical cables is what's driving that. The other pragmatic part is

that most people do not need the full length of optical," says Walsh.

Research from Dell'Oro Group predicts that 80 percent of server connections will be 10GbE-based by 2018, with most intra-rack connections linking servers to storage, and leaf switches using some form of copper cabling over the short distances required.

That cabling is likely to be either twinax 10GBase-CR in the direct attached cable (DAC) format, which comprises a fixed length cable with SFP+ plugs integrated into both ends, or 10GBase-T using twisted pair CAT6 or CAT6A copper cabling, which pushes data at speeds of 10Gbps up to 100m and is backwards-compatible with 1GbE cables, meaning no wiring upgrades are required.

And with network interface cards and 10GBase-T Lan-On-Motherboard (LOM) equipped servers widely available, Dell'Oro Group believes the next few years will see increasing numbers of enterprise scale data centers in particular, accelerating their 10GBase-T deployments.

The research company predicts that 10GBase-T port shipments will double those of SFP+ DAC by 2017, primarily driven by the vast installed base of legacy 1Gbps ▶

> *We see copper as one of the main interconnects used inside the rack at 100GbE*
>
> **Arlon Martin, Mellanox**

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UTP links between the server and top-of-rack switches being refreshed.

Not all data centers are the same, and precise upgrade paths are difficult to predict in every case because not every data center is the same. Some place much higher bandwidth, latency and throughput demands on their cabling infrastructure than others, depending on their business. Many facilities deploy different environments for blade servers and box servers, and wiring upgrades are often tackled one step, row, or rack at a time rather than undertaken as complete redesigns, which usually results in a broad mix of different technologies being deployed concurrently.

There is certainly a sense that the broader data center market is becoming segmented as the requirements of Web 2.0 companies such as Google, Facebook and Amazon, and cloud service providers and telcos running hyperscale facilities force a faster migration to 25GbE and 40GbE server interfaces that already rely on 10GbE fiber optic cabling and interconnects between top-of-rack and aggregation switches, for example.

Leading-edge data centers may have to move to fiber in order to get the benefits of newer technologies. "The early adopters will go fiber first because those standards tend to get written first, but there is a difference in the way people use their data centers," says Carrie Higbie, global director of data center solutions and services at network cabling specialists the Siemon Company. "If you take an ISP or Google, or Facebook, their revenue is their data center, so their cost base for that business is significantly different from that for a bank, for example," says Higbie.

Different architectural approaches may affect the choice of cables. For instance, some approaches replace top-of-rack switches with one switch at the end of each row to cut the power wasted in underutilized switch equipment. These configurations may swing the choice between UTP, DAC or fiber optic cables, particularly in small data centers for which centralized switching represents the least expensive option, and where server virtualization is not as widely used.

Clearly, cost is a big factor in any data center cabling upgrade decision, but other factors – including availability, standardization, power consumption, distance and cabling media characteristics – also play their part. The IEEE's next-generation 40GBase-T standard is currently being defined to run at 40GBps on some form of Category 8 structured copper cabling system, with greater shielding to prevent crosstalk and boost signal distance. But it could be another five to seven years before suitable products reach acceptable price points and energy consumption levels.

"I think [40GBase-T] is a year-and-a-half out or so, and with the first round equipment power will be a concern, so it will take a good three to five years before the stuff becomes commercially available and affordable," says Higbie. "You will have the bleeding-edge users that will drop in, but some of those guys are using fiber 40GbE today. They will be the first to push the envelope, but that is not the typical, average company's data center by any stretch."

Elsewhere, many vendors have developed 25GbE and 50GbE SFP+ over DAC in rack interconnects, and top-of-rack switches that are able to truncate multiple ports to offer 100GbE and 200GbE speeds using four lanes of fiber or copper pairs in the future.

"We see copper as maybe not the principal but one of the main interconnects used inside the rack at 100GbE," says Mellanox senior director for marketing, Arlon Martin, who believes an 8m length could be enough to satisfy 98 percent of in-rack cabling requirements. "In the large data center space, it will be the predominant form of in-rack 100GbE, the reason being that most servers will move from 10GbE to 25Gbe or 50GbE ports using the QSFP form factor."

But in smaller hosting facilities, the cost and management advantages of UTP will keep 1000Base-T and 10GBase-T wiring in demand for some time to come. "Most people did not think copper would be a strong player in 10Gigabit, and it proved to be," says Walsh.

"I don't think copper is dead," says Higbie. "If 10GBase-T is going to get into most data centers, even those that are highly virtualized, it is going to stay there for a good while." ●

COPPER STANDARDS

Speed [Gbps]	Distance [m]	Name	Standard/ Year	Notes
1	100	1000Base-T	802.3ab 1999	At least Category 5 cable
10	100	10GBase-T	802.3an 2006	Category 6a cable
40	≥30	40GBase-T	802.3bq (draft)	Proposed Cat 8 shielded cable

Silicon photonics:
Wait for it

Running light signals into your hardware will disrupt your network, says *Michael Kassner*, but not just yet

Michael Kassner
US Contributor

🐦
@MichaelKassner

Back in 2011-12, there was a plethora of breakthroughs in silicon-photonic research, with a number of companies claiming big advances, including Intel and IBM, and an expectation that the technology would quickly change the way data centers are built. But a quick search today shows that new information about "lighting up silicon" is almost non-existent. Has the promise not been fulfilled? We asked an expert, Giacomo Losio, head of technology at ProLabs and previously lead optical engineer for Cisco's transceiver module group.

What is silicon photonics? Losio defined it as technology that employs silicon (instead of glass) as the light-transport medium. Since silicon is used for integrated circuits, it is conceivable that a hybrid device containing both optical and electronic components could be fabricated on the same substrate — simpler, faster, and all-around better.

However, most fiber-optic/electronic interfaces do not use silicon photonics. Instead, devices use discrete electronics and optics similar to that described by the Fiber-Optic Association:

Electrical signals enter the transmitter and are converted into optical signals (LED or laser). The light from the transmitter then travels through the connected fiber-optic cable. Receiving an optical signal from a connected fiber-optic cable enters the receiver where a detector converts the light into electrical impulses.

This technology has been around for many years and works well. However, the technology is expensive and labor-intensive, due in large part to all the individual electronic components — microchips, amplifiers, drive optics, lasers and photo eyes, to name a few.

For several years, researchers investigated silicon as a way to do away with separate components. However, silicon has several undesirable characteristics. "Silicon is a poor candidate for photonic applications because its electronic structure has an 'indirect band gap', making it a poor light emitter," Mario Paniccia, director of Intel's photonics technology laboratory, explains to SPIE's Optics.org. "This means that when an electron and hole combine in silicon, the resulting energy released is more likely to be emitted as vibrational energy, or phonons rather than as photons."

Silicon afforded researchers at Intel's photonic lab another stubborn problem: how to modulate optical signals. The material is not known for its ability to change optical properties in response to an electrical field — in technical terms, silicon lacks an electro-optic effect.

The good news is that in 2011, Paniccia and his research team figured out how to overcome silicon being a poor light emitter and not having an electro-optic effect.

The bad news: for years there have been no disruptions, just a few blips on the silicon-

2017
When Fujitsu will likely release product using silicon photonics

COBO focuses on standards

The Consortium for On-Board Optics (COBO) is pushing for integration: it wants to move optical modules from the faceplate to within the networking equipment. To do this, co-founders Cisco, Dell, Intel, Juniper Networks and Microsoft will develop new standards for on-board optical modules. "The consortium will immediately begin collaborating on a set of industry standards that define electrical interfaces, management interfaces, thermal requirements, and pinouts to permit the development of interchangeable and interoperable optical modules that can be mounted or socketed on a network switch or adapter motherboard," the group said.

photonics marketing radar.

Losio suggests patience: moving from laboratory to beta-testing to production when integrated circuits are involved usually means a five to ten-year development cycle. Unlike discrete components on a PC board, if there is a mistake in the chip design, the prototype chips are scrapped, the design changed, and the entire chip-fabrication process starts over.

There are some silicon-photonic-based products in the marketplace right now, one of which is the ubiquitous fiber-optic transceiver.

Unlike traditional fiber-optic transceivers using separate components packaged in a hermetically-sealed mechanical assembly, silicon photonic-based transceivers have all the required components on a small integrated circuit, similar to that pictured in the diagram (see right).

Fujitsu appears to be relatively close (early 2017) to releasing its first product using silicon photonics — the Optical PCI Express server. Fujitsu's Primergy platform and Intel's optical PCI Express technology showcase new silicon-photonic connections that allow PCI cards to be located away from the motherboard. This affords engineers a great deal of flexibility and should change how servers and racks are designed.

Victor Krutul, director of marketing for the silicon photonics operation at Intel, agrees: "The solution to current power and space density problems is to locate the storage and compute components on a remote blade or tray in such a way that they appear to the
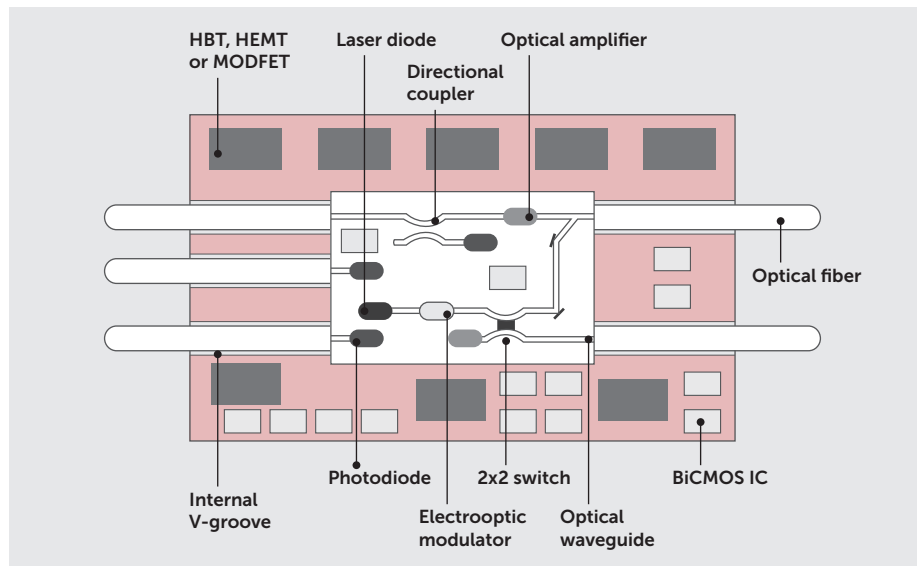
Silicon photonic transceivers have all the required components on an integrated circuit

CPU to be on the main motherboard."

Building on the Fujitsu collaboration is Intel's Rack Scale Architecture introduced in early 2014. Intel threw out the current rack design, coming up with a very different-looking rack based on silicon photonics, that does the following:

- Enables pooled and disaggregated compute, network and storage resources
- Exposes hardware attributes to the provisioning management layer
- Allows software to compose a system based on the requirements of a specific application
- Simplifies cooling and power distribution

Intel and a slew of other companies think silicon photonics will be a disruptive technology, given its potential to commoditize interconnections.

"It also introduces some of the optical features that make dynamic pathing possible in carrier networks," says Michael Bushong, vice president of marketing at Plexxi. "This allows network architects to provide dynamic bandwidth on a static infrastructure."

The disruption extends beyond the rack to the data center and to inter data-center communications: "Ultimately, the future of networking has to scale in terms of both performance and cost," adds Bushong: "And it has to scale across switching, management, and the interconnect. Photonic switching will undoubtedly be the third leg of the commoditization stool. ●

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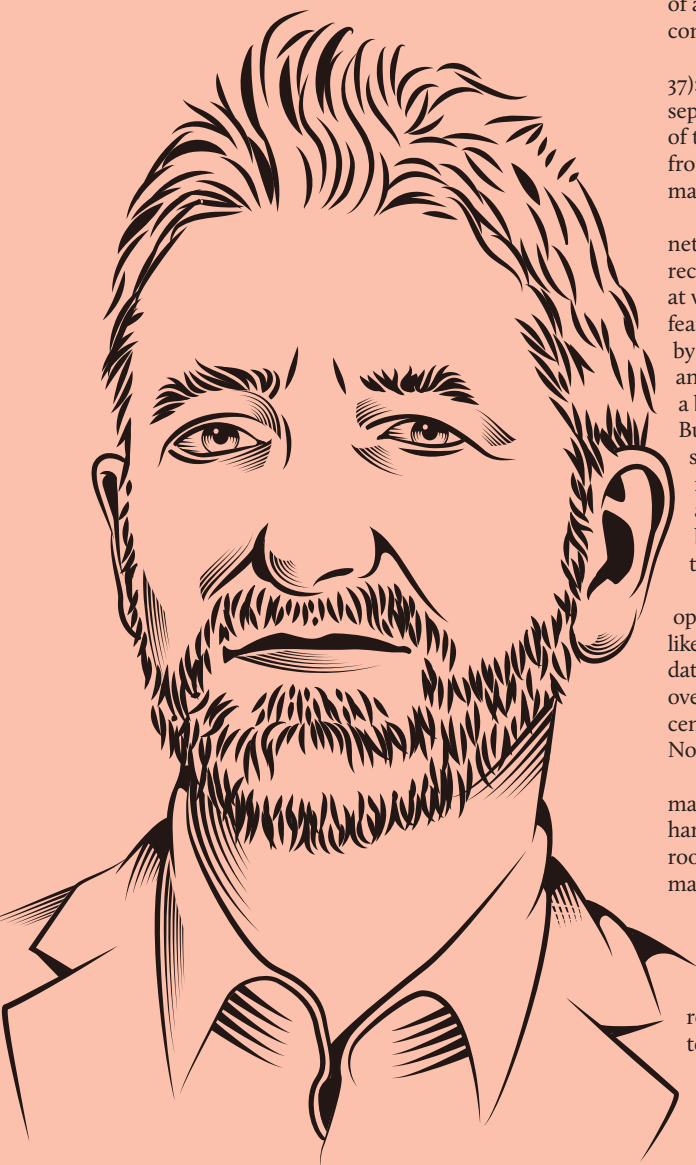
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Who wants to have a revolution?

SDN, fiber and silicon photonics could utterly change networks – but not until they are good and ready, says *Peter Judge*

What is actually happening in the world of cables? After reading the first few pages of this cabling and connectivity supplement, you might well be wondering if anything is going on at all.

We took on this supplement as a chance to catch up with a world that, by all rights, should be in turmoil.

SDN, fiber and silicon photonics are all in the process of revolultionizing the cables in your server room, if you believe their PR. So we briefed three expert writers and sent them off to the frontlines to be our war reporters. What came back to us was a surprise.

There is plenty of news. Lots of activity, lots to understand. But conflict and rapid change? Nope.

Take SDN (see feature, page 37): software-defined networking separates the data handling features of the network from the management.

An SDN network can be reconfigured at will and new features added by downloading an app. That's a big change. But it's coming slowly, and no CIO is adopting it before the time is right.

Fiber optic cables, likewise, offer a chance to carry data faster between servers, and over greater distances. But are data centers leaping at the opportunity? Not really.

More advanced forms of fiber may perform better, but they are harder to handle. You need a clean room to terminate the cables, and major upgrades to your switches.

Instead of leaping at the new, the industry is finding ways to extend copper.

This is not a Luddite response. There's actually technical innovation in the new structured cabling standards (Cat 8 anyone?) that will carry data faster and let IT people install new architectures without the pain of utterly new hardware.

Finally, what about silicon photonics? The response from the industry, it seems, is: "Wake me up when it's ready."

Running light signals straight into the chips of your IT kit will be a fantastic breakthrough. But right now, like so many other good ideas, it's a lab project.

No one is going to implement it in a data center until it's actually working. Reliably. Every time. With standard products, available from multiple suppliers.

That's true for all these technologies – and it's how the industry should be.

SDN startups need to know they can't get a free ride on hype. In a meritocratic industry, their ultimate success will be down to their delivery of decent stuff.

Likewise, advances in materials may create opportunities, but the real story is in how new and existing technologies are adapted to make the best use of any innovation.

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CIOs are sensible. That's not a shock headline, it's a basic truth. They have new networking technologies on their radar but – to state the obvious – they only use stuff when it's actually useful.

Show the IT community real benefits and they jump in, but not for technology's own sake.

This might disappoint us as journalists, but it's exactly what the industry needs.

> *We sent out war reporters. What we got back was much more positive and creative than any war story*

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The Role of Tax Breaks and Regulations in the EU Data Center Industry
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North America Metropolitan Hub Series: The New York Regional Data
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REPORT
Global Data Center Market Trends Report 2014–2015
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April–June 2014

ENERGY & COST MANAGER + CRITICAL OPERATIONS PROFESSIONAL
London, Quito, San Jose, Sao Paulo, Mexico, Buenos Aires, Brasilia, HK, Madrid, JKT, Lima, Istanbul
April–June 2015

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2 New Webinars From The Leaders In Data Center Technology

I Heard It Through the Grapevine
Don't Be Last to Learn About Your Data Center's Failure

EMEA: Tuesday April 28, 3pm BST
AMERICAS: Tuesday April 28, 1pm CST
APAC: Wednesday April 29, 1pm SGT**

The last thing you want to hear is that your data center is down. Even worse, is reading about it online on your way to work.

Last year, a data center breach cost the average business $3.22 million*. But how do you keep ahead in Data Center Risk Management and minimize the chances of it happening to your business?

Learn about the 6 Layers of Data Center Security and avoid seeing your name in the media, by joining global data center Infrastructure-as-a-Platform (IaaP) provider Anixter's free webinar.

*Ponemon Institute 'Cost of Data Breach' study, 2014
** APAC customers:please note the following equivalent times –
India: 10:30am; Indonesia, Thailand: 12 noon; Singapore, Malaysia,
Philippines, China, Taiwan, Hong Kong: 1pm; Australia (Sydney): 3pm;
New Zealand: 5pm

www.datacenterdynamics.com/anixter-webinar

A pPUE Approaching 1
Fact or Fiction?

Tuesday 5 May, 3pm BST (10am EDT; 4pm CEST)

Every data center manager dreams of a pPUE of 1. The challenge is: how to achieve it?

A good place to start is a hard look at your center's cooling system. Is it tuned for optimum energy efficiency? Does it meet the latest environmental standards? Are you maximizing your potential savings?

Answer these and other critical questions facing DC professionals today in leading global data center solutions provider Rittal Corporation's free webinar on Data Center Cooling Technology.

www.datacenterdynamics.com/rittal-webinar

30,000
Guests expected at DCD Converged in 2015

The machinery for change

There is a special energy in the US that I love. As you can read inside this issue, *DCD* magazine went to the Open Compute Summit in San Jose to report from, and connect with, the liveliest innovators on the planet.

Let me give you one example. The evening before the Open Compute Summit, I was in the business lounge of the Marriott Hotel with the chief architect of a company which, for now, shall remain nameless. His name was Steven and he was accompanied by his channel development executive Nick.

Steven decided, at about 11.30pm, that there were too many wires in the piece of kit he was demonstrating the next morning and went about eliminating them. At about 1.00am he was joined by his CEO, who called their patent lawyer. He applied for the patents for the new wireless design in the early hours, and when Steven took to the floor of the developers' conference at 9.00am he was able to present a radical new product born in the space of a few hours the night before.

This energy, and need to perfect products, was evident at the San Jose event, but there was an interest in tech that pervaded not just the delegates but everyone. As the song *The Future* says of the US: "It's here they got the range and the machinery for change, and it's here they got the spiritual thirst." It's also where they've got the bratwurst that fuels Steven and Nick.

After a week in Silicon Valley, it was time to move on to the East Coast and our very own *DCD* Enterprise USA event. New York is always a blast, but the conference was a sheer whirlwind. I've been to many industry events over the years, and there are usually one or two memorable scenes, discussions or discoveries. At Enterprise USA, there were too many to remember. The sheer numbers in attendance were the best of any event I've been to for years, but don't trust my word for that. Just watch the videos of delegates and sponsors of major IT companies who said this was one of the best events they had ever attended. And the attendees were out to spend.

The new security event track was packed to the rafters with live-wire speakers and a great level of interest given the renewed worries about data center security. The industry is moving in the right direction and we are at the heart of it. Sail on!

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Bill Boyle - *Global Managing Editor*
🐦 *@billboyleDCD*

> *Steven decided there were too many wires and eliminated them overnight*