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Savills World Research
European Datacentres

Spotlight
European Datacentres
Nordics, the rising star out of the cloud

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The digital universe and data storage

The number of datacentres is multiplying to accommodate the surging demand for data storage

I assume the vast majority of my readers are above 20 years old and are therefore familiar with audio cassettes. Between the early 70s and the late 90s, the cassette was one of the two most common formats for pre-recorded music alongside the vinyl record, and later the compact disc, commonly known as the CD. From the beginning of the 21st century, sales of audio cassettes, quickly followed by all other analogue systems, dropped to the benefit of digital recording. In 10 years, the digital took over the physical format.

Soon after, cameras, telephone and TV also went digital triggering a major growth spurt for the digital universe. The second wave of growth is now happening, heralded by the Internet of Things (IoT). This new era is no longer the matter of the computerisation of companies or people, but adding of digital intelligence to all type of things such as aircraft, cars, smartphones or toothbrush, all tracking, monitoring or feeding data.

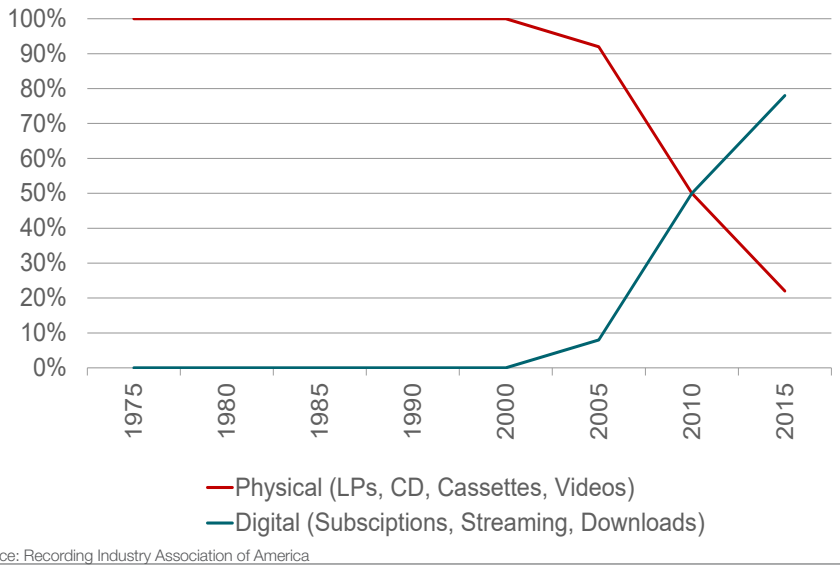
According to the IDC, if the digital universe were represented by the memory in a stack of tablets, in 2013 it would have stretched two-thirds of the way to the moon. By 2020 there would be 6.6 stacks from the earth to the moon, representing 44 trillion gigabytes (44 zettabytes / ZB). At the same time, Cisco forecast that datacentre traffic will reach 15.3 zettabytes annually, a 27% increase compared to 2015. To accommodate this growing demand for storage capacity, the number of global datacentres is rapidly growing, from 7,440 in 2012 to 9,540, in 2016 according to DCD Intelligence.

Most of the world collocation datacentres currently concentrate in the US, but also in the UK, Germany, France and the Netherlands. However, this geographical distribution could well change soon.

44 ZB

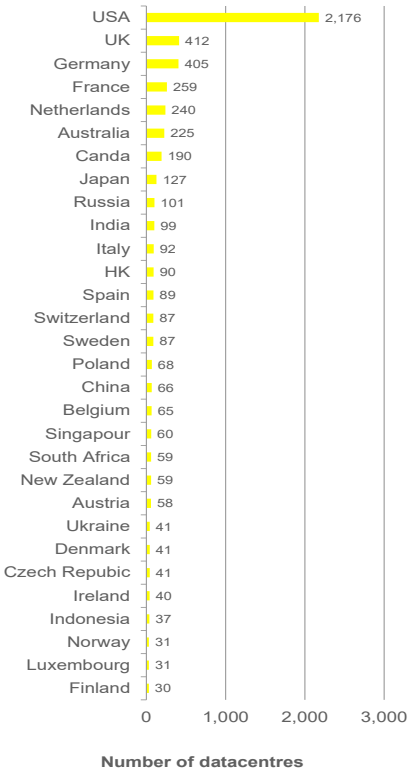
The size of the digital universe forcast by 2020

FIGURE 1: The digital takeover
Recorded music sales by format



Source: Recording Industry Association of America

FIGURE 2: Distribution of datacentres



Source: Cloudscene

Disruptive cloud

The number of hyperscale datacentres is growing rapidly whilst the total number of datacentres is slowly stabilising

According to the latest data from Cisco, global cloud traffic is expected to rise 3.7-fold, up from 3.9 zettabytes in 2015 to 14.1 zettabytes by 2020 and will account for 92% of the total data traffic. This massive migration to cloud architectures is due to their ability to scale quickly and efficiently support more workloads, mainly arising from cloud computing, IoT, big data and video streaming.

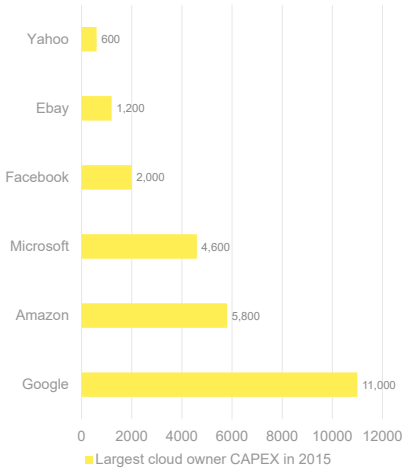
Owing to the growing popularity of cloud-based infrastructures, the need for hyper-scale datacentres has been escalating over the past five years. Additionally, hyper-scale datacentres are cost-effective compared to traditional datacentres. Cisco predicts that hyper-scale datacentre traffic will quintuple over the next five years.

The success of cloud-based infrastructures has also let market players prioritise rationalism over nationalism. Datacentres no longer have to be located near to their clients but can be located in countries where clean energy is abundant and cheap as long as connectivity is safe and fast. Data, after all, is the most mobile commodity on earth.

Yet "offshoring" data storage has raised the question of data sovereignty, which remains open following the abolition of the Safe Harbor Agreement. This explains why some countries, where strick data sovereignty rules apply such as Germany, remain hot spots for the datacentre industry.

Surging appetite for datacentres and the subsequent hunt fight for scale and global footprint have triggered great divisions within the industry, notably between small market players and giant IT companies. Consolidations amongst service providers have been increasing since 2015. According to Synergy Research Group, the value of datacentre M&A doubled to $20bn last year. The largest deal was the acquisition of DuPoint Fabros by Digital Reality for $7.6bn.

FIGURE 4: Largest cloud owners



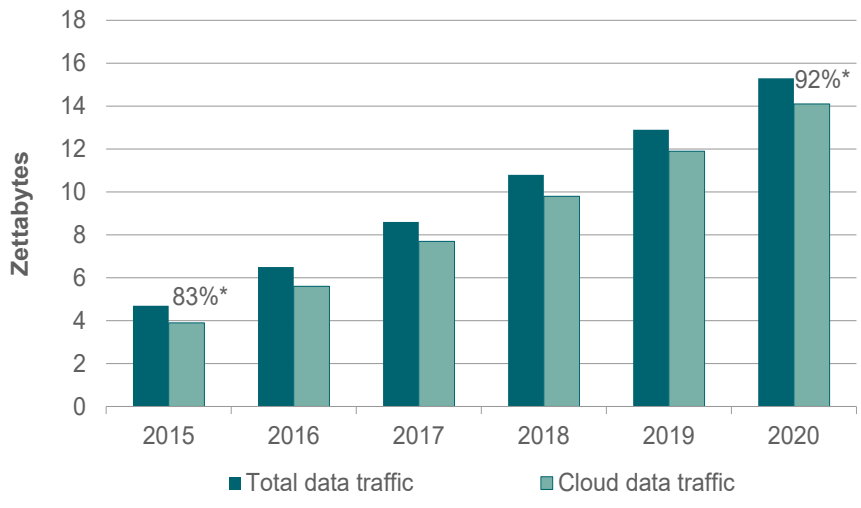
Source:Intel

FIGURE 5: Largest European datacentres

Name	Country	Area in sq m
Lefdal Mine Datacenter	Norway	120,000
Portugal Telecom - Covhila	Portugal	75,500
Next Generation Data - Newport, Wales	UK	70,000
Microsoft - Dublin	Ireland	51,000
Facebook - Lulea	Sweden	27,000
Equinix LD5 - London	UK	21,000

Source:Various

FIGURE 6: The takeover of cloud data traffic
Global data traffic



Source: Cisco / *Cloud traffic as % of total data traffic

3.7 fold

Cloud traffic increase forecast between 2015 and 2020

$20bn

Amount of M&A between datacentre operators in 2017

Ogre's energy appetite

But the industry is rapidly adopting environmentally-friendly technologies

Datacentres are energy voracious. Indeed, first, they need the power to run the IT equipment that they house. Then, because servers emit heat when they are working, they need the power to keep those servers cool enough to work efficiently and reliably. Datacentres are estimated to represent between 3% and 4% of the world power, corresponding to 73 billion kWh.

But datacentres are not just about power, water consumption is the other big issue for datacentres. According to the California Department of Water Resources, a midsize datacentre uses about 130 million gallons per year. This is more than two 18-holes golf courses.

The industry has been pinpointed by environmentalists for its massive carbon footprint that rivals the aircraft industry. This and the major incentive to use efficient technologies in order to reduce their energy costs has led the industry to rapidly adopt environment-friendly technologies.

The major energy savings are mostly coming from the new mega datacentres built by Internet giants and cloud companies like Google, Facebook, Apple, Amazon and Rackspace.

3-4%

of the world power is used by datacentres

FIGURE 6: Green datacentres in the top 30 Tech & Telecom

Name	Rank	Green power %
Microsoft	2	100%
Google	3	47%
Apple	4	100%
Digital reality	6	25%
Equinix	7	43%
Rackspace	9	36%

Source: EPA

Datacentres as an asset class

Where are the opportunities?

The datacentre investment market emerged at the beginning of the 21st century together with the IT bubble. As any new asset class, the sector has offered great opportunities but also challenges.

The lack of liquidity and transparency is the main drag on the datacentre investment market. Due to the speed of technological development, obsolescence is another concern for the property type and for tenants. It also requires a good degree of specialism which explains the limited groups of market players. Datacentre investment REITs are the most active in Europe, notably the US Equinix REIT, the Asian Keppel DC REIT and the US Digital Realty. But the market is slowly opening to non-specialist investors (investment managers and general REITs).

From an occupier's perspective, the sector is flourishing and demand for data storage is set to grow dramatically in the next five years. Tenants usually occupy the premise for a long period, over 10 years. Thus the sector offers long-term income stream and security. The sector is slowly maturing, although still at an infant stage. Investment is no longer fuelled by development activity or M&A between operators, but it is also moving towards sale & leaseback options. Yields are attractive compared to other asset types, reflecting the liquidity premium. Prime yields range between 5% and 7% accross Europe and according to FTSE, the average total return in 2017 was 28.43%. This is based on the five major datacentre REITs, namely, CyrusOne Inc, Digital Reality, QTS Realty Trust Inc., Equinix Inc. and CoreSite Realty Corporation.

In 2017, €450 million was invested in European datacentres according to RCA. This is well below the €3.4 billion in 2016 when two very large European portfolios changed hands following some M&A. The UK accounted for 41% of all European datacentre investment recorded between 2007 and 2017. Over the years, investment activity slowly spread across European countries, notably, Germany, France, the Netherlands, and Sweden. So far this year, Schroder European REIT, a non-specialist, acquired a datacentre in the Netherlands for approximately €20 million, reflecting a net initial yield of 10%. The premise is fully let to KPN NV, with an initial term expiring 31 Dec. 2026.

BEST LOATIONS FOR RATIONALISATION

Data is the most mobile commodity on earth. Today, datacentre service companies can choose where to locate their premise in order to reduce their operating costs.

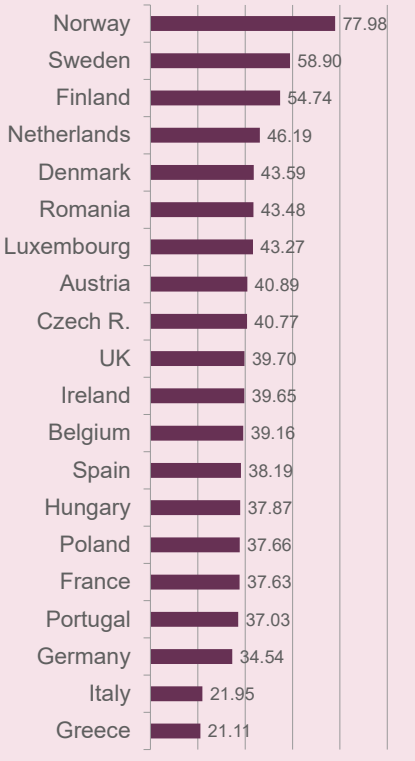
To identify the best places in European where to invest in a datacentre, Savills conducted a benchmark based on various parameters crucial to the development of a datacentre, natural environment, security, energy and connectivity.

This research analysis covers 20 European countries including Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden and the UK.

The analysis used to benchmark datacentre opportunities draws on 12 indicators including, the average annual temperature, average temperature during the peak month of the year, availability of fresh water per capita, average annual loss liaised to natural disasters, political stability, cybersecurity, electricity production per capita and electricity price, availability of green energy per capita, internet average speed and the FTTH/B (fibre to home / fibre to building) penetration rate. The various indicators have been graded an ranked across the 20 countries.

The results show that far ahead the best-graded country is Norway, followed by the the rest of Nordic countries and the Netherlands.

FIGURE 7: Benchmark results
Grade over 100



Source: Savills

"Datacentres are increasingly an investment product category accepted by institutional investors such as AXA and CBRE Global Investors, and the weight of money has pushed yields down significantly over the last couple of years to 5-7%. We expect these yields to move in further in the coming months and years."

Marcus Lemli, Savills European Investment

Nordics, the rising star out of the cloud

IT giant datacentres are massively polarising in the Nordics

Over the past five years, some of the IT giants have expanded their European facilities in the Nordics region or have even targeted the Nordics as their entry to Europe.

■ **Google** opened its first European datacentre in Finland in 2011. The IT company has now three more in Belgium, the Netherlands and Ireland. At the end of last year, Google acquired 109 hectares of land in Avesta 160 kilometres north-west of Stockholm, and another plot in Denmark located in Aabenraa as part of its datacentre strategy. Since Aabenraa will host an Apple datacentre, should Google proceed with their project, the area would become the largest datacentre hub in the world. Besides its new 131-hectare plot in Aabenraa, Google also owns a 73 plot in Fredericia, 80 kilometres north of Aabenraa.

■ In 2013, **Facebook** opened its first datacentre outside the US (28,000 sq m) in Luleå in Sweden. A year after, they opened Luleå 2 (25,000 sq m). In January last year, they announced plans to build a datacentre in Odense Denmark (56,500 sq m), only its fourth outside of the United States and the third will be located in Ireland. Last month, they applied for a building permit of 31,000 sq m for their third unit in Luleå.

■ In 2014, **Bitcoin Company KnCMiner** opened a datacentre nearby Boden, in Sweden.

■ In 2015, **Apple** announced its first datacentre in Viborg Denmark (166,000 sq m). The second will be the twin datacentre in Ireland located in County Galway. Last year, they announced a second datacentre in Denmark that will be located in Aabenraa and expected to start running in 2019. These three Apple units are set to become the biggest datacentres in Europe.

■ Last year, **IBM** opened its 12th European datacentre in Norway, in Fetsund, 30 km outside Oslo, named the Lefdal Mine Datacenter. This 120,000 sq m datacentre was built in a former mine and is 100% powered by green energy. It is also the largest datacentre in Europe.

■ **Amazon Web Services (AWS)** announced it will establish three new datacentres in Sweden (Västerås, Eskilstuna and Katrineholm) in 2018. They already have 12 datacentres located across Frankfurt, Ireland, London and Paris each.

■ **Alibaba** is also planning to open its second European datacentre in Sweden, the first one is in Germany.

■ **Microsoft** already has datacentres in Ireland Netherland, Ireland, Austria, Germany and two in the UK. Another will soon be operational in France and Microsoft has also shown some interest in Denmark.

It is no coincidence that tech giants are choosing the Nordic regions to host datacentres. This is notably due to the Nordic chill air and the cold fjord freshwater and seawaters which enable efficient natural cooling. Energy costs in the Nordic region are among the lowest in the world. It is also abundant compared to other European countries notably the production and the availability of green energy. Connectivity is also amongst the highest across Europe and the region is politically stable and safe in terms of natural disaster and cybersecurity. Last but not least, Norway and Sweden are offering some tax incentives and Denmark is currently implementing a similar tax reduction.

Norway

By far, Norway tops the league of our benchmarked countries. The country has the best grade in nearly all of the parameters selected in the benchmark. Where Norway really stands out is the availability of fresh water, the amount of energy production per capital and the availability of green energy per capital which is between 8 and 11 times higher than the average of the 20 countries benchmarked.

Sweden

Sweden ranks 2nd in our benchmark notably thanks to the natural low temperatures which enables natural cooling but also thanks to large freshwater resources, very good connectivity, a large amount of energy produced per capital, notably green energy and low risks. Sweden has many submarine cables connecting the country with Denmark and the Baltic States. There are 90 Swedish datacentres, the majority of these colocation facilities (47) are located around Stockholm, followed by Malmo, Gothenburg and Lulea.

Finland

Finland has the coldest climate of the 20 countries surveyed and the lowest loss in terms of natural disasters. It has a high amount of freshwater available, twice the average of the 20 countries and low electricity costs. Finland has 30 colocation datacentres of which, 20 are located in Helsinki, three in Tampere and the remaining seven are in regional areas.

Denmark

Denmark was graded above average in all criteria selected in our benchmark with notably with very good internet speed. Additionally, Denmark is directly linked to the fibre network cable TAT-14, linking the Nordics to the US, whereas Norway and Sweden have to run through Denmark. Denmark has 45 colocation datacentres of which, 31 are in Copenhagen. The pipeline in Denmark is nearly 400,000 sq m.

Conclusions and outlook

Great opportunities ahead for opportunistic investors

We believe M&A will continue throughout 2018 as some small market players are struggling due to the growing presence of the giant IT tech companies in the Cloud datacentre industry. Sale & leaseback could be an option for some operators to free up some financial resources and invest in new infrastructure and technology.
The share of hyper-scale datacentres will increase whilst the number of new construction will slowly stabilise. New, larger premises will increasingly concentrate in peri-urban or rural areas in countries that offer the best opportunities in terms of natural environment, security, energy and connectivity. The Nordics region will continue to be a target area for these large datacentres.

Yet there will still be a need for small and medium-sized data centres, nationally based, to avoid any potential latency but also to avoid legal issues relating to data sovereignty. This means that countries such as the UK, Germany France and the Netherlands will continue to experience an increasing demand for data storage.

The rapid change of pace in IT as well and the overall drive for data efficiency is generating a need for flexibility in the sector. We believe prefabricated and modular designs will become increasingly popular as they shorten the construction time and reduce facility costs.

Although evolving fast towards green energy, the overall volume of energy used by datacentres will continue to grow as cloud datacentres are expected to grow exponentially in the next five years.

Innovations can pose new opportunities and challenges to the sector with one example being Project Natick. Microsoft is evaluating the long-term prospects of under the sea datacentres. The main advantages to dropping datacentres in the deep would be to decrease the cooling costs and to reduce the construction time. Indeed, Microsoft believes these new datacentres could be deployed within three months. Should the project see the light and become commonplace, it would harm the traditional datacentre market. Furthermore, concerns about using the oceans and the negative impact this could have on the local marine ecosystem are rising and could put an end to the project.

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