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January 2017

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Our tracks guide you through the DCD magazine, website and events

-  **Colo + Cloud**
-  **Power + Cooling**
-  **Design + Build**
-  **Security + Risk**
-  **Core>Edge**
-  **Servers + Storage**
-  **Software-Defined**
-  **Open-Source**

# Meet the team



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Former CIO, test lab leader and developer. Our man in Philadelphia gets his hands dirty.



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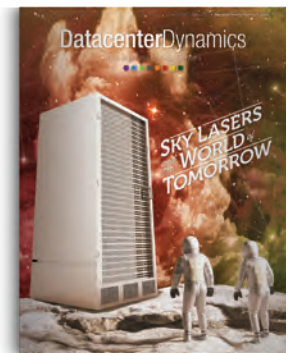
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# The future's not what you expect

**N**ate Silver's 2012 book *The Signal and the Noise* explains why polls and predictions are so often wrong. He predicted Obama's wins - but this year his career as a celebrity seer took a big knock. On the morning of the 2016 presidential election, he gave Hillary Clinton a 71.4 percent chance of winning.

Why are predictions wrong? I'm not talking about the glut of identical forecasts we receive each new year from the industry. As usual, this year we've been told that Storage demands are rapidly growing, network speeds are increasing, cyber attacks are proliferating... and everyone needs the latest product from Company X.

Let's ignore these marketing messages disguised as forecasts, and consider the actual business of real predictions, where Brexit and the US elections are just the most recent examples of prophetic failure.

"It is difficult to make predictions, especially about the future," says a joke attributed to Mark Twain and the Danish physicist Niels Bohr, but probably first said by another Dane, the politician Karl Kristian Steincke.

I would never have predicted that free-space laser light would prove to be a good enough communications medium to supplement optical fibers. It seems (p18) that it also took the British Interplanetary Society and NASA by surprise - but space lasers are soon to be used for backhaul between Equinix data centers.

**Larry Ellison**, of Oracle, was less than oracular in 2008, when he described cloud computing as "idiocy" and "gibberish." Now, Oracle is retooling to make use of the cloud (p24). The company is a couple of years late thanks to Ellison's dud forecast. We look at Oracle's delayed cloud implementation, and the data centers that support it.

Another failed prediction was the idea that ARM server chips would mount a serious challenge to Intel's processors in low-power scale-out applications, but that fizzled out. It turns out that ARM is making a serious challenge, but it will be in an area no-one predicted: high performance computing.

The difficulty of real prediction is it involves looking beyond the world around you, not just extrapolating.

**Who is going to get it right?** I reckon our Awards Winners (p28) are in with a chance. It's the tenth year of the DCD Awards, and past recipients have shown clear vision and tactical thinking. This year, I predict more far-sighted work from the data center community.

And one more prediction: We will have a new look in 2017. I think you will like it!

•  
Peter Judge - Global Editor

•  
@Judgecorp



*Brexit and the US elections are just the most recent and spectacular examples of prophetic failure*

# 42%

of statistics used to make predictions are just made up (BOMUS - the Bureau of Made Up Statistics)



## Amazon uploads petabytes by truck

Amazon has launched a service which will take 100 petabyte (100PB) by truck from the customer premises for upload to the Amazon Web Services (AWS) cloud.

The Snowmobile truck, with optional security guards, was announced by AWS chief executive Andy Jassy at the company's annual re:Invent conference in Las Vegas. It extends last year's announcement of Snowball, a 50TB storage unit in a rugged, tamper proof box, with which businesses can send large chunks of data to the AWS cloud by post. Jassy also announced Snowball Edge, a 100TB upgrade to Snowball which can be clustered and rack mounted.

Many companies have more than an exabyte (1,000PB) in their data centers, and they are clamoring for faster ways to move this data, said Jassy, before he was joined on stage by a 45ft shipping container on a truck. Sending an exabyte of data to AWS using a 10Gbps network pipe would take some 26 years, but this drops to less than six months with a fleet of 10 Snowmobiles, he explained.

Like the original Snowball, the Snowmobile shipping container itself is ruggedized and tamper-resistant. Powering up the Snowmobile and its built-in climate-controlled equipment requires around 350kW of AC power, though

AWS says it can arrange for a generator if there is insufficient capacity on site.

Once in place, the Snowmobile is hooked up to the data center using fiber optic cables, where it appears as a local, NSF-mounted volume. Existing backup and archiving tools can be used to shunt data over to the Snowmobile, and when it arrives at an Amazon facility, it can be ingested into Amazon Simple Storage Service (S3) or Glacier.

Multiple mechanisms ensure that the data on the Snowmobile is protected, including chain-of-custody tracking, video surveillance, GPS tracking, and cellular or satellite connectivity back to AWS.

Snowmobile is already in use by satellite imagery firm DigitalGlobe, to move 100PB to AWS. "Like many large enterprises, we are in the process of migrating IT operations from our data centers to AWS," says DigitalGlobe VP of infrastructure Jay Littlepage. "Our geospatial big data platform, GBDX, has been based in AWS since inception."

<http://bit.ly/2gQKu7O>

### Suse buys HPE's OpenStack

Hewlett Packard Enterprise (HPE) will hand over its OpenStack and Cloud Foundry to Germany's Suse, which becomes HPE's preferred open source partner.

### Anchor cuts off islands

A ship's anchor cut three fiber optic cables to Britain's Channel Islands, causing Internet delays, as traffic had to be routed via France in December.

### Emerson becomes Vertiv

Emerson Network Power's data center division finally became Vertiv, owned by Platinum Equity, with a new CEO, Rob Johnson.

### Alibaba goes global

Aliyun, the cloud division of China's Alibaba has opened in Sydney, Germany and Japan, and opened its own facility in Dubai.

### Micron makes 8TB SSD

Memory maker Micron has launched a range of SSDs that includes a monster 8TB device - the highest capacity SATA-enabled solid state drive on the market.

## Vox Box



**Yuval Bachar**  
Global Infrastructure  
Head  
LinkedIn

### How is LinkedIn's Open19 project for a new rack standard going?

We've reached a point where we have all the systems up and running in our labs, the switch is running open software, we have five or six sources of servers, the cage and the backplane connectivity are working, and we're ready to go to production in the next couple of quarters. We hope to set up a consortium to do the sharing in a more organized way.

<http://bit.ly/2gh5WUU>



**Michael Adams**  
EMEA Director  
Integrated Data Centers  
Panduit

### Why do customers need 100Gbps in the data center?

There has been a huge amount of focus on compute, and mobility and storage, but traffic is growing exponentially. Recent Cisco research showed that 40 percent of the traffic in a data center is machine-to-machine, and only around 17 percent goes out of the data center. The real challenge we have is that the infrastructure does not get the attention and investment it needs.

<http://bit.ly/2gZpqLR>

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### SDN/NFV: Start of a Revolution – Are you Ready?

Jeremy Rossbach, CA Technology  
Brad Casemore, IDC  
Stephen Worn, DatacenterDynamics

▶ Watch here: <http://bit.ly/2gO3bKS>



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### Is Hyperconvergence a Viable Alternative to the Public Cloud?

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Rich Kucharski, Simplivity  
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▶ Watch here: <http://bit.ly/1ZIlg2e>



### Powering Big Data with Big Solar

Bill Thomas, First Solar  
Adam Kramer, Switch  
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▶ Watch here: <http://bit.ly/29sZ5CJ>



### Next Generation Data Centers – Are you ready for Scale?

Qing Xu, Belden  
Stephen Worn, DatacenterDynamics

▶ Watch here: <http://bit.ly/2bKEb7a>



## Drone park gets a \$10m data center

EdgeData is building a \$10 million data center for a military/commercial business-park at Grand Forks, a US Air Force Base in North Dakota that flies drones.

Grand Sky is a 217-acre business and aviation park, dedicated to drones, or unmanned aerial systems (UAS). It is located on the Grand Forks Air Base, which flies the RG-4 Global Hawk and the Reaper and Predator drones. The new 16,000 sq ft data center will cost \$10 million and provide colocation space for Grand Sky tenants by the end of 2017.

North Dakota wants to be a "Silicon Valley for drones," capitalizing on its clear atmosphere and the presence of Grand Forks. The state has spent about \$34 million nurturing drone business, much of it going to Grand Sky. While Grand Sky is intended to foster both military and civilian drone

industries, the first tenants, General Atomic and Northrop Grumman are very much from the military side.

The EdgeData building will allow integration and sharing amongst Grand Sky tenants, to make better use of data from their projects, said Thomas Swoyer, president of the Grand Sky development company: "For the UAS industry, as well as a number of other industries, the real value of operations lies in the data produced through imagery and other technological applications."

The site will initially hold up to 72 cabinets of IT equipment in 6,000 sq ft of data center space, with space available for future growth. It will have redundant power, multiple fiber optic connections and layered security.

"EdgeData will immediately become the North Dakota-based industry leader in big data applications, and is pleased for the opportunity to develop the world's first UAS-focused data center," said Lonnie Bloomquist, CEO of EdgeData.

The data center and its tenants will get

tax exemptions on equipment purchases, which the State of North Dakota says are designed to diversify the local economy, supporting tech and small businesses.

"These data centers will bring high-tech jobs with matching salaries and support the growth of other small boutique businesses by providing the necessary IT support to grow these businesses," said State Representative Mark Owens.

<http://bit.ly/2htoAXp>



## GoDaddy to buy Host Europe Group

GoDaddy, the giant US-based cloud platform for small businesses, is buying Host Europe Group (HEG), which describes itself as Europe's largest privately-owned cloud and domain provider.

The \$1.79 billion (€1.69bn) deal has been approved by GoDaddy's directors and HEG's shareholders and is expected to complete in the second quarter of 2017, subject to regulatory approvals. Among other assets, HEG has a recently refurbished data center in Leeds, as well as four other UK locations, six in Germany, and one each in France, Spain, Romania and the US (St Louis).

Both companies have focused on serving small businesses and web professionals, and there is reckoned to be little geographic overlap between their empires. HEG owns the registrar 123 Reg, and has acquired multiple brands including Domain Factory, Heart Internet and Germany's Intergeria.

GoDaddy says it will integrate most of HEG's business, but the PlusServer managed hosting service could be sold, as this has a different business model. PlusServer has a dedicated sales force and account management, and works with larger companies.

The combined European operations of the two companies will be led by HEG CEO Patrick Pulvermüller, reporting to Andrew Low Ah Kee, GoDaddy's international executive vice president.

HEG has 1.7 million customers, and is expected to generate approximately US\$328 million revenue and approximately US\$139 million in adjusted EBITDA earnings in 2016.

The company has been owned by private equity firm Cinven since 2013. The deal to buy it includes €605 million paid to selling shareholders and €1.08 billion in net debt.

GoDaddy says it will also maintain and develop HEG's two conferences: World Hosting Day and NamesCon.



<http://bit.ly/2gkq3kS>



### Peter's random factoid

Google plans to use 100 percent renewable energy before the end of 2017

An advertisement for EnerSys UPS. The background is a dark red gradient with a silhouette of a human head in profile, facing left. The head is filled with a pattern of binary code (0s and 1s). Overlaid on the head is the text: "Cut cooling costs by raising data center temperature by as much as 9°F". Below the head, the text "RETHINK UPS" is written in large, bold, white capital letters. At the bottom right, the EnerSys logo is displayed, consisting of the word "EnerSys" in a stylized font with a red swoosh underneath, and the tagline "Power. Full Solutions." below it. At the bottom left, the website "www.enersys.com/XE" is listed. At the very bottom, there is small text: "© 2016 EnerSys. All rights reserved. Trademarks and logos are the property of EnerSys and its affiliates unless otherwise noted. Subject to revisions without prior notice. E.&amp;O.E."



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## Frantic growth in Frankfurt

According to analysis by real estate services giant CBRE, Frankfurt reached 30MW of colocation take-up in 2016 by Q3, more than any European market has managed in a full-year.

London, the reigning champion, was close behind at 28.7MW after adding 7MW in Q3, but may lose its title as the top market in Europe for 2016, CBRE reckons.

Across the continent, CBRE predicts that there will be continued strong leasing activity by cloud service providers in Q4, bringing the total annual take-up to over 100MW - a 30 percent increase over any other year.

"There has never been so much wide-spread interest in the data center industry," Andrew Jay, executive director of CBRE's Data Center Solutions team, said.

"The amount of colocation space acquired by the cloud service

providers in Frankfurt has been staggering and is indicative of how the cloud and Internet of Things have become so integral to everything we do in society."

Frankfurt's rise has in part come from German data residency laws that have led to more and more companies doing business in Europe's largest national economy to seek facilities in Germany.

Rackspace has announced plans to open a data center in Frankfurt, again citing data residency as one of the factors behind the decision, and Alibaba has said it will come to Frankfurt, while Keppel T&T has bought a stake in a Frankfurt facility.

October saw Colt announce a Frankfurt facility, while September saw Google reveal plans to come to the city, along with Interxion.

Microsoft's partnership with T-Systems International makes full use of Germany's data laws, putting T-Systems in control to legally block access by US authorities.

<http://bit.ly/2ghgnHR>

## Equinix buys Verizon's 24 data centers for \$3.6 billion

Confirming widespread rumors, Equinix has announced plans to buy Verizon Communication's data centers, adding 24 locations consisting of 29 data center buildings across 15 metro areas.

The \$3.6 billion all-cash transaction brings Equinix's global footprint to 175 facilities. Verizon has approximately 900 data center customers, some of which are already with Equinix.

"This unique opportunity complements and extends Equinix's strategy to expand our global platform," Steve Smith, president and CEO of Equinix, said.

Karl Strohmeyer, president of Equinix Americas added: "This deal gives existing customers access to new locations, ecosystems and partners."

The 15 metro areas the soon-to-be-acquired data centers operate in: Atlanta (Atlanta and Norcross), Bogotá, Boston (Billerica), Chicago (Westmont), Culpeper, Dallas (Irving, Richardson-Alma and Richardson-Pkwy), Denver (Englewood), Houston, Los Angeles (Torrance), Miami (Miami and Doral), New York (Carteret, Elmsford and Piscataway), São Paulo, Seattle (Kent), Silicon Valley (Santa Clara and San Jose), and Washington, D.C. (Ashburn, Manassas and Herndon).

Equinix noted that the Network Access Point of the Capital Region hosted in Culpeper, VA, "is a highly secure campus focused on government agency customers," bolstering the company's position as a provider of services to the public sector.

Once the sale is complete, around 250 Verizon employees primarily involved in data center operations will become Equinix employees.

<http://bit.ly/2h2kerf>

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## RagingWire announces third Virginia facility



NTT Com's RagingWire Data Centers is to build a third facility in the 'Data Center Alley' of Ashburn, Virginia.

The company plans to invest \$160 million in its 245,000 sq ft (22,761 sq m), 16 MW Ashburn VA3 data center. The first of a potential six buildings on the 76.5 acre site, it is scheduled to be available by the end of 2017.

"Virginia is the top data center market in the world and a strategic location for NTT Com as we expand our data center capacity," said Tetsuya Shoji, president and CEO of NTT Com.

Also in Ashburn are RagingWire's existing VA1 and VA2 data centers, with all three set to have a footprint of over a half million square feet of space and 44.4MW of power.

The company said that its investment is "significant for the Virginia economy not only for the jobs it creates, but also because it supports the exemption from the Virginia Sales and Use Tax on qualified equipment purchases by RagingWire and its customers."

These savings in tax revenues "encouraged companies to establish or expand their IT and business operations in Virginia," presumably then creating tax revenues.

Virginia Governor Terry McAuliffe said: "Thank you to NTT Communications and RagingWire for this major investment in the Ashburn VA3 Data Center, I recently met with NTT executives in Tokyo, and look forward to strengthening this important relationship as we build the new Virginia economy."

<http://bit.ly/2gU3Smd>

## LinkedIn opens flagship Oregon data center

LinkedIn has opened a start-of-the-art data center in Hillsboro, Oregon. Known internally as LORi, it consists of two buildings located on a campus managed by Infomart.

The facility offers 8MW of power capacity, cabinet-level cooling and a new network topology that relies on 100G connectivity. It has been awarded the Efficient IT (EIT) Stamp of Approval by the Uptime Institute, and is intended to serve as a template for future LinkedIn data centers.

Earlier this year, Microsoft announced plans to acquire LinkedIn for \$26.2 billion, but the deal is yet to pass regulatory scrutiny.

LinkedIn operates two other data centers in the US, in Virginia and Texas, and one abroad in Singapore, but its capacity needs keep growing. The facility

in Hillsboro is meant to serve as a test bed for Project Altair, a new hyperscale approach to infrastructure. The campus near Portland consists of two buildings and four data halls, featuring chilled door cooling developed by MotivAir that adjusts to the variable heat load, and 400-volt power distribution.

The facility has deployed just one type of network switch – the 'Pigeon', which was developed by LinkedIn engineers in-house. The entire network has been designed to use IPv6 protocol from day one.

"The advanced water side economizer cooling system communicates with outside air sensors to utilize Oregon's naturally cool temperatures, instead of using energy to create cool air. Incorporating efficient technologies such as these enables our operations to run a PUE (Power Usage Effectiveness) of 1.06 during full economization mode," explained Michael Yamaguchi, director of data center engineering at LinkedIn.

<http://bit.ly/2fmMkLe>

## Microsoft buys wind, sells spare backup power

Microsoft has nearly doubled its support for wind power, funding 237MW of capacity for its Cheyenne Wyoming site. At the same time, it has taken the unusual step of making its backup generators available to the local power grid.

Microsoft has a contract for fund the 178MW Bloom wind farm in Kansas, and will make up the rest of its requirements by paying for capacity at two other projects. This takes the company to 500MW of wind power in the US, according to a blog post by Microsoft president and general counsel Brad Smith, which also describes the plan to share the Cheyenne site's generators. "We're making our data center's backup generators available to the local grid, boosting reliability while keeping prices low for all ratepayers."

Microsoft's data centers currently get about 44 percent of their energy from renewable sources, and has promised to take that to 50 percent by 2018.

Microsoft is buying 178MW of power

from Capital Power's Bloom Wind Project in Kansas, using a new contract recently set up by Allianz Risk Transfer (ART) to fund wind projects. The rest of the 237MW is provided by contracts with local utility Black Hills' 59MW Happy Jack and Silver Sage wind farms in Wyoming.

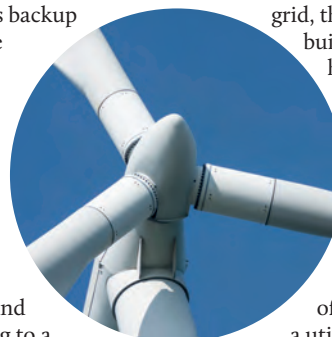
Meanwhile, Black Hills Energy can use Microsoft's backup generators at its Cheyenne site, in North Range Business Park, as a secondary resource for the local grid, thus avoiding the need to

build a new power plant to handle peak demands. The generators run on natural gas, which is better than diesel, Smith points out.

"Traditionally, when presented with a constraint on the system relating to reliability, load growth or the introduction of intermittent generation, a utility had one option: build new infrastructure, such as new substations, power plants or transmission lines. This ordinarily means higher costs to ratepayers," said Smith. "In this case, Black Hills Energy was faced with the potential need to build a new plant in Cheyenne."

Microsoft recently opened a 200kW prototype data center near Cheyenne, powered entirely by biogas.

<http://bit.ly/2hj6o2l>



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# Prospects for Google's new Asian regions

Its new Asian regions may be a bid to catch Amazon, but Google's regional director tells *Paul Mah* it is ahead in some respects



**Paul Mah**  
*SEA Correspondent*  
@PaulMah

**G**oogle's public cloud is lagging behind Amazon Web Services (AWS) and Microsoft Azure, but the search giant is in the midst of a massive expansion of its Google Cloud Platform, and it looks to be taking Asia very seriously.

Google plans to introduce 12 new regions in two years, and those plans will take its Asian regions to five, by opening in Tokyo, Mumbai, Singapore and Sydney during 2017, alongside its existing Asian service, delivered from Changhua County, Taiwan.

**To manage the expansion,** Google hired a new director of public cloud in the Asia Pacific region and Japan - Rick Harshman, who previously served as the head of AWS in India and was then AWS's head of the ASEAN (Association of Southeast Asian Nations) zone.

Harshman told *DCD* that the new Google Cloud regions will be welcomed by enterprise customers, and be a boon for companies and



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developers looking for low latency access to their data and cloud applications.

In particular, the new Singapore region will allow companies running applications on Google Cloud to serve content faster to their installed base in Singapore and Southeast Asia, he said. But how are enterprises in Asia Pacific using Google Cloud at the moment, and why should they even consider Google's public cloud platform?

"We see our managed services used for daily processes such as website and application hosting, identity and access management and storage," said Harshman.

**Google supports** containerized software, and provides the Kubernetes container management system: "Containers are a key piece of enabling companies to apply a hybrid cloud strategy. They are able to run their applications on premise as well as with other cloud providers."

Some public cloud providers coerce customers into a contract by offering varying levels of discounts for those that prepay or commit to a fixed usage term, but Google does not do that, he said: "There is no contract lock in, customers are free to come and go as they choose."

Google's game is to entice enterprises with collaboration and productivity services, Harshman says: "Google Cloud offers a number of services to enterprises. We are seeing companies use them in various combinations to increase productivity and digitize their business operations."

At least one of the zones for the new Google Cloud region in Singapore will probably run off Google's second data center that is currently being built there. The new multi-story data center is being constructed adjacent to Google's first data center in Singapore, and is scheduled to come

online in mid-2017.

While Google builds, we know that AWS and Alibaba Cloud already have at least two facilities in Singapore, in different parts of the island.

"The number of data centers a provider has is often mistakenly considered a direct measure of the provider's value," said Harshman. "Speed and reliability comes from not just how many data centers a cloud provider has, but also what hardware and software the facility is comprised of and the infrastructure that connects them."

Something he didn't mention is that competitors like AWS, Alibaba Cloud and SoftLayer are not often operating out of their own data centers in Singapore, but within other providers' facilities.

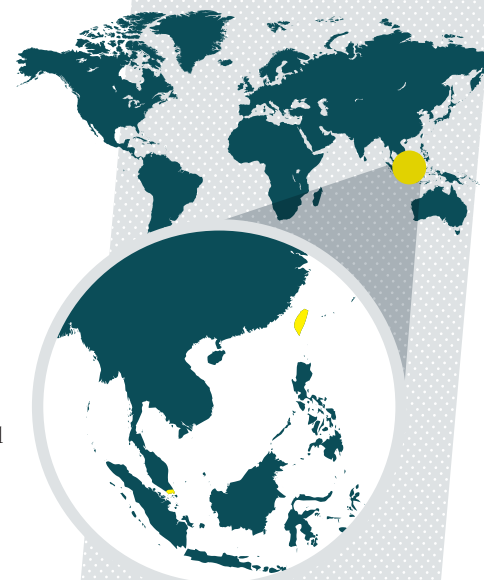
Another factor in Google's favor is a series of investments in physical data center infrastructure in the Asia Pacific region: "In addition to the new regions coming online in Tokyo, Mumbai, Singapore and Sydney, we have also launched three undersea cables in the last few months with faster speeds and higher capacity than ever before," he said.

"One of the strongest differentiators Google Cloud offers over other providers is its network," he continued. "Even without a region in Singapore currently, we are still often able to offer our customers better performance."

At a separate Google briefing, Lucas Ngoo, the CTO of Singapore mobile classifieds startup Carousell said his team moved to Google because of its affordability and the strength of its network.

**The Google Cloud region** in Singapore will be useful in other Southeast Asia countries, given the strong connectivity that Singapore has with its neighbors, said Harshman: "Singapore customers will see lower latency and other APAC countries will see a measurable difference as well." ●

*We had a Tier III data center that prevented the growth of the company*



### Google's current sites

#### Changhua County, Taiwan

Opened at a cost of \$600 million, uses a night-time cooling and thermal storage system

#### Singapore

Opened in December 2013, Google's first multi-story data center and its first in Southeast Asia, uses recycled water

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## Five years of expansion

2017

Brazil's Ascenty to open a 6-8MW data center in Santiago. Entel to produce a third phase (2,000 sq m) at its Ciudad de los Valles data center.

2016

GTD Group announce a plan for a 2,395 square meter data center in Santiago. Telefónica opens its third data center in Chile, a 5,000 sq m building designed to withstand earthquakes.

2015

Google opens \$150 million data center.

2014

Tivit buys Synapsis, and now owns three data centers in Chile.

2013

Quilicura opens data center (capacity expands by 40 percent in 2016). Claro opens a 5,000 sq m, \$100 million, data center in Chile.

2012

HP opens its 1,000 sq m seismic-designed Paine data center.

# Chile looks to the future

The data center industry of the country is ready to grow, says *Virginia Toledo*

**T**he Chilean economy fell slightly last year, thanks to the adverse impact of lower prices for copper exports, according to the LatinFocus Consensus Forecast, a study from analyst firm FocusEconomics. The prediction is that GDP will increase by 1.8 percent this year, and a similar level of growth (2.3 percent) in 2017.

Will this affect Chile's data centers? Not too much. It seems. There are reports of rapid growth and high demand in the sector.

Kathleen Barclay, president of AmCham Chile, says demand for data centers in the country is growing at around 20 percent per year, and in 2017 investments in the market exceeded \$800 million, according to an interview published in *Diario Financiero*.

For Barclay, these figures demonstrate the importance of this sector as a new space for development, which could impact the country's economic growth and affect how Chile is positioned both regionally and internationally. "The country could become a hub, as has been the case in Colombia and Uruguay," she says.

**It seems that Chilean** service providers are not affected by macroeconomic data, according to the ISPs consulted. "Since 2010 to date [the industry] has had a steady and stable growth, and this is expected to continue," says Gino Bernucci, assistant manager of outsourcing at Ente, because providers have changed their recurrent expenditure to capture economies of scale.

The economic context could even be beneficial to the market for data centers by promoting outsourcing, says Heidy Bauer Fairer, manager of data center and cloud provider Chile Sonda: "Companies seek to maximize profitability and clearly a way to achieve this goal is outsourcing."

This year, the market growth in construction of data centers has decreased a little and next year will be similar, says Richard Rebolledo, a project manager at Powertec. However, he adds: "There are still many parts of the data center market which are not experiencing a slowdown."



**Virginia Toledo**

Editor LATAM

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These areas include management, operation, monitoring and control.

In 2010 Chile was hit by the fifth largest earthquake ever recorded, creating outages as data centers went offline. Since then, the industry has made great strides in improving the reliability of its infrastructure.

"In recent years we have seen a radical change" says Carlos Leiva, CEO of CLK. "Direct users such as service providers in data centers are now markedly more interested in international standards. For design, construction and operation, everyone wants to know the level of reliability of data centers."

This level of professionalism is essential in a seismic country, with its own particular regulations for construction and electricity. Since 2010, he says, "large data centers have sought and obtained certifications for Uptime Tier III design and construction, and are increasingly interested in obtaining certification for operations."

**Marco Cantamesi**, country manager for Chile at Dimension Data, confirms this, explaining that Chile's infrastructure has been tested by various high-magnitude quakes during the last five or six years, and most data centers have passed the test.

Trends such as big data analytics, the Internet of Things (IoT), and smart cities are beginning to emerge in Chile, as in the rest of the world, but there is still much work to do. Customers' interest is driven by marketing initiatives and awareness of the analytic power of the hyperscale clouds which power such solutions, says Heidy Bauer.





However, Gino Bernucci is more cautious, pointing out that so far such projects at Entel have not translated into great use of space in data centers: "It is estimated that by 2020 the demand for these projects increases, because processing and storage must be done locally, since the response times and network latencies should be minimal."

**There are new technologies** which can help. Powertec's Rebolledo highlights containerized data centers and DCIM solutions. The first of these are good for dynamic structures or temporary requirements, he says, and Powertec has modules in applications such as mining in the south, for data centers which are "quick to assemble and operate as well as to move if needs change."

Interest in DCIM is growing amongst users, says CLK's Carlos Leiva: "It has become clear that many of the downfalls of data centers could be avoided or prevented, or recovered faster if they had a tool like this."

Inside the IT stack, the solutions that are being implemented do not differ greatly from the rest of the world, with software containers, Docker, software defined systems and networks, and hyperconverged cloud all appearing more frequently.

Although it is clear that things are going well in the market for data centers in Chile, there is still room for improvement - particularly in the areas of energy efficiency and operation.

"In Chile, facilities should develop plans to be more aware of the environment," says Marco Cantamesi. "It is vital to reduce energy costs without sacrificing the reliability of data centers." With data center demand increasing, data centers need strategies to reduce energy consumption and limit the environmental

impact: "That's a big challenge and an issue that should be worked on in the future," he says.

Maintenance and operation should also improve, along with training: "We need protocols that support predictive and preventive work for disaster

recovery, and they must be reviewed and practised constantly" says Leiva. He wants to see staff constantly learning and updating their knowledge.

Despite these challenges, there is a permanent change driving the sector which should not stop. The growth will continue, says Leiva. ●

*It seems that Chilean service providers are not affected by macroeconomic data - they've grown steadily since 2020*

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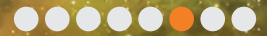
# SKY LASERS *and the* WORLD *of* TOMORROW

After years spent in military labs, laser communications satellites are ready to hit the market. **Sebastian Moss** investigates the world of Space Cables



Sebastian Moss  
Reporter  
@SebMoss





**A**t the British Interplanetary Society's 2014 *Reinventing Space* conference, the presentation on satellite-based free-space optics consisted of two people, talking about a potential future to come, should the right funding be found and crucial technological advances be made.

Two years later, the same panel was overflowing, with event organizers struggling to fit in placards with the speakers' names, as representatives from around the world crammed the stage.

The message was clear: The industry had seen the light.

And, in that packed room in London, some argued that those in the data center industry would see it soon too.

"It has always been the tech of tomorrow, but it is ready now, for today," said Dr Donald Cornwell, director of advanced comms and navigation at NASA.

**The futuristic idea** being discussed was that of using lasers to transmit data through free space, be it air or an actual vacuum, rather than through glass or some other medium. Data is beamed up from the ground to a satellite, then sent to another satellite, and back down to somewhere else in the world.

Until now, free-space optics has been the domain of the military, most notably in the form of the proposed \$12-18 billion Transformational Satellite project that aimed to launch five satellites capable of transferring 10-40Gbps.

With the military facing budget cuts and ongoing conflicts in Iraq and Afghanistan, TSAT was canceled in 2009, but the work on the project did not go to waste.

"We got the benefit of that

## 10,000 Kilometers

The distance Laser Light's satellites will orbit. That's in the Van Allen belt - which is pretty hostile to electronics. "But we have very few electronics on our spacecraft, we have photonics instead, so we stay away from the photon belt," Brumley said.

investment, because several of the vendors who participated in TSAT are our vendors now, and less than 5 percent of our overall budget is for R&D - 95 percent is for commercial off-the-shelf technologies," Robert Brumley, CEO of Laser Light Communications, told *DCD*.

Brumley's company has ambitious plans for the technology. It aims to place 8-12 satellites in Medium Earth Orbit at roughly 10,000km up, each of which will have four intra-satellite links of 200Gbps. "Two looking forward and two looking back to satellites in each direction, and then there are six laser heads looking down, five of which will be used and a sixth one as a spare," Laser Light's Ove Ericsson explained.

The result is a space-based Internet backhaul service with a capacity of 7.2 Tbps that hopes to go toe-to-toe with submarine cables. The high articulation laser optics (HALO) system supports software defined networks (SDN), enabling optical-satellite-as-a-service.

"The way most data travels today is on submarine cables between continents, and the issue with that is it's a developed market phenomenon - most of the cables run sort of East-West in the northern hemisphere before they go South," said Jim Poole, VP of ecosystem business development at Equinix.

"So if you want to go from Argentina to South Africa, you have to go all the way

up to North America, across the North Atlantic, and then down. There's a lot of dog legs in the system. A direct beam that can go up from Argentina, hit a satellite, across to another satellite, then back down to South Africa, could take 60/70ms off the round trip time."

Removing the various steps and winding pathways that make up a fiber network is not the only reason satellite networks can be faster - light travels roughly 31 percent slower through standard fiber optical cables than it does through a vacuum.

Even small improvements in latency are already proving enticing in transatlantic cables: "A lot of the banking industry bought capacity on the Hibernia Express at well above normal transatlantic market rates, just because Hibernia specialized in building a system that connected London to New York at far less latency, and they made quite a bit of money doing that," Poole said. "So this is a very comparable scenario."

**Another potential benefit** for customers is cyber security. "We all know what submarines are capable of doing in terms of intercepting submarine cable systems," Ericsson said.

"Cables can be tapped, but if somebody blocks the laser, it gets highly noticeable," Equinix's Poole added.

This is key to the free-space sales ▶

► pitch, Brumley said: "For banks that are concerned about transaction security, it would be better than anything they have now, and for media companies that are worried about their intellectual property, it would again be the most secure network they could buy."

The difficulty of intercepting or jamming laser communications technology has piqued the interest of the military-industrial complex.

Defense contractor General Atomics is working on free-space optics, the company's Dr David Robie said. "Some of the places that we'll be asked to operate [drones in] in the near future will have significant jamming environments, and we will find ourselves with very limited ability to use our traditional RF or even  $K_u/K_a$  Satcom.

"As we start operating our aircraft over large expanses of water, we find ourselves somewhat limited, especially as we make transits through the Pacific region."

Free-space optics could present a solution - unjammable, untappable and able to connect to drones as they fly across the ocean, hundreds of kilometers from any other communications system.

Brumley told DCD: "I know for a fact that our government in the US is very interested in it, they have several requests for information about optical for a variety of different uses - drones, terrestrial communications, battlefield communications."

**Another important security** benefit is that lasers can't be cut, said Brumley: "Submarine cables have cuts, whether it's anchors carrying them up, or sharks chewing on them.

"The Chinese and Russians are making a big deal about having cable cutting ships

and have actually displayed them."

There is, however, one crucial weakness to laser communications, said Ericsson: "Lasers don't like clouds."

As light cannot penetrate cloud cover, the system has to reroute around areas where the weather is overcast and hostile to data transfer.

Brumley said: "So as the weather changes, the network is instructed to seek the shortest route and the lowest latency. And it does it based on thousands of weather sensors and monitors around the world, measuring atmospheric conditions, wind, and water vapor, etc."

The data from the sensors will be collected for three years before the full constellation is launched, which the company hopes will give the machine learning and deep learning algorithm enough time to learn how to manage the network "and then once we turn it on it will run the network itself."

The company plans for several ground nodes in "about 20 regions globally, and then within the regions, which are SD-WAN based, there is a lot of fiber to connect those," Ericsson said.

Equinix has signed a deal with Laser Light to install one of the ground nodes at its DC11 International Business Exchange data center in Washington, DC.

"The aim is to test the SDN aspect of the system. The first ground node will either sit on the roof, or we'll erect a tower next to the facility," Poole said.

Should the test, an upcoming trial on the International Space Station, and the rocket launches starting in 2018, all prove successful, the companies hope to roll out the ground nodes to other Equinix facilities around the world.

Neither Equinix nor Laser Light believe free-space optics will ever rival submarine

cables as the primary method of cross-continental data transfer, but Brumley was still keen to point out the value of even a small fraction of that market.

He said: "With just this first constellation, we can do over 5 Petabits of distribution a day, and we can do 1.5 Exabits a year. That's about one percent of a market that is in the hundreds of billions of dollars - not a bad place to be."

He added: "We're not a kilobit or even a megabit transportation platform, we're a gigabit and terabit transportation platform. So we're looking at large corporates, enterprises and governments who have huge amounts of data that have to get to other places in the world, some in economic centers, and some in the middle of nowhere. They can't wait an hour for a download, they need it now."

#### **There are greater plans** to follow:

"We have a development program with an idea of moving our 100 Gigabit links to 1 Terabit links. So our next constellation could move from a 7.2 terabit system to a 72 terabit system."

He is not alone in dreaming big. NASA's Dr Cornwell said: "If we wish to bring back a Google Map at 30cm resolution from Mars at just 1 bit per pixel, using the best  $K_a$  band system ever, it would take nine years to bring that data back. A 250Mbps laser link could do that in nine weeks. That's a system that we're working on."

Should human life on Mars ever become a reality, it is this technology that would keep our two worlds connected.

Poole said: "You would have a constellation of satellites around Mars that would talk to the constellation that sits around Earth. It really blows your mind when you think about it." ●

*Our next constellation could move from this current*



**20**  
Years of  
military  
research



**12**  
Satellites  
planned  
for launch

*architecture of a 7.2 terabit system to a 72 terabit system*



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# ARM reveals its data center super powers

The idea of low-power ARM chips running cloud jobs didn't get very far. Now the same chips are being pitched for supercomputing, says *David Chernicoff*

**W**hen the eyes of the world began to look at the power consumption of data centers, operators realized that they needed to discover new ways to save energy. Vendors started re-engineering the designs of their hardware to find ways to make them more energy efficient and minimize overall power consumption.

One of the more high-profile efforts was to make the low energy chipset designed by ARM a contender for the role of data center CPU (see box). The approach taken by a number of vendors was to build a massively scalable system using hundreds, if not thousands of ARM cores.

**HP's Project Moonshot** was the best known of these efforts, and AMD got into the game by purchasing an existing ARM microserver vendor, SeaMicro - a business it closed down in 2015.

While this was going on, AMD had an effort to build its own low-energy chips based on ARM cores, but this suffered delays and when the Opteron A1100 series was released in January 2016, it was almost a year late.

While products suffered delays, the underlying market dynamic also changed. The low-power ARM-based server concept depended on deploying large numbers of moderate capability CPUs to support specific applications or classes of applications that didn't require the power of a major database application. But this fell by the

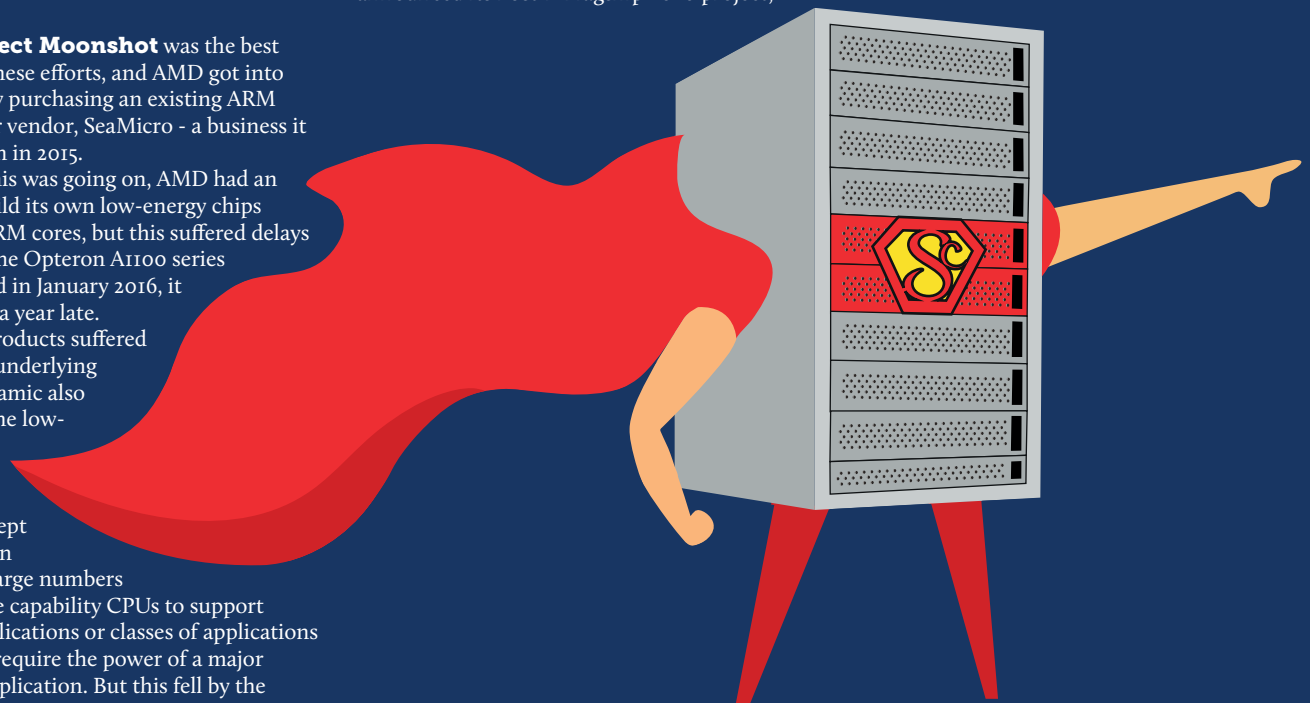
wayside as a different idea emerged: as virtual machines became a data center standard, previously wasted CPU cycles could be used to support additional virtual machines.

ARM CPUs still have their reputation for handling limited applications and moderate requirements in exchange for lower cost (both capex and opex), but they seem to have lost their place in the data center when considered for general IT computing loads.

The perception of the ARM processor as suitable only for mobile devices and other implementations where power consumption was paramount was shaken in 2016 when Fujitsu, which is contracted to build Riken, Japan's next generation supercomputer, announced its Post-K Flagship 2020 project;



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a 1,000 petaflop computing monster that would be powered by ARM CPUs. This would replace Japan's K Computer, currently the world's 5th fastest supercomputer. It would also be 8-10 times faster than today's top ranked supercomputer, China's Sunway TaihuLight, representing a significant move towards exascale (a billion billion calculations per second) computing.

**The current K Computer** is built around SPARC64 VIIIfx CPUs, developed by Sun Microsystems and now owned by Oracle, but Fujitsu has said it believes it can have more control over custom chip manufacturing with the selection of ARMv8 designs than would have been possible by either staying with SPARC or moving to Intel. ARM also has a much more significant ecosystem than SPARC Linux, so the combination of more support in software and more control over the hardware (apparently at the urging of Riken) made ARMv8 the best alternative for the Flagship project, Fujitsu says.

In August 2016, the ARMv8 blueprint added scalable vector extensions to the core architecture. This SIMD (single instruction, multiple data) technology will enable supercomputers to address large data arrays with up to 2048 bit vectors (compared to 512 bit in the current ARM Neon SIMD architecture). Implementation is necessary to make the CPU suitable for this next generation Fujitsu supercomputer and other potential exascale projects. Fujitsu is the lead partner with ARM in HPC extension development.

Ideally, Fujitsu hopes to allow Riken to simply recompile scientific applications and enable auto-vectorization to take advantage of the SVE extensions. If this isn't the case, significant pieces of code would need to be reworked, delaying the implementation of the Flagship 2020 supercomputer operations.

The types of data manipulation being considered for supercomputer operations, such as predicting global climate change or folding protein chains, are typically not found in the business data center, but routine business operations are manipulating ever larger data sets. Big data continues to accumulate information on everything from customer behavior to product feature sets; and that information is used to continuously model business potential.

Information is sliced, diced, and manipulated in ever-changing ways as businesses look for a competitive edge and the companies at the forefront of data acquisition, such as Google, Facebook, Amazon, and Microsoft, continue to investigate new ways to make use of that data.

This could be where ARM works its way back into the data center on a significant scale. Large data center operators are faced with the increasing power demands of their business users and their applications and if ARM-based high performance computing can simply meet the output offered by x86 hardware and still deliver significant power savings, this will draw the attention of hyperscale players. For companies that run thousands of servers, a few percentage points of power use represent millions of dollars in operational expenses.

Keep in mind that the existing K supercomputer features over 700,000 cores (and uses 12 MW of power), while the leading Chinese supercomputer manages to link together more than 10,000,000 cores to achieve its dominant position.

Power savings at that level need only be a small amount per core to result in significant overall savings. The target set for the post-K computer is to increase power demand four- or five-fold over its predecessor, while increasing performance 100-fold.

Curiously enough, this would bring ARM into the data center in almost the exact opposite position that was originally envisioned for it. Rather than providing a cheaper operational alternative for low priority workloads, ARM-based systems could emerge as the superheroes of data center performance, managing the demanding workloads that justify the very existence of the data center.

But making these changes to the underlying ARM architecture and designing world-class supercomputers is no easy task. During 2016, Fujitsu announced the Flagship 2020 Post-K computer could be delayed as much as two years. The delay is being attributed to issues with the development of the semiconductors.

**Dr. Yutaka Ishikawa**, project leader for the development of the Post K supercomputer, has been quoted as saying: "We face a number of technical challenges in creating the new system. In its development, we aim for a system that is highly productive and reliable, and which maintains a balance between performance and power consumption. To achieve this, we must develop both hardware and software that enable high application performance with low power consumption."

No one has ever said that the cutting edge would be easy, but with SoftBank's \$32 billion dollar purchase of ARM, it would seem that not only Fujitsu is betting on it for the future of a broad range of computing products. ●

1,000  
Petaflops  
Fujitsu's Post-K  
Flagship 2020

## The death of the micro-server dream

During the early 2010s, micro-servers were seen as a way to reduce data center power demands and relax Intel's stranglehold on server CPU market. Most interest centered on ARM, a British firm whose processor designs were based on vintage RISC architecture, required less energy, and were already widely used in mobile devices. Micro-server enthusiasts included Cavium, Applied Micro, Calxeda and SeaMicro. Dell supported the idea, and HP became one of the first to deliver a micro-server system called Project Moonshot. AMD ended up buying SeaMicro, and developed its own chip, the Opteron A1100. But the expected revolution never came. Virtualization provided many of the same benefits, and Intel gradually improved its own low power Atom processor. Micro-server interest peaked in 2014 and then waned. By the time AMD delivered the A1100 in 2016, some of the ARM-based startups were already closing down.



# Oracle finally gets the cloud

From naysayer to proponent, Oracle now fully embraces the cloud model, says *David Chernicoff*



**David Chernicoff**  
US Correspondent  
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**I**t's not easy to think of Oracle as a cloud powerhouse. Perhaps that isn't Oracle's fault. Amazon dominates the cloud services market, sucking up about a third of all the business. Microsoft achieves only a third of Amazon's penetration, followed closely by IBM, and Google has not even reached half of the business Microsoft is doing. Alongside that, Oracle's investment in cloud computing doesn't register very high on anyone's radar.

**But while most** of the attention has been focused elsewhere, Oracle has been building a worldwide network of cloud data centers and migrating its application base to the cloud, with roughly 95 percent of Oracle's current applications able to run in its cloud. During 2016, Oracle has rolled out a number of services and technologies, culminating in announcements by Larry Ellison at the OpenWorld conference outlining the strategies for the cloud that Oracle will be following.

Oracle, which now offers infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS), has launched its second generation IaaS platform running in the "Innovation Data Center" design. The backbone for the next generation services are the Oracle cloud data centers.

Oracle's data center design is exemplified by the facility in West Jordan, Utah. The 164,000 sq ft facility, which includes 44,000 sq ft (4,088 sq m) of office space, 95,000 sq ft (8,826 sq m) infrastructure support space, centered around a 25,000 sq ft (2,323 sq m) data center space, is designed to use free air cooling in winter, swamp coolers in the summer and

technology that permits waste heat for humidification in the cooler months. The facility is designed to support up to four 7.2MW super cells, and is currently at greater than 80 percent capacity.

Oracle has been opening new data centers at a regular pace and is believed to operate more than 20 worldwide at this time. The rollout of the new generation 2 IaaS data centers is highlighted by their focus on a "lift and shift" strategy.

In this model, customers can take advantage of a new Oracle offering, Oracle Bare Metal Cloud Services. Using this, businesses can upload their entire on-premises network, applications and storage directly to the Oracle cloud. Oracle thinks that this will give it an edge over Amazon Web Services, which has been successful with a managed service, the AWS Database Migration Service which supports migration not only to the same database running in the cloud but also to a new database backend. While Amazon does support Oracle, it is aiming this service at those who want to move away. Amazon's marketing materials use the example of migrating from Oracle to Amazon Aurora.

This service is enabled by several features of Bare Metal Cloud Services. Part of this offering is a secure SDN Virtual Cloud Network that allows the customer to treat the service as a secure extension to their on-premises network.

**Earlier this year**, Oracle announced the Oracle Cloud at Customer suite. This is an on-premises solution that consists of the same hardware, software and operational services used by Oracle Cloud, but installed at the customer site. The customer gets all the public cloud services, infrastructure, and database, as the Oracle Cloud but it now resides on their side of the firewall. Because the environment is identical, the customer is able to more easily move workloads between



**Larry Ellison**  
has gone from skeptic to fan

*Maybe I'm an idiot, but I have no idea what anyone is talking about. What is it? It's complete gibberish.*

**Larry Ellison, 2008**





their on-premises installation and the Oracle public cloud.

Oracle Cloud at Customer differs from products such as the Azure “cloud in a box” offered by several hardware vendors for the Microsoft cloud, as Oracle offers a fully managed service solution; customers access the locally installed service in a subscription format using an elastic metered formula. All administration, maintenance, and updating of Cloud at Customer is the responsibility of Oracle and included in the service pricing, which is targeted at being consistent with the cost of using the Oracle public cloud.

**The latest release** of Oracle’s flagship database software, version 12c, is, for the first time, being released initially as a cloud service, with the promise of a later release of a traditional software version. This pretty much represents the final stage in complete turnabout from Larry Ellison’s often-quoted statement almost a decade ago that the cloud was “complete gibberish.”

“Amazon’s lead is over,” Ellison said at the 12c launch. “Amazon is going to have serious competition going forward.”

The database as a service comes in three service levels; Exadata Express, the entry level version, the Oracle Enterprise Database Cloud Service, and the full-blown Exadata Cloud Service. The platform also now supports Oracle MySQL Cloud Services and Oracle Big Data Cloud Service.

Oracle is also rolling out the first new version of the Ravello Cloud Service since Oracle acquired Ravello. This service allows customers to run enterprise VMware and KVM workloads on the cloud without requiring any reconfiguration of the applications, changes to the network or conversion of the virtual machine.

Oracle is clustering data centers in Regions; three self-contained data centers called “availability domains” in geographic proximity clustered over high-speed fiber connections. Data is duplicated across the clusters to provide high-availability and redundancy, and eventually all of the regions will be networked together.

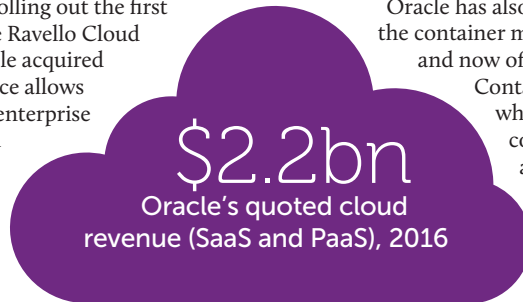
First the North American sites will be connected, then Europe, and then these European and North American regions will be networked together. It’s a reasonable presumption that this will eventually apply to some of its Asian sites, currently in China and Japan. The Global Infrastructure graphic from Oracle shows the basic locations of the Oracle data centers and their regions and availability zones.

Oracle has also fully embraced the container model in its cloud and now offers the Oracle Container Cloud Service which is a Docker-compatible service that allows single-click deployment.

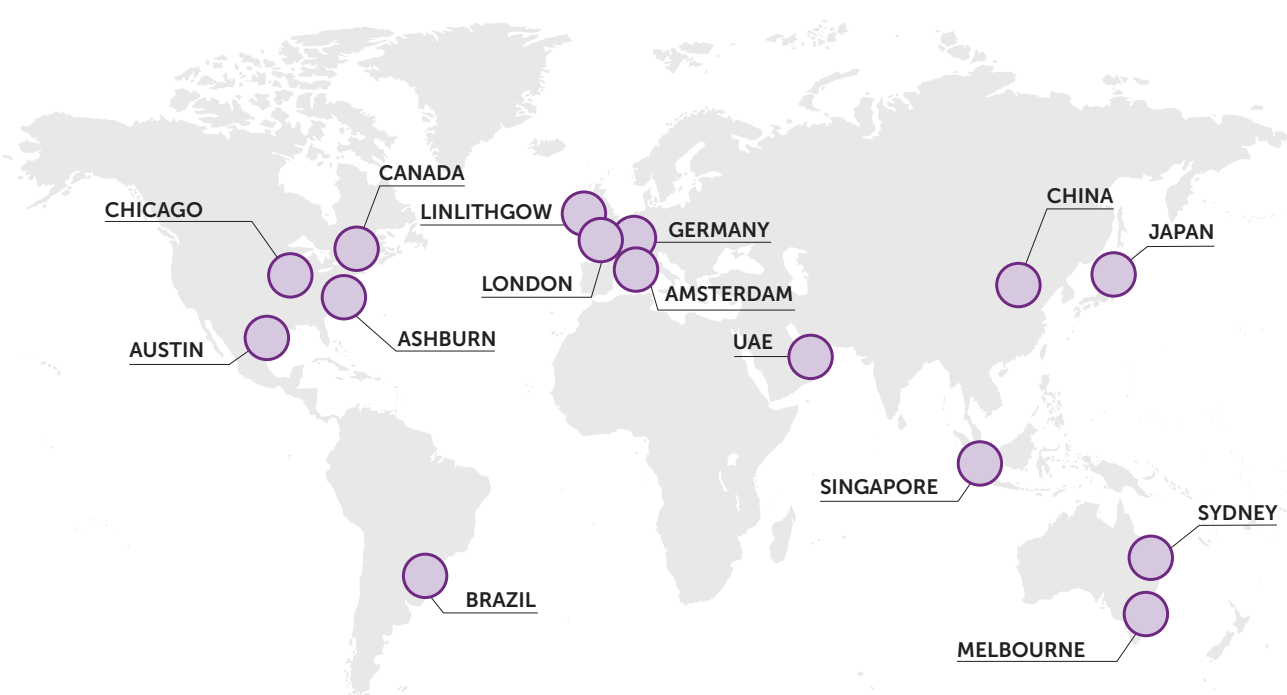
All of these announcements add up to a serious attempt for Oracle to find a strong

position in the cloud services market, which, in fiscal year 2015, earned the company several billion dollars. Whether or not it is enough for Oracle to increase its customer base, and not just migrate existing customers to the cloud, remains to be seen.

Once considered to be a day late to the cloud game, Oracle may no longer be that dollar short. ●



## Global Infrastructure (2014)



# Beware the Silver Lining

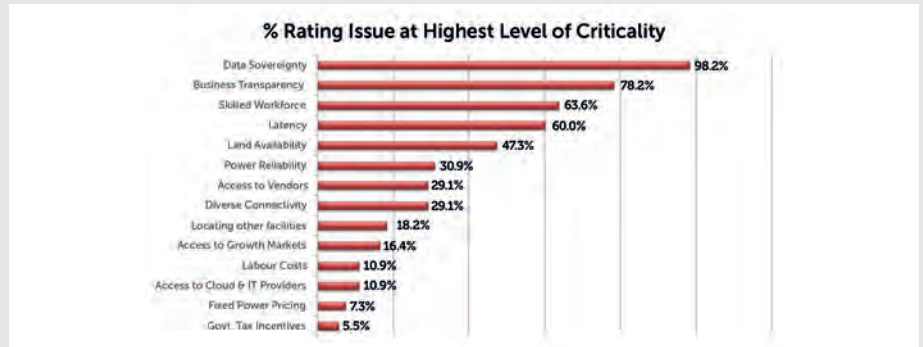
The idea that the digital world is a limitless and unfettered universe is an illusion.

Just as the world of data centers and corporate IT has been disrupted by cloud, so the requirements for locating a data center outside the home country have also. Location has to some extent been superseded by interconnection, the quality of facility has been balanced against access to quality service providers, and resource provision against the technology and expertise to deliver efficiency. The market also has changed from a focus on attracting end-users to a focus now almost entirely on colocation, cloud and service providers.

And the drivers for relocation and the issues of concern have shifted also. A survey of 55 executives in American multinationals responsible for decisions on data center location nominated **data sovereignty** as the most important consideration when considering locations for siting an overseas data center. And while the rankings emerging from a survey of this size can only be indicative, another ‘intangible’ – **business transparency** – is ranked second. Both are rated at some distance ahead of the issue ranked third, which concerns the level of **workforce skills**. Might data sovereignty and the local business and governance culture emerge as significant risk factors for today’s investment in offshore data centers?

## An intangible risk to invisible data

So, why the importance attached to data sovereignty? Data sovereignty is the principal that data is subject to the laws (privacy, IP, censorship) of the country in which it is located rather than those of the country where the owner or tenant of the data center is located. Possibly, as the data center industry gets more adept at dealing with the resource issues that marked its legacy phase through better practice, more efficient technologies and through cloud, data sovereignty represents a new and less tangible challenge to the international free-flow of data. While the key enablers of the data center industry have always come from within the industry, through technological or operational evolution, both data sovereignty and ease of doing business means that the industry is reliant on external factors and decision makers. If the complaint of a single individual against one of the key,



*“MDEC sees the cloud as a critical enabler for the digital economy and we have been looking at Malaysia’s data governance landscape over the past year to identify any impediments to the adoption of cloud and other technologies which enable digital transformation. Some industries have sector specific regimes which may impede the adoption of public cloud and cross-border data flows. In general, apart from sectors such as banking, finance and healthcare (which are carefully regulated in most countries), Malaysia does not have any impediments to cross-border data flows and we would like to keep it that way. Even for regulated sectors, we are engaging with the relevant regulators to identify specific concerns and address those in order to enable those sectors to also leverage on the advantages technologies like cloud brings”.*

**Wan Murdani Mohamad, Director, MDEC**

pioneering companies of the cloud era was able to invalidate an agreement (Safe Harbor) that had existed for 15 years between the EU and American organisations then the industry has a real cause for unease. OK, Safe Harbor was flawed, founded largely in an era before cloud and the volumes of data and traffic now seen, and it papered over some of the key cultural differences in regard to privacy that exist between Europe and the USA, and when it was invalidated in the European Court of Justice, this represented a block to American companies transferring data on EU citizens out of Europe.

The potential disruption to data centers which are part of international networks or which are operated by companies outside their home legislature can be caused by failure to comply with the privacy regulations of the country in which the data is stored, and also by the possibility that data held in another country may be subject to subpoena whereby the data may be requested, sought or seized. These situations have occurred recently in relation to multinational American companies operating outside the USA, and both have major implications for the siting and the operation of a data center. In the words of one respondent to the survey:

*“Politics is the biggest influence. We want a location with good track record on being good for business, open and a climate free from political burden”.*

Unseen and unmeasurable risk is of greater concern than risks that can be modelled as part of a risk assessment process. It is a

situation riddled with uncertainty – in Europe, how will the successor to Safe Harbor – Privacy Shield – track data ‘abuse’?

So, how does an international data center operator interpret and deal with the cluster of laws and regulations that legislate and enforce data sovereignty? Locate in the market with the legislation most like that of their home country? Locate in the market with the fewest constraints? Or locate in the market with the most? The decision obviously depends on many other factors and it depends also on how different the legislation in one market is viewed in others. While many of the drivers of data sovereignty might reasonably be expected of ethical data management, the political dimension adds uncertainty to the mix. For companies seeking to eliminate as many of the risks of data sovereignty as possible options of separate national data centers, cloud segregation or a clear statement of global policies (not of separate policies for separate jurisdictions) should be evaluated together with their business model and cost consideration.



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# Tech should take control of Brexit

Given the lack of a clear policy for Britain's exit from the EU, the tech sector has an opportunity to lead the debate, says *Emma Fryer*



Illustration: [studiopipoltd.com](http://studiopipoltd.com)

I've spent the last five years at techUK, dealing with issues ranging from generator emissions compliance to cyber security, taking in climate change, data protection, data sovereignty, energy costs, security of supply and physical resilience.

Now we need to revisit all these issues in the light of Brexit, but until we know the form that our future relationship with Europe will take, we are in limbo. The impact of Brexit depends on government policy actions. And it depends on us – how well we prepare as a sector and how clearly we articulate our needs.

**Let's start with the sector.** Brexit, like any large scale change, presents both risks and opportunities.

Reaction so far has been mixed. Some operators predict little change, some are already feeling adverse effects and others are busy developing strategies for a range of different outcomes. Most say that the real impact will not be felt immediately. Projects to build or expand UK facilities take several years to deliver, so it will be a while before the statistics show the effects of any which are delayed or offshored.

Our businesses are agile and adaptable but we are not free agents. We operate within a complex set of regulations and policies. So we now depend on government to demonstrate similar agility in making policy decisions and in implementing them with real urgency.

The problem is that policy development is usually very slow, so government needs to act with entirely uncharacteristic speed.

This is where I come in, but we are a little outside the normal rules of engagement for policy dialogue. Usually government proposes a measure of some kind and we can then choose to support it, to ignore it if it won't make much difference, or to throw all our teddies out of the pram.

On this occasion there is, er, no policy. So the best way we can help is by articulating exactly what we need. The government may not agree with everything we say, or be in a position to provide the necessary assurances just yet, but we need to start the debate.

There are lots of questions to answer. How do we mitigate these new and unexpected risks? How do we ensure that we can continue to process, manage and store EU citizens' data in the UK and move it freely and safely between the UK, the EU and the US? How do we protect foreign nationals working in key roles in data centers? How do we fill skills gaps that cannot be met from our domestic pool of talent? How do we avoid tariff and non-tariff barriers to trade in services without access to the Single Market? How do we remain competitive when commodity prices rise as sterling falls? Can anything positive be salvaged from all this mess?

We think it can. We have identified seven areas where policy can make a difference: uncertainty, data flows, trade, skills, energy costs, inward investment and environmental

regulation. Even the most intelligent policy can do little more than mitigate risks in the first three areas, but on issues like skills, energy, inward investment and environment, Brexit could generate opportunities for the sector if handled well.

We asked government to minimize uncertainty by making immediate commitments to protect data flows, to ensure that UK data governance laws will be adequate, and to prioritize access to the single market in negotiations.

We also asked for a skills-based migration policy, for non-British EU nationals working in data centers to be protected, for better mitigation of energy costs, particularly the non commodity elements, and for the UK's offering to inward investors to be upgraded.

While we agree that standards and targets be retained, we have urged government to simplify environmental legislation and streamline compliance.

**We have set out** our template for public policy dialog in a document which tells the industry what we are asking government to do, and tells government what we want. The outcome of this dialog will profoundly influence our collective future. Wish me luck!

*The Silver Linings report on the implications of Brexit is available from techUK.*

*Emma Fryer is an associate director at techUK. Remember, Murphy was an optimist! ●*

*The best way we can help is to say what we need*

# DatacenterDynamics AWARDS

EMEA 2016

WINNERS 2016

10



WINNER

## Enterprise Data Center

**Management & Technology  
Team Delivers Application  
and Infrastructure Services,  
Surrey County Council**

*Award Sponsored by Digiplex*

The Council operates two purpose built data centers which provide secure application and infrastructure services to over 8,000 users, and hosting space to internal and external teams. The IMT Critical Environments team has direct responsibility for the two facilities.

"It was a really fantastic evening and I still can't believe that we won. The whole team is really pleased as it is some recognition for all of the hard work they have put in and it is certainly a great way to end the year."

**Paul Clarke,  
Surrey County Council**



WINNER

## Internet Data Center

**Ericsson Iberia Cloud  
Data Center, Ericsson**

*Award Sponsored by Future-Tech*

Ericsson offers a telco-grade cloud which can deliver network function virtualization services within days or hours. It is served from a Tier IV certified site with high security and redundant power and cooling, and a secondary Tier III-equivalent site for disaster recovery. The data center uses OpenStack, and offers several cloud environments including x86, Sparc and AIX.

"It is amazing, we were really very, very excited. These Awards are recognition for the hard work done by the whole Ericsson team."

**Felipe Martinez-Sagarra,  
Ericsson Spain**



WINNER

## Service Provider Data Center

**LuxConnect, The Unique  
Multi-Tier Data Centre,  
LuxConnect**

*Award Sponsored by DCPPro*

The 5,500 sq m DC I.3 has been certified by the Uptime Institute for Design and Constructed facility as Tier II, III and IV within the same building. Clients can use Tier II rooms for less critical applications and Tier III or IV rooms for very critical applications, tailoring a solution and saving cost.

"For LuxConnect to win against such intense respected international competition is an accolade and a well-deserved acknowledgment to the team who designed, built and now operate the data center to the highest standards."

**Jonathan Evans, LuxConnect**



## Sustainable Data Center

**Datacenter U.S.E. Program, KPN N.V**

*Award Sponsored by Arup*

Instead of using grid power to preheat its backup diesel engines, KPN uses waste heat at three data centers, saving a total of 1.6 MWh of energy per year. The cold output of the heatpumps is also used to cool the data centers.

"I am especially proud that our team is the first winner of the new Sustainable Data Center category. We firmly believe in the importance of making data centers energy-efficient. This will motivate us to continue."

**Paul Driessen, KPN**



## Public Services Digital Delivery

**The MET Police Data Centre Transformation Project in Collaboration with Keysource, Metropolitan Police Service**

*Award Sponsored by DencoHappel*

London's Metropolitan Police Service ("the Met") has highly secure data centers which support an average of 6,000 emergency and 15,000 non-emergency calls every day, automatic number plate recognition which captures over 38 million plates daily and the recently introduced body worn video camera.

"We are absolutely delighted to have won this award. We are proud to have worked with an organization which has such a rich history and is a symbol of global excellence."

**Mike West, Keysource**



## Modular Deployment

**Lamda Hellix River-Powered Containerised Data Center, Lamda Hellix**

*Award Sponsored by AECOM*

Lamda Hellix has developed the first high density efficient containerized, data center in Greece, on behalf of the Greek Research and Technology Network (GRNET). It is powered exclusively by renewable energy sources, from the Philippias 10.5MW Hydropower Station in Epirus.

"We are honored to receive this award recognizing us as a pioneer in the green data center market within the EMEA region."

**Petros Tritsinis, Lamda Hellix**



## Data Center Critical Environment Team of the Year

**CenturyLink M&O Certification for EMEA Data Centres, CenturyLink**

*Award Sponsored by Schneider Electric*

CenturyLink is the first data centre provider to commit to certify all its data centers worldwide to the Uptime Institute's Management and Operations (M&O) Guidelines. CenturyLink convened a team to benchmark and validate its five UK data centers in London and Slough, assessing their mission critical operations against the M&O Stamp of Approval.

"Winning this award shows that the people in our team demonstrate effort and business results, supporting our customers and underpinning leadership in the data center industry."

**Steve Weiner, CenturyLink**



## Critical Environment Future Thinking

### Concert Control Project, DigiPlex

Award Sponsored by CBRE

The award went to DigiPlex's Concert Control system, a control algorithm which helps improve power usage effectiveness (PUE) at DigiPlex's Stockholm and Fetsund data centers. The system is good for environmental reasons and also gives customers an additional 10 percent in energy savings, beyond the savings provided by air-to-air cooling.

"We are extremely proud that our Concert Control system is recognized as the next innovative step in this field. It will provide customers with an additional 10 percent in energy savings, on top of the savings delivered by our Air-to-Air solution.."

**Gisle Eckhoff, DigiPlex**



## Energy Efficiency Improver's Award

### ArCTIC (Adsorption Chiller Technology for IT Cooling, Leibniz Supercomputing Centre(LRZ))

Award Sponsored by Starline

Energy costs at LRZ have doubled over the last five years to €6 million in 2015, due to the installation of more powerful IT systems, and increased energy prices. LRZ is using high temperature direct liquid cooling (HT-DLC) to reduce its need for mechanical cooling, while also allowing the re-use of waste heat from the IT systems. The center is using adsorption refrigeration to produce cold water from waste heat - the first such installation in a production environment, which was pioneered on LRZ's SuperMUC HPC system in 2012.

"We would like to thank the DCD Awards expert panel for selecting us. Winning this award is motivating us to continue to strive to improve the efficiency of data centers worldwide."

**Leibniz Supercomputing Center**



## Data Center Transformation Project of the Year

### Ericsson Iberia Cloud Data Center Migration, Ericsson

Award Sponsored by AirSys

Ericsson's Iberia data center provides IaaS services for systems with more than 60 million users. The company moved these services more than 220km, from a facility located at Boecillo (Valladolid) to a Tier IV facility at Alcalá de Henares (Madrid). The new location will provide a number of new features including 99.995 availability, a PUE energy efficiency of 1.2-1.3, and greater scalability for future needs. This involved moving all assets including 350 physical machines and 1,500 virtual machines, all without affecting customer services, in a very short time and with a small budget.

"I want to thank the whole DCD organization for the two awards we won. Yesterday, we made history!"

**Felipe Martinez-Sagarra, Ericsson Spain**



## "Open" Data Center Project

### Public procurement of OCP at CERN

Award Sponsored by Anixter

The European physical research establishment CERN operates computing facilities at its premises outside Geneva and has a remote colocation center in Budapest, with a total of more than 10,000 servers and 2,500 storage enclosures. CERN IT decided to test the usefulness and maturity of the open source specifications published by the Open Compute Project (OCP) to procure and deploy fully assembled racks, instead of buying pre-assembled server and storage units to be installed in existing 19-inch racks in CERN's machine rooms.

"We're very pleased that our work has been distinguished with the DatacenterDynamics EMEA Award in the Open Data Center Project category"

**Olof Bärning, CERN**



## Cloud Journey of the Year

### SDL's Machine Translation to the Cloud

*Award Sponsored by Huawei*

SDL delivers translation services to thousands of customers. Over 10 months, SDL migrated hundreds of servers to a private deployment on NTT's cloud, without customer downtime.

"I'm honored for this recognition by my industry peers, and proud how we applied the learnings to other journeys going forward. It also showed the importance of collaboration between departments."

**Jan Wiersma, SDL**



## Outstanding Contribution to the Data Center Industry

### Lex Coors, Chief Data Center Technology and Engineering Officer, Interxion

*Award Sponsored by Rittal*

Lex studied mechanical engineering and management in Rotterdam, and has been at Interxion for more than 16 years. Over the past 25 years of his career, he has built exceptionally strong credentials in the design of versatile, cost-effective and energy-efficient data centre infrastructure.

"Winning the personal award for 'Outstanding Contribution to the Data Center Industry' is the highest recognition that can be achieved as an individual and I can only confirm that I was thrilled to win this award during DCD's 10th anniversary; which makes it even more precious."

As a judge for many years I have seen the increasing number of applicants that battle for a DCD award. DCD Awards are highly recognized in the data center industry, as proven by a nearly 700 people attendee list for the awards dinner. Thank you DCD!

**Lex Coors, Interxion**



## Young Mission Critical Engineer of the Year

### Paul Harrison, Future Facilities

*Award Sponsored by Kao Data*

Paul is a senior engineer within Future Facilities' UK team, using computational fluid dynamics (CFD) to optimize data center operations for major international clients, as well as supporting Future Facilities' CFD simulation suite. He joined Future Facilities five years ago with a degree in Engineering from Sheffield University.

"I'm stoked to win Young Mission Critical Engineer of the Year! The work I do is at the forefront of technology and it's encouraging to be recognized for my efforts. It has given me confidence in my career path and has helped to soften the blow of the late night project work! "

**Paul Harrison, Future Facilities**



## Business Leader of the Year

### Malcolm Howe, Mechanical Design Engineer, Cundall

*Award Sponsored by Mercury*

Malcolm has worked for the past six years with suppliers and developers to promote refrigeration-free cooling. He worked with Facebook in Luleå Sweden, and with Digital Realty on Profile Park Dublin. He also worked on the recently opened Telehouse London North Two data center, which brings indirect air cooling to an urban high rise building for the first time, offering a future for low PUE air-cooled data centers in locations where they were hitherto not thought possible.

"I am very pleased and proud to have been given this award. I am also genuinely astounded as I had absolutely no idea I had even been nominated."

**Malcolm Howe, Cundall**

# DCD Com

## Highlights from DCD Beijing | December 8, 2016



David Wang  
*Data Center Science*

"DCD is one of the most significant conferences in the data center industry. We made a lot of new friends and clients, and let our clients learn more about us."



## Training

### 2017 Course Calendar



[Data Center Design Awareness](#)  
February 27-March 1, London



[Data Center Power Professional](#)  
March 6-8, London



[Data Center Technician](#)  
March 9-10, London



[Data Center Cooling Professional](#)  
March 13-15, London

Visit [www.dc-professional.com](http://www.dc-professional.com) to view our full course schedule.

MORE SESSIONS COMING SOON

## DCD gets a facelift

In 2017, we are unveiling an improved design for our magazine. The new look will also feature on our website and events, and across other DCD services.

Here's a sneak preview of the new logo that tops the design off. You'll see the rest starting in the very next issue of the DCD magazine.

We hope you have had a good break at the end of 2016, and look forward to hearing your reactions to the new look in 2017!

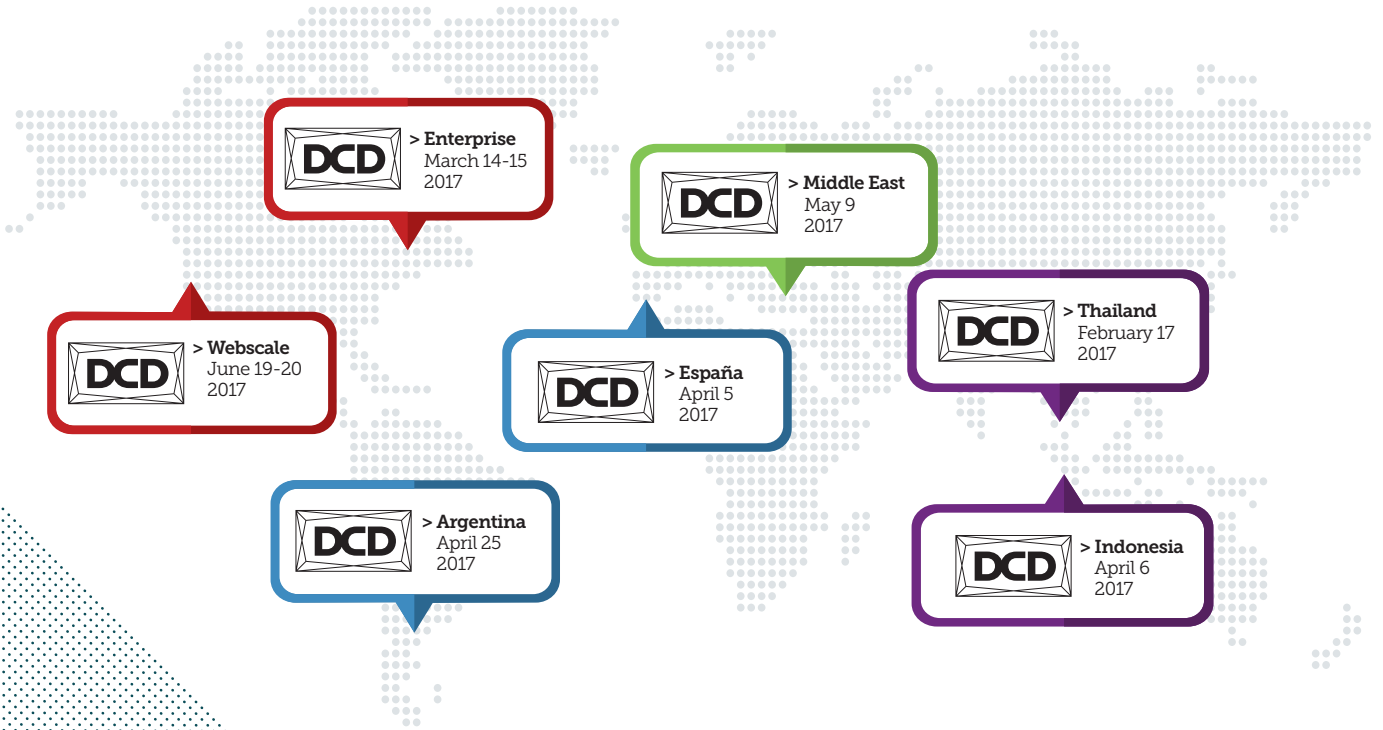






# munity

## Upcoming events



DatacenterDynamics  
**AWARDS**  
 US & Canada 2017

// US & Canada // 20 June 2017 // San Francisco

Book your place now and celebrate with key players from across the industry.  
[www.datacenterdynamics.com/awards](http://www.datacenterdynamics.com/awards)





# The Fifth Age

In 2020, the first commercial services based on fifth generation wireless networking, otherwise known as 5G, will begin to be rolled out. And even though the relevant standards are not due to be approved before the end of 2017, the race to deliver the infrastructure required is already on.

5G will enable wireless network operators to stream gigabits of information to end-user devices with latencies as low as one millisecond, blowing today's fixed line broadband out of the water. The air will provide all the bandwidth we could need. And this has the potential to change every aspect of daily life, at least in big cities. 5G will be used to stream virtual reality content and to collect distributed sensor information from billions of IoT devices, to guide self-driving cars and to provide your home and business connectivity – why bother with ducts and cables when a small access point will do the job?

5G will replace an extended family of wireless standards that were developed to make 'things' talk to each other, leading to a technological extinction event the likes of which we haven't seen before.

But why should you care about any of this? Advances in antenna design or spectrum management don't concern you, but you do care about cloud computing, and 5G will require lots and lots of cloud. Wireless connectivity of the future will rely on Cloud Radio Access Network (Cloud RAN) technology, which achieves two things: on one hand, it virtualizes baseband processing, so common tasks can be carried out right under the mobile base station, using commodity servers. On the other hand, it simplifies collection and processing of telecommunications data at a single location - the data center.

Cloud RAN will cut the costs of mobile network operators and improve the quality of service, using all the things you know and love - servers and racks, switches and PDUs. It will require space, power and cooling. It will require edge computing and fiber networks.

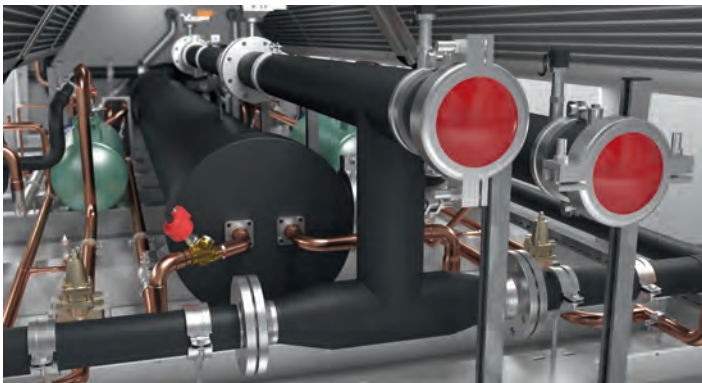
Traditional telcos like BT, Telefonica and China Mobile are already running their first 5G trials, but they need help in order to take this technology mainstream. If you want to cash in on the coming revolution, start reading up on EMI shielding, seismic design and other requirements that set telecommunications equipment apart from your basic data center kit.

•  
**Max Smolaks** – News Editor  
@MaxSmolax

*You care about cloud computing, and 5G will require lots and lots of cloud*

# STULZ

CLIMATE. CUSTOMIZED.



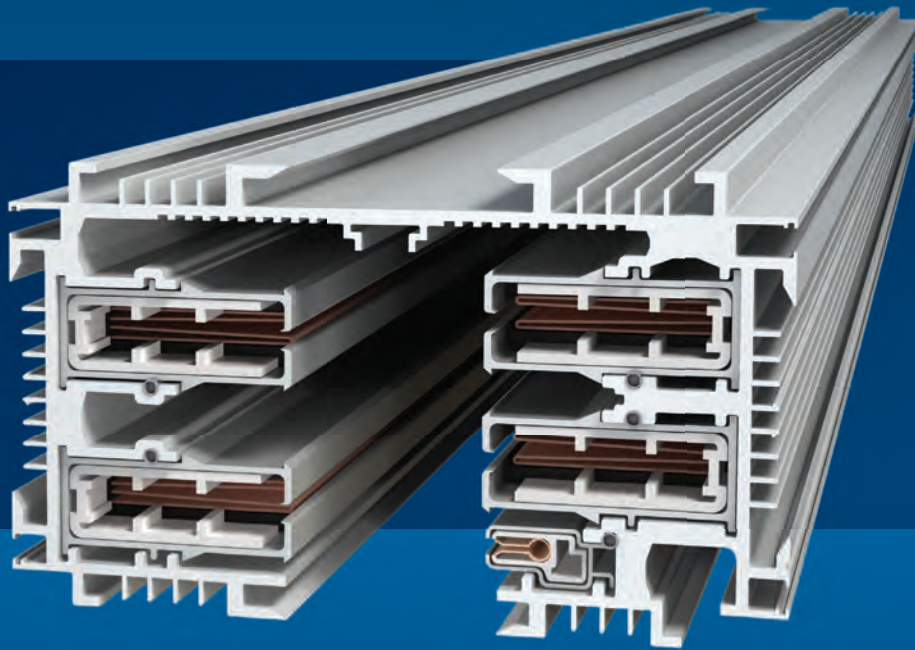
## CyberCool 2

# High-end cooling made in Germany

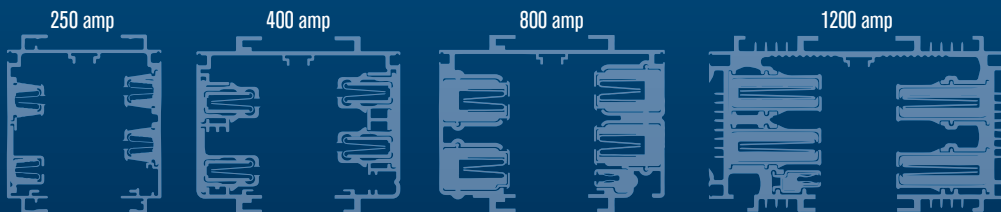
Our CyberCool 2 chillers are optimized for continuous 24/7 operation. They cool industrial facilities and data centers to the optimum operating temperature, extremely reliable and with maximum efficiency. Flexibility included: With a cooling capacity from 110 to 1,400 kW and eight different sizes, the CyberCool 2 is capable of satisfying most industry-specific requirements and individual customer requests. [www.stulz.com](http://www.stulz.com)

# Packing more power into the same flexible design.

Introducing **1200 Amp Starline Track Busway**,  
the newest addition to the T5 Series.



Starline's newest addition to our line of track busway options delivers even more power, without losing any of the flexibility that you've come to rely on from our T5 Series. The 1200 amp busway still has our unique, modular, build-as-you-need design, and is equipped for high-density electrical distribution under the most demanding conditions in data center and mission critical environments. Best of all, the same plug-in units can be used for all systems in the T5 series—from our 250 amp to the new 1200 amp. To learn more about our newest and largest busway choice, visit [StarlinePower.com](http://StarlinePower.com).



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TRACK BUSWAY