State of the Dutch Data Centers

Room for Growth
Dutch Data Center Report 2017

State of the Dutch Data Centers

Room for Growth
COLOPHON


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All online activity and disruption is coming from data centers near you. Without them, our economy comes to a halt, and therefore data centers are the main enablers and new foundation of our now, digital economy.

With the digital transformation in full throttle the demand for data centers is growing and (foreign) investments in this industry in the Netherlands are at a record high. As the fastest growing digital hub in Europe, the Digital Gateway to Europe, last year a record growth in supply was reported while the demand continues to be higher. The cloud and data center industry continues to be the largest job and largest foreign investment sector in The Netherlands, and is becoming more important, year after year.

With this growth we, as Dutch data centers, see numerous challenges ahead of us. Challenges to be able to grow at the right places, to get enough skilled personnel, having up to date legislation and policies that make sense, challenges with recognition and promotion of this ‘golden’ industry, with not fast enough power grid investments and challenges with how to get heat grids where data centers are, to help to speed up the energy transformation. Since our waste heat is green and free, the time is now to really do something.

With this annual report, the third time it is published, the Dutch Datacenter Association would like to emphasize the importance of this crucial industry and provide insights into how this sector works, how it grows and what its challenges are.

With the speed that we are growing, the speed that companies transform and move to a data center, we hope to give insights and inspire action. To continue the growth of the digital world we live in.

Stijn Grove
Managing Director
Dutch Datacenter Association
The Dutch Data Center Report is an annual study initiated by the Dutch Datacenter Association. The main focus is to provide a quantitative overview of the Dutch data center market, the Netherlands as Digital Gateway and the direct and indirect way the data center industry impacts the Dutch (digital) economy.

The report is a combination of research exclusively done by PB7 Research, CBRE Data Centre Solutions and the Dutch Datacenter Association itself.
Data centers are the foundation of the digital economy
The digital industry has grown to be the engine of the Dutch economy. In 2016, the digital sector accounted for 25% of the GDP, with a total of €171 billion. In essence, all digital data is transported through networks and stored and processed in data centers, highly secured buildings with redundant power supplies. Data centers ensure that digital services such as cloud and mobile apps operate properly and therefore these modest buildings are the foundation of our (digital) economy.

The Netherlands is the Digital Gateway to Europe
The digital sector of The Netherlands is not only prosperous on a national level; it is also a major hub for digital services on an international scale. As Digital Gateway to Europe, it is second largest data hub in Europe and growing with double digits over the last 10 years. The last six years we have seen a steady growth of 15% per year. Almost all important players in the international digital economy are established in our country with equipment and head offices. And those who aren’t, have plans to launch soon. Nowadays, 20% of foreign investments is driven by digital activities.

However, there is room for growth
As is the case with any transformation, it changes the way we live and the way we work. The challenge with the digital transformation is that the pace is exceptionally high. So although we are doing great in the digital area, we need to keep investing and keep innovating in order to safeguard our leading position. Relevant topics with regard to this include legislations, sufficient, efficient and durable energy supplies, cyber security and suitable education programs within the technological sector.

Collaboration is more essential than ever
We at DDA believe that working together is the only way forward. In our three years of existence, we have had the pleasure to work together with the digital industry, but also policy-makers, politicians, authorities, researchers and so on. We are more than happy to continue exchanging knowledge and setting up partnerships in order to make the digital sector even more prosperous and durable. As we find there is a lot to win in the area of policy making, we invite politicians and policy makers to join the discussion.

Let’s lead the way
In 1988, the Netherlands was the second country in the world to connect to the Internet. Today - almost 30 years later - the world we live in has changed immensely. What hasn’t changed is that we still lead the way when it comes to digital matters. However, we need to join forces in order to safeguard our position as competition is on the rise. All stakeholders together can manage to set an international agenda that benefits all. After all, the ones who lead should guide the way.
The greatest transformation in human society is in full swing, and it’s greater than any other transformation that has ever taken place in human history. We are at the beginning of the digital era and interestingly, it will change every single sector of our economy.

Data has already gained a central role in our daily lives, and new technologies such as AI, big data analytics, robotics and IoT cause huge disruptions across all industries, leading to new breakthroughs and exponential growth.

**Prerequisite for the Dutch industry**

All digital activities are housed between the walls of data centers. This is why data centers, but also connectivity, cloud providers and the digital ecosystem are indispensable for the prosperity of the (digital) economy of the Netherlands and Europe. After all, the Netherlands is known as an international hub centered at the heart of Europe, and acts as a digital gateway to other countries.

Data centers serve as a prerequisite for our economy and our society. They ensure the operational activities for energy providers, they store and analyze patient databases for hospitals and they provide the foundation for online stores that are open for business 24/7, 365 days a year. These are just a few examples that show the potential of digital services.

**Quarter of the Dutch GDP**

The digital economy is outpacing every other segment of our economy in terms of growth. At the moment, one quarter of the Netherlands’ Gross Domestic Product (GDP) is already dependent on data centers, connectivity and cloud providers.

The appeal of these sectors is what brings many international businesses to the Netherlands, along with significant investments. Nowadays, 20% of foreign investments is driven by digital activities, making the Netherlands one of the major operators in the global digital economy.

Data centers are the new foundation of our (digital) economy and a magnet for foreign investments. Without our digital services, all coming from data centers, life as we know it would come to a halt.

**Digital Transformation**

Technology is transforming our economy. Data centers serve as a prerequisite and with the impact of technology becoming greater and greater they are the new core. But it is also a best kept secret: One of our fastest growing industries and the main enabler of all the online services we use on a daily basis.

**Figure 1:** Digital disruption within the NACE sectors

DATA CENTERS AS THE NEW CORE OF OUR ECONOMY

History shows us that a good infrastructure has a catalyzing effect on both economy and society. The Greek harbours, the Romans roads and in modern times the American railroads and highways sparked a new boom in the (local) economies.

Data centers are the modern equivalent of the harbours, as this is where all digital infrastructure comes together. They provide robust housing for international enterprises, SMEs, the public sector, the IT-sector, and digital startups. Even though they have a modest appearance and are located anonymously in the landscape, they are the physical manifestation of what many people see as ‘cloud services’.

Datacenter growth
Over the last decade we have seen strong data center growth in the Netherlands. Commercial, multi-tenant data centers have spread across the country and have become a vital part of the Dutch digital infrastructure.

Throughout the country, regional data centers provide a platform for organizations to compute, run and store their services and data. Nowadays, organizations rely heavily on online services, which is why a regional data center can be found in every province in the Netherlands. Data centers have direct and indirect effects on the local economy, with multi-tenant data centers already contributing over a billion euros to the economy.

International hub
The Netherlands is also a major international hub for digital services. As Digital Gateway to Europe, it is second largest data hub in Europe and growing with double digits the last 10 years. The last six years we have seen a steady growth of 15% per year. Almost all important players in the international digital economy are present in our country with equipment and head offices. And those who aren’t, have plans to launch soon. Although data centers, as modest physical manifestations, pale in comparison to the other Dutch international hubs - the Port of Rotterdam and Schiphol Airport - they are outperforming them in growth and size.

Focus on data centers
The online sector has become the largest investment sector in the Netherlands and is growing fast. Maintaining economic growth requires among other a focus on data centers. This means focus on strengthening the existing campuses, increasing investments in power distribution and it means promoting the future-proof sector.

Figure 2: Digital Economy model

FOCUS ON DIGITAL

As with any major transformation, disruption or revolution, it changes the world. It changes the world we live in, the world we work in, the way we do trade, and (if necessary) the way we regulate things. What seemed like the right thing to do yesterday, is not compatible with the new reality of today.

Especially with the speed of the digital transformation, it seems like we can’t keep up anymore. This is problematic, as success is dependent on the degree to which we can focus and adapt to new circumstances.

Smooth running of the digital economy
The effectiveness of digital delivery, creation and consumption supply chain is vital for the prosperity of the digital economy. Aside from the industries themselves, environmental factors such as innovation, research, education, promotion, sustainability, policy, laws & regulation, trust, security and finance affect the performance of the digital economy.

Digital transformation also means that these enablers must adapt to the new reality, and is necessitating change among all social and economic stakeholders and institutes.

A new framework
With every change, existing laws and regulations need to be altered and new regulations have to be written. Hereby, history repeats itself time and again. For example, when the telephone was introduced, we had telegraph laws. The same is occurring again: we still rely on telecom laws, even though the online infrastructure has been introduced.

In order to create a new framework, in-depth knowledge on the topic is key, and it’s important to partner with the industry to make well informed decisions.

Coherency in policies
Another vital aspect is policy coherence. We need to make sure that economic, social, environmental and governance dimensions are considered in the process of policy making on the topic of sustainable development. This is a requirement if we want to stimulate investment and growth, as investors naturally prefer countries that focus on creating an attractive investment environment. Therefore, we need to continue to work on an orchestrated interdepartmental, well-balanced approach with regard to policy making.

Figure 3: Digital Creation & Consumption


THE MEASURE OF SUCCESS IS HOW WE CAN FOCUS AND ADAPT QUICKLY TO THE NEW DIGITAL REALITY.
SUPPORTING A NEW INDUSTRY

Over the last 15 years, Dutch data centers have grown to a billion euro industry, almost completely under the radar. They have been established in areas that were never meant for them, and they have expanded without deliberate planning. This particularly applies to the Greater Amsterdam campuses that are considered the golden hotspots: world famous and known as the connectivity capital of the world.

Surprisingly enough, data center campuses are still not taken into account in area development and infrastructure planning. Considering the importance of data centers for economic growth, this needs to change.

The growth of data centers
Data centers are a capital intensive industry. The costs of large commercial data centers can add up to over 150 million euros. In the last 15 years, many data centers have been built all over the Netherlands. Alongside this development, large investments were made in the power and network infrastructure (sea and land data cables). The investment of customers and connectivity providers have been even larger going up as high as 10 fold the investment value in the facilities and infrastructure outside the data center.

Power and network infrastructure
In Amsterdam, and also in the other 10 major data hubs in the world, we see that data centers grow in campuses, close to each other. A challenge we observe is that the expansion of power and network infrastructure can’t keep up with the expansion of digital services and data center campuses. To illustrate: it takes two years to build a data center; whereas it takes five to seven years to build a power substation and even 10 to 15 years to build high voltage networks.

Jobs and education
Almost every country in the world has the same, shared problem: a shortage of technical and IT personnel. With the digital and energy transformation in full throttle, serious action is needed with regard to our education system if we want to manage the digital transformation. We need to invest in highly skilled IT people in order to meet the demands. This is top priority as we are already a minute past midnight.

Promotion and representation
The digital infrastructure industry is the new top sector for the Netherlands. The Digital Gateway to Europe is the digital distribution hub and is quickly surpassing the Port of Rotterdam and Schiphol Airport in terms of growth and revenue. These days, the data center and cloud industry has already attracted more foreign direct investment (FDI) than any other sector. Yet, on a national and international level, permanent backing for research, promotion and education is almost non-existent.

Figure 4: The Foundations for the Digital Economy 2016
The data center sector is an example of an industry that is ‘future proof’: it fully runs on electrical energy and almost exclusively on green power. Furthermore, data centers generate huge efficiency benefits by bringing together and concentrating digital equipment in one place.

As a result of the professional exploitation of data center facilities, large amounts of energy are saved in comparison with on-premise IT. Due to economies of scale, specialization and state of the art technology, data centers can handle energy very efficiently. Without data centers, the Dutch economy and society would use more than twice the amount of energy than is currently being used.

**Sustainable energy potential**
Almost all of the electricity consumed by data centers is converted into heat. The concentration of online services in a data center therefore offers a large, hitherto hardly utilized energy potential. The utilization of the green excess heat generated by data centers is a logical step towards a fully circular economy.

**Reuse of green waste heat**
The waste heat, generated by green and renewable energy sources, can be reused as high-quality, low-caloric heat to warm houses, offices and greenhouses. Furthermore, industrial processes can be made sustainable quicker. By reusing the heat that data centers generate, it will be possible to achieve CO₂ reduction targets faster; we will accelerate the transition to sustainable energy use and we will need less natural gas.

**Low caloric heat networks**
Data centers connected to heat networks are already a reality in several places in the Netherlands. However, to make use of the full potential we need to build more heat networks, ideally low caloric. We have found this to be a challenge. Because even though there is a business case available, there are still risks that need to be mitigated. Incentives are needed to cross the threshold and to get up to speed.

**Free energy**
The DDA aims to initiate/accelerate a concerted effort to make use of waste heat, which for the Netherlands can lead to millions of GJs of energy preservation. Therefore, we have offered our waste heat for free. On behalf of the Dutch data centers, we at DDA propose that the use of waste heat will be an important item on the agenda of all relevant stakeholders, not the least the Dutch government. Next, we need to further improve energy efficiency policies in order to meet the goals of the Paris climate accords.

**Figure 5:** Datacenter energy flow and usage

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**THE DUTCH DATA CENTER SECTOR, REPRESENTED BY THE DDA, OFFERS ITS WASTE HEAT FREE OF CHARGE, TO SPEED UP THE ENERGY TRANSITION**
2017 DUTCH DATA CENTER REPORT STATE OF THE DUTCH DATA CENTERS

DUTCH DATA CENTER STATS
205 multi-tenant data centers
504,000 m² gross surface
283,000 m² net surface (data floor)
125 colocation providers (total)
  73 colocation providers (>100 m²)
  52 colocation providers (>400 m²)

AMSTERDAM METRO REGION STATS
49 multi-tenant data centers (>100 m²)
53 single-tenants data centers (>100 m²)
188,000 m² net surface (data floor)

DUTCH DATA CENTER POWER
591 MW multi-tenant
665 MW single-tenant

AMS-IX: World’s largest Internet Exchange
3.45 Tbit/s average throughput (May 2017)

NL-IX: Netherlands 2nd top 10 Exchange
1.43 Tbit/s average throughput (May 2017)

Research done by:

DUE TO DATA CENTERS
until 2020 a 10-20% decrease in IT-related energy consumption is forecast relative to 2013
2016: RECORD BREAKER FOR THE NETHERLANDS
Amsterdam in 2016 Europe’s top data center market
Highest EU individual market annual take-up (53.6 MW)
Highest EU individual market quartely take-up (Q4, 44 MW)
Highest ever recorded take-up in Amsterdam

2016: AVERAGE TAKE-UP AMSTERDAM METRO REGION
Amsterdam doubled its (2011-2015) average take-up
2016: 30% average take-up
2011-2015: 15% average take-up

The Netherlands has
2
Hyperscale campuses

17,5%↑
average growth in take-up
over the last 6 years in
the Amsterdam region

ENERGY PRICING Most
competitive pricing of all
key markets in Europe

AMSTERDAM CAMPUSES
Science Park, South-East,
West, Schiphol-Rijk

www.dutchdatacenters.nl
STATE OF THE DUTCH DATA CENTERS

About the study
With London, Paris and Frankfurt, the Amsterdam region is one of the top-four data center locations in Europe. All of these areas show growth, but Amsterdam has been outpacing the others for a while now. The strong position of the Amsterdam area can be attributed to two key factors. First, Amsterdam is home to one of the biggest and fastest Internet Exchanges in Western Europe, even the world. And secondly, out of the four metropolitan areas, Amsterdam is the most affordable in terms of property prices, doing business and cost of living. With the presence of Amsterdam Airport Schiphol as a major international airport, it is also very accessible for international customers.

The Dutch data center landscape
The Netherlands continues to be a top location for data centers. Companies from all over the world choose the Amsterdam Metro Area because of its perfect connectivity. Connectivity via data cables and carriers, connectivity via the AMS-IX, the largest Internet Exchange in the world, and connectivity via the (cloud) ecosystem.

With the presence of Schiphol as a major international airport, it is also very accessible for international customers. Additionally, compared to the other top datacenter regions in Europe – London, Frankfurt and Paris - Amsterdam is more affordable in terms of property leasing, power, doing business, and living. But also outside of the Amsterdam Metropolitan Area, we see that high quality multi-tenant data centers are available to almost any organization in the Netherlands within a 30 minute drive. This unique situation provides companies the luxury of a make-or-buy decision when the time comes to expanding or upgrading a server room or datacenter.

An increasing amount of organizations decides to outsource its server capacity and corresponding management to data centers, often by using colocation, and even more so by using cloud and hosting solutions. The strong growth of multi-tenant data centers has, more than anything, been the result of the rise of cloud computing. Cloud computing continues to shape the datacenter industry in various ways. It has resulted in the arrival of hyperscale datacenters, in the Netherlands represented by Microsoft and Google. At the same time, hosting companies bet big on selling virtual computer resources, therefore moving out of the colocation market, leaving it to the colocation specialists. The end result is that many hosting companies have moved their servers to colocation providers.

Multi-tenant data centers
The number of multi-tenant data centers that are active in the market is not growing. Small, non-specialized data centers have stopped offering colocation and a few have closed the books. On the other side of the spectrum, major colocation providers continue to open new data center locations like clockwork. As a result, the total amount of data floor surface continues to grow and we see a decrease in the number of service providers.

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<tr>
<th>TABLE 1: SIZING THE DUTCH MULTITENANT DATA CENTER MARKET, MAY 2017</th>
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<tr>
<td><strong>Gross surface (incl. office space, etc.)</strong></td>
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<tr>
<td></td>
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<tr>
<td><strong>Net surface (data floor)</strong></td>
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<tr>
<td><strong>Data centers facilities (#)</strong></td>
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<tr>
<td><strong>Colocation providers (#)</strong></td>
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Source: Pb7 Research, 2017

1 The 2016 data has been restated compared to last year, based on improved information on a number of data centers
This year, we identified 157 multi-tenant data centers, one more compared to last year. There have been some acquisitions (Telecity by Equinix, Digital Realty acquired data centers from Equinix/Telecity, Dataplace by Eurofiber, and Vancis by InterXion). Some new vendors have made their entrance, with EdgeConnex as the biggest newcomer. On top of that, there are another 48 small data centers providers with up to 100 m² of data floor (less than 2% of the total floor space) that have not been identified yet. If we add up the total surface of the data floors, we see a total growth of 12%. If we compensate for the changes within KPN (KPN separated the colocation data centers into NL-DC, so we are no longer counting the data floor from KPN’s hosting activities), the organic growth totals 15%.

In terms of growth, 2016 was not one of the top years in recent history, but still showed double digit growth. And if we look at the growth plans and the construction of new data centers that have started, there is a very strong growth ahead. In total, we have identified plans for an additional 180,000 m²(!) of multi-tenant data center space. It is important to note that 98% of the additional data center capacity is planned to be built in the Amsterdam Metropolitan Area. The importance of Amsterdam for the Dutch multi-tenant data center market also increased over the last twelve months. Last year, 64% of all data floor space was located in and around Amsterdam (Amsterdam, Almere, Aalsmeer, Haarlem, Hoofddorp/Schiphol, Purmerend). This has increased to 68% and this percentage is likely to increase even further to more than 75% over the next three years.

**FIGURE 1: MULTI-TENANT DATA CENTER FLOOR SPACE (NET M² * 1000, % OF TOTAL), BY PROVINCE, MAY 2017**

<table>
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<th>Province</th>
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**Source:** Pb7 Research, May 2017

“**68% OF THE DUTCH DATA CENTER FLOOR SPACE IS LOCATED IN THE AMSTERDAM REGION**”
Regional multi-tenant data centers

Last year we stated that there is limited growth in terms of data floor surface in the province as a result of overcapacity. However, the demand is growing. Most local data centers use the growth in demand for improving the utilization rates. And those that ran or run out of space, are expanding. We have seen expansions from Alticom, Dataplace, Datacenter Fryslan, and Serverius. Noord-Brabant was the only province that expanded with more than 1000 m². This year, we see a continuation of this trend of moderate local growth. In line with this trend, we have not seen a lot of success in launching new local datacenter companies in recent years. Most new local entrants that tried to enter the market with a single regional data center failed. The latest of these regional initiatives is a 4000 m² datacenter for DC Valley in Ede, to be opened in 2018. This initiative will hopefully buck the trend.

In the meantime, we see the regional data center landscape changing. Driving by the demand for continuity by their customers, the traditional one-location data center company is slowly disappearing. There have not yet been a lot of mergers or acquisitions, but more and more partnerships are being announced in order to offer twin datacenter facilities. Over the next couple of years, we expect to see more consolidation and more partnerships. As a result, the quality of local data centers is only expected to improve even further.

Just like last year, we observe that that most data centers anticipate growth for the next 12 months. Most, 60% expects an increase in square meter usage. Only 6% expects a decrease in square meter usage. Multi-tenant datacenters are even more optimistic in terms of power. 79% anticipates growth of power usage and 74% expects an increase in investments. Based on the higher growth of power usage compared to data floor surface, we can conclude that the server density continues to increase.

![Figure 2: Multitenant Data Centers' Growth Expectations for the Next 12 Months, April 2017 (N=100)](source:Pb7 Research, 2017)
Regional datacenters expect to find growth from SMEs and local organizations that are looking to move primary or secondary IT-related sources to third party data centers. Still, most are well aware that the biggest opportunities can be found within the IT-sector itself, cloud and SaaS vendors, and other types of hosting companies are key to colocation growth. Next, IT service providers that offer a full service package to their customers provide key growth opportunities for almost half of the surveyed multi-tenant data centers. Regional datacenters perform best when they are located at digital innovation hotspots, where digital players and start-ups can interconnect.

If we look further ahead into the future, regional data centers are expected to become more important in the data center landscape as a result of “edge computing”. The rise of the Internet of Things (IoT), where “things” are bestowed with an increasing amount of artificial intelligence (AI), requires an increasing amount of compute power (analytics) and storage close to the device, as opposed to locked up in centralized data centers. Not all smart things will require a minimum amount of latency, but others, such as smart vehicles, will. In the short term, the impulse for regional data centers will be limited. In the long term, edge computing will drive regional data center growth. To benefit from that, organizations will need to build a national network of data centers, comparable to Alticom’s, or even more fine grained.
**Single tenant datacenters**

For most organizations (68%) in the Netherlands, digital transformation is high on the agenda\(^2\). Although it’s typically associated with front-office transformation, most organizations in the Netherlands are actually focusing on transformation in the back-office\(^3\). As a result, continuity in the IT-infrastructure has become critical. Not every single tenant data center or server room is able to provide the required quality as they don’t have adequate facilities and/or lack specialized skills that are required to minimize costly downtime.

As a result, many single tenant datacenters are upgrading their facilities or moving to third party locations. For some, especially in the public sector, there are also regulatory demands that require the adoption of twin data centers. Since most organizations with a single data center are unwilling to invest in a new secondary datacenter, they typically look for the services of a third party service provider. At the same time, over the last 12 months we have seen that there is an increased willingness to invest in on-site facilities. The number of organizations that expect an increase in data floor surface, and power has gone up significantly compared to last year. Furthermore, the number of organizations that expects a decrease is more than halved compared to a year ago.

![Figure 4: Single tenant data centers' growth expectations for the next 12 months, April 2017 (N=100)](image)

The key reason for the continued on-site investments has to be that most Dutch organizations are embracing private and hybrid cloud models, while only a limited group is moving all-in to the public cloud, even if we are only looking at innovative workloads with a short lifecycle. Although most organizations are using public cloud solutions today and the use is growing rapidly, the impact on the corporate IT-infrastructure is relatively small (see figure 5). Most corporates are using private cloud or other on-premises virtual infrastructure as the basis for most workloads.

\(^2\) Source: National Cloud Monitor 2017, Pb7 Research/Cloud Community Europe

\(^3\) Source: National Cloud Monitor 2017, Pb7 Research/Cloud Community Europe
While we can expect most growth from multi-tenant data centers, on-premise data centers are clearly here to stay for the foreseeable future. And if we look at the segment of "high end digital players", we are actually looking at rapid growth. This segment consists of a small group of leaders in the digital world, such as Google, Microsoft and bol.com, who have the scale to cost-effectively design, build, and manage tailored data centers. The enormous scale of Microsoft’s and Google’s data centers places them in a special category of the single-tenant data center market known as hyperscalers or hyperscale data centers. Microsoft and Google have so far built 44,000 m² of data center floor and have plans for an additional 140,000 (estimate) m². That would give these two companies a footprint comparable to the combined multi-tenant data centers of the entire Amsterdam metropolitan area!

Interestingly, hyperscale data centers are not attracted to metropolitan areas such as Amsterdam. They require excellent connectivity (for example where an ocean cable comes ashore) access to large quantities of green power and affordable locations. As a result, new datacenter one-vendor hotbeds are emerging in Groningen and North Holland.

**Going green**

All data centers combined, data centers in the Netherlands have a total capacity of more than 1200 megawatts. This is evenly spread across single- and multi-tenant data centers. The enormous power consumption of data centers has been widely discussed over recent years. However, it must be said that data centers have reacted by investing in durable energy solutions: not only have data centers been reducing the amount of power they require to house and cool computer equipment, they have also started to embrace green power consumption, as we found in our survey among 100 Dutch data center decision makers. For both major multi-tenant data centers and hyperscale data centers, green energy has become the standard, and most medium sized data centers are following their lead. Many small data centers (below 400 m²) have not yet kept up with this trend and are bringing the average below 80%.

**95% OF THE ENERGY USED IN LARGE MULTI-TENANT DATA CENTERS IS GREEN.**
However, if we look at the average, apply it to the energy usage of multi-tenant data centers and enrich the data with public information from major data centers, this translates in much higher volumes of green megawatts. Datacenters with data floors of at least 1000 m² mainly use green power. Since data centers with fewer than 1000 m² data floor account for only 7% of the total multi-tenant data floor, the impact on the overall power usage is limited as well.

Similarly to the group of small multi-tenant datacenters, many single tenant data centers also show little concern about their carbon footprint. Only one in three of the single tenant datacenter decision makers say they are using green energy. There may be more, but 41% simply doesn’t know. This will especially be true for organizations that have smaller server rooms and do not have separate contracts for data center power. Since especially these types of data centers have relatively high PUEs, moving towards a third party just for lowering the carbon footprint, is making a lot of sense.
Summary
The Dutch data center landscape continues to evolve. It is becoming richer, more varied, and - despite the growing power usage - greener as well. The Amsterdam metropolitan area has shown solid growth and is clearly preparing for even higher growth over the next three years. These new growth plans are pointing towards a bright future where Amsterdam data centers are larger in terms of data floor surface. Hereby, the sky is the limit. But Amsterdam data centers are not the only segment contributing. Microsoft’s and Google’s hyperscale data centers are growing almost exponentially and will most likely contribute a similar surface of new data floor over the same period. Most of the growth in both segments can be attributed to the rapid adoption of the cloud.

And we will also continue to see moderate growth in regular scale single-tenant data centers, as more and more organizations enhance their in-house infrastructure to house private cloud deployments. However, this will be a bit more of a mixed bag. With continuity emerging as the key factor as opposed to cost-effectiveness, the key factor in this market is scale. You need to be able to answer questions such as: are we big enough to have data center specialists in-house; do we need to and are we able to monitor and respond not only during office hours, but also 24/7? As a result, a growing number of organizations find they lack the scale. They decide to hire a colocation provider; look for support from managed service providers, or outsource IT altogether. On the other hand, a growing number of organizations that focuses heavily on digital transformation and believes that they do have the scale and expertise, decide to move out of multi-tenant data centers and build a new data center of their own.

### TABLE 2: TOTAL AMOUNT OF DUTCH DATA CENTERS

<table>
<thead>
<tr>
<th>NATIONWIDE</th>
<th>Multi-tenant</th>
<th>Single-tenant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datafloor (m²)</td>
<td>Companies (#)</td>
<td>%</td>
<td>Companies (#)</td>
</tr>
<tr>
<td>10-99</td>
<td>52</td>
<td>42%</td>
<td>5.608</td>
</tr>
<tr>
<td>100-399</td>
<td>21</td>
<td>17%</td>
<td>217</td>
</tr>
<tr>
<td>400-9.999</td>
<td>42</td>
<td>34%</td>
<td>107</td>
</tr>
<tr>
<td>10K-19K</td>
<td>5</td>
<td>4%</td>
<td>4</td>
</tr>
<tr>
<td>20K or more</td>
<td>5</td>
<td>4%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td></td>
<td>5.937</td>
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</table>

<table>
<thead>
<tr>
<th>AMSTERDAM METROPOLITAN AREA</th>
<th>Multi-tenant</th>
<th>Single-tenant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datafloor (m²)</td>
<td>Companies (#)</td>
<td>Facilities (#)</td>
<td>Companies (#)</td>
</tr>
<tr>
<td>&gt;100</td>
<td>25</td>
<td>49</td>
<td>44</td>
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</table>

<table>
<thead>
<tr>
<th>HYPERSCALERS</th>
<th>Single-tenant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datafloor (m²)</td>
<td>Companies (#)</td>
</tr>
<tr>
<td>&gt;100</td>
<td>2</td>
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</table>

**Source:** Pb7 Research, 2017
## Multi-tenant and Single-tenant Data Centers in the Amsterdam Region

### Table 3: Total Dutch Data Center Datafloor Surface

<table>
<thead>
<tr>
<th>NATIONWIDE</th>
<th>Multi-tenant</th>
<th>Single-tenant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datafloor (m²)</td>
<td>Aggr. total (m²)</td>
<td>Aggr. total (m²)</td>
<td>Aggr. total (m²)</td>
</tr>
<tr>
<td>10-99</td>
<td>5,250</td>
<td>81,877</td>
<td>87,127</td>
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<tr>
<td>100-399</td>
<td>3,929</td>
<td>43,732</td>
<td>47,662</td>
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<tr>
<td>400-9,999</td>
<td>76,933</td>
<td>122,839</td>
<td>199,772</td>
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<tr>
<td>10K-19K</td>
<td>63,762</td>
<td>55,500</td>
<td>119,262</td>
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<tr>
<td>20K or more</td>
<td>132,690</td>
<td>26,000</td>
<td>158,690</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>282,564</strong></td>
<td><strong>329,948</strong></td>
<td><strong>612,512</strong></td>
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<table>
<thead>
<tr>
<th>AMSTERDAM METROPOLITAN AREA</th>
<th>Multi-tenant</th>
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</thead>
<tbody>
<tr>
<td>Datafloor (m²)</td>
<td>Aggr. total (m²)</td>
<td>Nationwide (%)</td>
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<tr>
<td>&gt;100</td>
<td>188,296</td>
<td>68%</td>
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<table>
<thead>
<tr>
<th>HYPERSCALERS</th>
<th>Single-tenant</th>
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<td>Datafloor (m²)</td>
<td>Aggr. total (m²)</td>
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<tr>
<td>&gt;100</td>
<td>44,000</td>
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</table>

**Source:** Pb7 Research, 2017

### Table 4: Total Dutch Data Center Power

<table>
<thead>
<tr>
<th>NATIONWIDE</th>
<th>Multi-tenant</th>
<th>Single-tenant</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Power (MW)</td>
<td>591</td>
<td>665</td>
<td>1,246</td>
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</table>

**Source:** Pb7 Research, 2017
What makes the Netherlands a top data center location?

In last year’s report, we identified why the Netherlands is among the four top European multi-tenant data center locations. Other top regions are Germany (Frankfurt), the United Kingdom (London) and France (Paris). A top data center location has great infrastructure and great customers. The presence of a major Internet hub is a key asset. Additionally, the quality of infrastructure is also dependent on access to energy, access to in-depth data center expertise and innovation skills, costs of doing business, fiscal climate, and cost and quality of living. In terms of customers, data centers typically thrive where financial centers and international business meet and where technology led companies are located. On most of these criteria, Amsterdam performs well compared to fellow European data center strongholds London, Frankfurt and Paris.

Internet Exchanges

The Netherlands is host to the Amsterdam Internet Exchange (AMS-IX), now the largest Internet exchange point in the world, surpassing the DE-CIX in recent months. In terms of average throughput, only the German DE-CIX comes close, while other exchanges follow at quite a distance. Per second, the AMS-IX passes more than 3450 Gbit. Furthermore, the number eight internet exchange on the list, NL-IX, was formed in the Netherlands and is currently owned by KPN.

### TABLE 5: LIST OF INTERNET EXCHANGE POINTS BY SIZE

<table>
<thead>
<tr>
<th>Short name</th>
<th>Name</th>
<th>Country</th>
<th>Established</th>
<th>Members</th>
<th>Throughout (Gbit/s) max</th>
<th>Throughout (Gbit/s) average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AMS-IX</td>
<td>Amsterdam Internet Exchange</td>
<td>Netherlands</td>
<td>1997</td>
<td>804</td>
<td>5.284</td>
</tr>
<tr>
<td>2</td>
<td>DE-CIX</td>
<td>Deutscher Commercial Internet Exchange</td>
<td>Germany, USA, UAE, Italy, France, Turkey, Spain</td>
<td>1995</td>
<td>718</td>
<td>5.638</td>
</tr>
<tr>
<td>3</td>
<td>LINX</td>
<td>London Internet Exchange</td>
<td>United Kingdom, USA</td>
<td>1994</td>
<td>644</td>
<td>3.420</td>
</tr>
<tr>
<td>4</td>
<td>IX.br</td>
<td>Brazil Internet Exchange</td>
<td>Brazil</td>
<td>2004</td>
<td>1.350</td>
<td>2.780</td>
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<tr>
<td>5</td>
<td>DATA-IX</td>
<td>DATA-IX</td>
<td>Russia, Ukraine, Kazakhstan, Germany</td>
<td>2009</td>
<td>344</td>
<td>2.700</td>
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<tr>
<td>6</td>
<td>MSK-IX</td>
<td>MSK-IX</td>
<td>Russia</td>
<td>1995</td>
<td>504</td>
<td>2.821</td>
</tr>
<tr>
<td>7</td>
<td>Equinix</td>
<td>Equinix Exchange</td>
<td>USA, Europe, Japan, Singapore, Hong Kong, Australia, Brazil</td>
<td>1998</td>
<td>768</td>
<td>1.600</td>
</tr>
<tr>
<td>8</td>
<td>NL-IX</td>
<td>Neutral Internet Exchange</td>
<td>Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Poland, Sweden, Switzerland, United Kingdom</td>
<td>2002</td>
<td>600</td>
<td>1.770</td>
</tr>
<tr>
<td>9</td>
<td>W-IX</td>
<td>W-IX LTD</td>
<td>Russia, Europe, Ukraine</td>
<td>2008</td>
<td>166</td>
<td>1.500</td>
</tr>
<tr>
<td>10</td>
<td>Netnod</td>
<td>Netnod Internet Exchange in Sweden</td>
<td>Sweden</td>
<td>1997</td>
<td>255</td>
<td>1.302</td>
</tr>
</tbody>
</table>

*Source: [en.wikipedia.org/wiki/List_of_Internet_exchange_points_by_size](https://en.wikipedia.org/wiki/List_of_Internet_exchange_points_by_size), Updated May 2017*
**Digital economy and society**

The AMS-IX started out as a scientific traffic exchange in 1994 and it opened up to Internet Service Providers in the same year. The Netherlands quickly developed into a country with excellent connections to the Internet, and the population very quickly embraced the Internet. To this day, the Netherlands is one of the best-connected countries in the world. If we take a look at the EU’s Digital Economy and Society Index, we see that the Netherlands is among the top-4 ranking countries in the EU. The Netherlands ranks first in the domain of connectivity, due to the wide availability and usage of broadband connections. 94% of Dutch households has a broadband connection, which is way ahead of the EU-average of 72%. But also in terms of digital public services (fourth) and the domains of human capital (seventh), use of Internet (sixth) and integration of technology (sixth), the Netherlands is on the forefront. In terms of IT-specialists (a subset of human capital), the Netherlands ranks fourth. Not only does the Netherlands have a very strong IT-services market, it also hosts a vibrant Independent Software Vendor (ISV) community and attracts a lot of international offices from global IT-vendors such as Cisco, Huawei and Oracle.

**FIGURE 8: DIGITAL ECONOMY AND SOCIETY INDEX (DESI) 2017 RANKING**

Source: https://digital-agenda-data.eu

**THE NETHERLANDS IS ONE OF THE BEST-CONNECTED COUNTRIES IN THE WORLD**
While the Netherlands ranks fourth, we find the key data center competitors at lower ranks. The UK comes closest with the sixth position. The UK scores better on human capital and is comparable in terms of internet usage, and falls behind on the usage of digital technology and public digital services. Germany follows at rank 11, scoring low on Internet usage and digital public services. France scores lowest at 16, just below the EU average, trailing on most dimensions of the DESI.

### TABLE 6: EU DIGITAL COMPARISON

<table>
<thead>
<tr>
<th></th>
<th>Connectivity</th>
<th>Human capital</th>
<th>Use of Internet</th>
<th>Integration of Digital Technology</th>
<th>Digital Public Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>1</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>France</td>
<td>20</td>
<td>10</td>
<td>25</td>
<td>18</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Germany</td>
<td>7</td>
<td>8</td>
<td>15</td>
<td>7</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>14</td>
<td>15</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: EU’s Digital Economy and Society Index, PB7

### Energy

One of the major cost factors for a data center is energy. The location of a data center is increasingly dependent on the availability of energy sources, preferably green. Since energy makes up such as big part of the expenses, data centers that consider locations in different countries need to take into account the energy prices. Energy prices are relatively low in the Netherlands, especially when compared to the other tier-1 data center locations. The prices in France are comparable, but energy is quite a bit more expensive in Germany and the UK.

### FIGURE 9: INDUSTRIAL ELECTRICITY PRICES IN SELECTED COUNTRIES 2016

Source: Eurostat. Includes energy, network costs and taxes
Expertise
Building and running top notch data centers requires having access to a wide range of skilled professionals. The Netherlands houses a strong ecosystem of consultancies with expertise in data center design, power systems and cooling that export their knowledge across the globe. Most global suppliers of data center equipment have a solid presence in the Netherlands. Additionally, the Netherlands is ranked number four in the EU for access to IT-specialists.

Cost of living
Another relevant factor when it comes to deciding on a business location is the cost (and the quality) of living. According to Numbeo, London ranks as the 25th most expensive European city and Paris 22nd, while Amsterdam (34th) and Frankfurt (45th) have a much lower cost of living. Furthermore, Amsterdam ranks 12th in Europe in terms of quality of life, leaving competitors like Frankfurt (18th), Paris (52th) and London (56th) behind.

<table>
<thead>
<tr>
<th>Rank</th>
<th>City</th>
<th>Cost of Living Index</th>
<th>Rent Index</th>
<th>Cost of Living plus Rent Index</th>
<th>Groceries Index</th>
<th>Restaurant Price Index</th>
<th>Local Purchasing Power Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Geneva</td>
<td>133</td>
<td>71</td>
<td>103</td>
<td>130</td>
<td>132</td>
<td>121</td>
</tr>
<tr>
<td>22</td>
<td>Paris</td>
<td>83</td>
<td>43</td>
<td>64</td>
<td>80</td>
<td>81</td>
<td>95</td>
</tr>
<tr>
<td>25</td>
<td>London</td>
<td>82</td>
<td>70</td>
<td>76</td>
<td>59</td>
<td>89</td>
<td>83</td>
</tr>
<tr>
<td>34</td>
<td>Amsterdam</td>
<td>78</td>
<td>46</td>
<td>63</td>
<td>62</td>
<td>84</td>
<td>90</td>
</tr>
<tr>
<td>45</td>
<td>Frankfurt</td>
<td>75</td>
<td>33</td>
<td>55</td>
<td>64</td>
<td>66</td>
<td>115</td>
</tr>
</tbody>
</table>

Source: Numbeo: Europe, Cost of Living Index by City, New York=100

Customers
In terms of digital infrastructure, the Netherlands scores remarkably high. Naturally, a hotspot cannot exist without customers. Where do these customers come from, and even more importantly; where will future customers come from?

Financial
Most tier-1 data center regions are located in a key financial city. But how does Amsterdam fit in with London, Frankfurt and Paris? After all, Amsterdam was host to the very first stock exchange in the world, however these days it is not a major global exchange. And while ING and ABN AMRO once challenged other banks for global leadership, they have become quite a fair bit more modest after 2008. The financial sector may have been a strong driver for the data center world before the credit crunch in 2008. However, what we observe is that the biggest growth in the data center industry in Amsterdam occurred in the past few years.
**International (high tech) business**

The Netherlands may not be the center of the financial world, but it has a strong claim to being a international gateway to Europe: the Rotterdam harbor is the biggest harbor in Europe and plays a crucial role in the distribution of raw materials and products to the EU and Schipol Airport is the third biggest European airport – after London Heathrow, Charles de Gaulle Paris and before Frankfurt am Main – with more than 63 million passengers per year.

The impact of the hub function becomes visible when the exports and imports are compared, as a percentage of the GDP. In the Netherlands, the value of imports and exports is 74% compared to the value of the GDP. For the other key data center countries, this percentage is much lower (see table below). Most of these Dutch imports and exports are related to international trade. The international orientation of businesses in the Netherlands also translates into a surprising number of large multinationals in a variety of sectors such as energy, retail, food, and high tech. High tech companies include Philips, ASML, NXP, TomTom, and also Adyen, Catawiki, Elastic and WeTransfer. The Netherlands also attracts a large number of regional headquarters from Asian and American multinationals, including major technology vendors such as Huawei, Cisco or Tata Consultancy Services and digital companies such as Uber. In conclusion, the Dutch hub is not just about “old” business, it has a very strong footprint in the digital business world as well.

<table>
<thead>
<tr>
<th>TABLE 8: IMPACT HUB FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports/GDP 2016</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Germany</td>
</tr>
<tr>
<td>France</td>
</tr>
<tr>
<td>Netherlands</td>
</tr>
<tr>
<td>United Kingdom</td>
</tr>
</tbody>
</table>

*Source: Eurostat, 2017*

**International Digital Companies**

Even though the Netherlands is not the financial hotspot or the biggest gateway to Europe, in the end digital companies decide the location of the data center hub. In the 2015 Dutch Datacenter Report, we found that almost half of the data center space is rented out to ICT-companies (ISV’s, outsourcers, hosting companies, cloud providers, telco’s, etc.) and digital organizations. Since most growth has occurred in that segment over the past few years, this percentage will most likely approach 60% by now. This applies to international data center providers as well as most national and regional providers.

For the development of Amsterdam as an international data center hotspot, it is strongly dependent on the opportunity to attract international cloud providers and new digital companies. International digital companies are attracted to the Netherlands as a result of the excellent (digital) infrastructure, fair cost levels and an attractive fiscal climate. The Netherlands and the Amsterdam Metropolitan Area will need to make sure to maintain this competitive advantage by investing in its infrastructure. Similarly, it will need to closely monitor how the fiscal climate is changing.

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4 Source: Dutch Datacenter Report 2015, Pb7 Research, 2015
“THE WORLD’S TOP TECH COMPANIES CHOOSE THE NETHERLANDS AS THE PLACE TO CONQUER EUROPE. THEY HAVE VERY GOOD REASONS.”
The key data center markets in Europe are Amsterdam together with London, Frankfurt and Paris, also known as the FLAP markets. The total market supply of the combined markets is almost 1000 MW.

**AMSTERDAM MARKET SIZE, BY OPERATOR TYPE (KW)**

<table>
<thead>
<tr>
<th>Year/Quarter</th>
<th>Retailers</th>
<th>Wholesalers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 Q4</td>
<td>57,849</td>
<td>17,760</td>
<td>75,609</td>
</tr>
<tr>
<td>2011 Q4</td>
<td>62,214</td>
<td>23,410</td>
<td>85,624</td>
</tr>
<tr>
<td>2012 Q4</td>
<td>87,789</td>
<td>23,410</td>
<td>111,200</td>
</tr>
<tr>
<td>2013 Q4</td>
<td>102,462</td>
<td>22,810</td>
<td>125,272</td>
</tr>
<tr>
<td>2014 Q4</td>
<td>122,932</td>
<td>22,810</td>
<td>145,742</td>
</tr>
<tr>
<td>2015 Q4</td>
<td>136,577</td>
<td>27,810</td>
<td>164,386</td>
</tr>
<tr>
<td>2016 Q4</td>
<td>141,571</td>
<td>62,810</td>
<td>204,381</td>
</tr>
</tbody>
</table>
Amsterdam had 54 MW of new supply in the last 12 months. This was the highest of the major European markets, bringing its total supply to 204 MW. Amsterdam has 1 MW more supply than Frankfurt and we will see a substantial amount of new facilities launching in the market over the next 12 months. These are much needed for the most popular market in Europe.
“IN 2016 THE AMSTERDAM DATA CENTER MARKET GREW 30% IN SIZE, THE AVERAGE ANNUAL GROWTH OF THE LAST 6 YEARS IS 17.5%”

Amsterdam Take-Up by Operator Type

Although Amsterdam is more a retail data center market than a wholesale data center market, we see the wholesale segment growing rapidly.

<table>
<thead>
<tr>
<th>AMSTERDAM TAKE-UP, BY OPERATOR TYPE (KW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesalers</td>
</tr>
</tbody>
</table>
“In the key FLAP (Frankfurt, London, Amsterdam, Paris) markets, 2016 saw a record take-up of data center space. Amsterdam recorded the highest take-up ever recorded in Europe annually. But still the take-up is higher than the level of new supply. As a result, Amsterdam’s absorption level has now dropped to 1.2 years. Though a healthy level of new supply is expected over the next 12 months by existing and new operators.”

Absorption: Market absorption is the number of years it would take current vacant supply to be fully let based on the fixed average take-up of the previous five years (i.e. not including take-up in the current year).
Data centers tend to have an anonymous and modest appearance. However, their impact on society is enormous as they are the foundation of our digital economy. In collaboration with PB7 Research, the DDA has created its report “The economic impact of Dutch data centers”, in which we highlight both the direct and the indirect impact on the Dutch economy.

When we look at the direct impact, our report shows that colocation, the core business of multi-tenant data centers, contributed €462 million to the GDP in 2015. Next to colocation, data centers may have other revenue streams. Especially smaller data centers may provide hosting services and other IT-services. These streams account for another €123 million, resulting in a total GDP contribution of €585 million.

Another key aspect to be considered is employment. As data centers are capital intensive, however labor extensive, the impact of this aspect is limited. In total, the Dutch multi-tenant data centers provide employment to 2300 people. About 41% of these people have an IT-related title. The remaining part works in facilities management, including security (20%), commercial roles (22%) and overhead management (16%). The resulting taxes and social contributions account for about 7% of total revenues, which comes down to €64 million.

Aside from the direct economic impact, there is also an indirect economic impact (also called supply chain impact) to be considered. For example, companies need to be hired to build the facilities, equipment for power and cooling equipment needs to be built and installed, energy and water is required, and so on. The total indirect contribution to the GDP comes down to around €293 million.

In terms of employment, the multi-tenant data center industry has indirectly led to 1300 jobs in the supply chain in 2015. The resulting taxes and social contributions account for about 6% of total revenues, which comes down to €15 million.

Finally, the induced impact was examined in this report to provide the full picture. The induced impact reflects the money spent by employees as a result of the money they earn in the data center supply chain. Assuming that the average salary comes down to roughly €3000 per month (plus holiday allowance), the total contribution to the GDP is about €67 million. This induced impact leads to the creation of 250 jobs and accounts for €4 million in terms of taxes and social contributions.

Having considered all aspects, the total contribution of the multi-tenant data center industry to the GDP in 2015 was close to €1 billion. Considering the increasing importance of digitalization, this amount is only expected to grow over the next years.

Download the full report here: https://www.dutchdatacenters.nl/publicaties

“THE TOTAL ECONOMIC IMPACT OF DUTCH DATA CENTERS ON THE GDP WAS CLOSE TO €1 BILLION IN 2015"
The digital industry has grown to be the engine of the Dutch economy. In April, the DDA, DHPA and ISPConnect proudly presented a report about data centers being the foundation of the digital economy, which shows a digital added value (DAV) in the Netherlands of €171 billion in 2016, a quarter of the Dutch GDP.

Both on a work-related and a private level we are constantly interchanging information by means of the digital ecosystem. This ecosystem is built on our digital infrastructure, which consists of data connections, internet exchanges, datacenters and cloud & hosting companies. In the Netherlands, we have the best digital infrastructure of Europe. For this reason, companies from all over the world use Amsterdam as a data distribution point, which has led to our capital being the Digital Gateway to Europe. Naturally, the Digital Gateway is a magnet when it comes to investors abroad: nowadays, data center related industries account for 20% of all foreign investments.

The visual representation of the digital economy is reflected in the model below. This model consists of different layers and shows the role of the data center industry in relation to other industries and to society as a whole. Structured and unstructured data shape the bottom layer of the model. The data is transported through networks and stored and processed in data centers, highly secured buildings with redundant power supplies. Within this building, several services are deployed such as web and application hosting (hosting providers), and public, private and hybrid IaaS/ PaaS (cloud providers). Finally, companies can make use of the infrastructure to provide their customers with software...
(SaaS) or any other type of service (everything as a service). The next layer represents the consumption of digital services. Digital services are offered via a wide range of devices, and more and more often these devices are interconnected. This is often referred to as the Internet of Things (IoT). When it comes to digital services within companies, we see that more and more often, on-premise IT is relocated to data centers (co-location).

Digitalization has a strong impact on nearly all industries, which is represented in the fourth layer of the model. For example, smart sensors are becoming increasingly important for primary industries such as agriculture. Technologies such as BIM and SmartGrid nowadays play an important role in secondary industries such as construction companies and energy suppliers. Within the tertiary sector (e.g. business services, communication), digital services such as e-commerce, social media and Fintech are increasingly popular. Finally, the fourth column represents the quaternary sector, in which traditional governmental services are transforming due to digitalization. Examples are e-learning and e-health.

Several environmental factors are important in order for the digital supply chain to function properly. These enablers decide the degree to which a digital ecosystem is successful. For example, as cyber threats are becoming more vicious, it is important to invest in cybersecurity. Furthermore, investing in innovative and sustainable technologies is crucial to maintain and improve the digital climate. Finally, programming interfaces (API) are the glue between all layers of the model and digital partner ecosystems offer new opportunities to enter the market.

In short: the digital economy has grown to be indispensable. Not only is it one of the main drivers of our GDP, it has also led to the Netherlands being the Digital Gateway to Europe – our third gateway next to Schiphol Airport and the Port of Rotterdam. As a result, this sector has the highest degree of foreign investments and employment growth. Without a doubt, the digital industry is of great significance for the Dutch economy and for Dutch society as a whole, and we should keep investing in its improvement in order to maintain its success.

Download the full report here: https://www.dutchdatacenters.nl/publicaties

“THE DIGITAL INDUSTRY IS OF GREAT SIGNIFICANCE FOR THE DUTCH ECONOMY AND DUTCH SOCIETY AS A WHOLE, AND WE SHOULD KEEP INVESTING IN ITS IMPROVEMENT”
In the previous chapter you have read about the digital economy and its growing importance for the Netherlands. The prosperity of the Dutch digital economy is strongly correlated with the Dutch digital infrastructure. Last year, Deloitte published a report in collaboration with DDA and 10 other parties that provides in-depth knowledge on this topic.

A digital infrastructure consists of several components, which are the following: networks, core internet, housing and hosting/cloud. A representation of this infrastructure can be found in image X.

The reason why the Netherlands is known for its exceptional infrastructure is that it scores high on each of these components. For example, the Netherlands has an average connection speed of 17.4 MB per second, therefore ranking sixth in Europe (Akamai, 2017). Furthermore, the Netherlands scores high on LTE coverage and download speed on a global scale. Within EMEA, the Netherlands holds a first position on LTE coverage and a fourth position on LTE download speed.

As for the core internet, the internet exchange of Amsterdam AMS-IX, is one of the largest in the world, having over 800 connected networks and a peak traffic exceeding 5 Tbit. With these results, the digital gateway performs even better than the other Dutch gateways Schiphol Airport and Port of Rotterdam (image 2).

The Netherlands also has a leading role in computing and storing the data, as Amsterdam is the second largest data center hub in the world (London comes first). Interestingly, Amsterdam became the first market that saw a take-up of more than 50 MW in one single year (source: CBRE, 2017).

Finally, within Europe our country is leading in domains per capita and we are the second largest country for hosted domains per capita.

As the Netherlands is a top performer on all components as mentioned before, it provides the best digital infrastructure in the world. This has not remained unnoticed and as a result many large internationals such as Google, Uber and Equinix have chosen the Netherlands as a location for their headquarters and data centers.

However, competition is on the rise and the Netherlands should strengthen its position even further by investing in energy availability, technological innovation and regulatory affairs. If we manage to do so, the Dutch digital infrastructure provides an unprecedented opportunity for the Netherlands to become the indispensable data hub that our digitally driven world needs.

Download the full report here: https://www.dutchdatacenters.nl/publicaties

“THE PROSPERITY OF THE DUTCH DIGITAL ECONOMY IS STRONGLY CORRELATED WITH THE DUTCH DIGITAL INFRASTRUCTURE”
SUBSIDIES FOR A GREEN FUTURE

What are the opportunities with regard to subsidies in the data center industry? Together with Hezelburcht, a full service subsidy consultancy, we would like to share an overview of subsidies in 2017. The overview shows that the subsidy climate for our members and partners is more than promising: in 2017, a much higher budget will be made available for several subsidies and tax regulations.

This offers a range of funding opportunities to deploy innovative, sustainable and energy efficient projects.

The Dutch government acknowledges the importance of innovation in business. This is reflected in the increased budget of €33 million for “de Wet Bevordering Speur & Ontwikkelingswerk” (WSBO), which encourages R&D activities within companies. This budget will continue to increase by another €85 million. Furthermore, a S&O statement will be provided in case of an approved WSBO-project, which is required in case you want to make use of the Innovation Box. If your company qualifies for the Innovation Box, you are able to reduce your effective tax rate in the Netherlands from 25% to 15%. On top of that, several innovation programs that have proven to be successful in 2016, will continue to be subsidized.

Aside from innovation, an increased budget of €15 million – adding up to a total of €176 million - is made available in 2017 for the “Energie-Investeringsaf trek (EIA) regulation, which promotes investments in energy efficient company equipment. The Milieu-Investeringsaf trek (MIA) remains unchanged in terms of budget compared to last year. By means of EIA and MIA, it is possible to effectuate a discount on corporation tax in case of purchasing sustainable company equipment. The EIA/MIA, combined with BREEAM and GPR, could turn out to be very lucrative.

Another regulation with regards to sustainable energy is Stimulerings Duurzame Energie (SDE+). The regulation entails that companies and institutions get subsidized when they invest in renewable energy. For 2017, a smashing €8 billion is made available. For data centers, investing in wind or solar power is an appealing strategy since they are eligible for SDE+. The abovementioned regulations are just examples of subsidy opportunities. The Dutch government strongly encourages initiatives regarding sustainability and energy efficiency and is willing to provide financial support. Therefore, this is an excellent time for the data center industry to invest in a green future.

Download the full report here:
https://www.dutchdatacenters.nl/publicaties

“For 2017, a total of €8 billion in subsidies is available for investments in renewable energy”
The Internet of Things (IoT) is rapidly winning territory in the digital economy. Gartner expects 20 billion connected things to be in use worldwide in 2020. Even though most of IoT currently takes place under the radar, it will drastically change our lives in the future. In a brand new report about IoT, the DDA provides a sneak peak in the possibilities it has to offer and to what extent it affects the data center industry.

The Internet of Things (IoT) is a digital framework driven by the idea of embedding intelligence in a wide range of devices that are all interconnected through the internet. Examples are thermostats, smart tvs, fitness monitors and so on. IoT has already subtly transformed the way we live and work, and this influence is only expected to grow exponentially over the years.

One of the early adopters of IoT is maritime transport. It is interesting to observe activities that used to take place in a maritime gateway (Port of Rotterdam), these days also take place in the Digital Gateway. In order to manage international traffic, all stakeholders have to be updated with real time data. Thanks to IoT applications, only relevant data is distilled out of the pool of big data, and presented to the parties involved. As a result, all traffic is managed in the most efficient and quickest way.

In the future, IoT will also play a big role in the public sector. Healthcare is among the sectors where IoT is already slowly emerging. For example, the medical information that is stored digitally provides an endless database of information that can be used for analysis. As a result, research is conducted in a much more effective way and this will speed up the introduction of new treatments and medicines.

Of course we should not overlook IoT on a consumer level. It is not unthinkable that within 10 years, we will all be using self-driving cars. Aside from the comfort it will provide us as drivers, it will also improve efficiency and safety on the road. Of course, there are many other promising IoT applications on the rise such as

Naturally, connecting an enormous amount of devices will generate a huge stream of big data that has to be processed, stored and in some cases analyzed. Interestingly, most of the data growth is an indirect result of IoT. For example, a self-driving car on itself doesn't drive a whole lot of data. However, watching Netflix in the car now that you don't have to drive, will.

Many business will choose to relocate these big data streams to data centers, which in turn will reshape the data center climate as we know it. After all, many IoT applications require the latency to be as small as possible. For example, Therefore, we expect to see a rise of edge and micro data centers as they are able to exchange real time data with IoT devices.

We should look at IoT from an optimistic yet realistic angle. On the one hand, it will provide us with an amazing amount of possibilities. On the other hand, it also requires us to facilitate IoT in order to maximize its potential. For the data center industry, this means increasing availability, improving connectivity and possibly heading towards an edge based data center model. One thing is for sure: if we manage to coordinate IoT well, it has the potential to immensely improve the quality of our lives.

Download the full report here: https://www.dutchdatacenters.nl/publicaties

“A RISE OF EDGE AND MICRO DATA CENTERS IS EXPECTED TO HANDLE IOT REAL TIME TRAFFIC”
IOT TRENDS

IoT is still at its infancy, and many of its potential seems to lie far ahead in the future. However, IoT already is subtly changing our lives and there are several trends to be observed. Below, you will find an overview of trends that contribute to shaping the IoT environment of the future.

**Vertical applications will be interconnected**
The consumer segment is the largest user of connected things with 5.2 billion units in 2017. Especially thermostats and appliances such as home security seem to be doing well in the consumer segment as these enhances the quality of the consumer’s life. In the near future, all these vertical applications (which support one specific purpose) will connect like dots. This development will simplify a consumer’s way of living even further.
(Source: Gartner, 2017)

**Big data will be big in IoT**
More data is available than ever before and this amount will only continue to increase exponentially over the years. IDC predicts the total amount of data created will be 600 ZB in 2020, of which 247 EB will be stored in data centers. IoT cloud platforms and devices store an incredible amount of data which can be fed into analytic algorithms, delivering specific insights into the target audience. This way, companies can fine-tune their products even more based on its customers’ preferences.
(Source: IDC, 2017)

**Security will play a key role**
As we connect more devices together, we make ourselves more vulnerable. Indeed, one simple cyber-attack could shut down your entire network of devices. Therefore, there will be a huge focus on securing the IoT ecosystems in the upcoming years. In 2017, companies will spent over $750 billion on firewalls to ensure network security, including IoT environments. By 2020, the global market for cybersecurity hardware will expectedly drive $1.8 billion.
(Source: IHS, 2017)

**Machine learning and IoT will go hand in hand**
Even though machine learning (ML) advances on its own, IoT will further accelerate its progress by connecting devices and digesting large chunks of data. This trend, combined with the increased data analytics as described in a previous paragraph will take artificial intelligence to the next level in a remarkably short amount of time.

**IoT driven business models are emerging**
With all the data gathered by IoT devices, new business models are emerging that promote the use of that data. One example would be smart advertising. Hereby, user data is gathered around Wi-Fi hotspots which are subsequently used to deliver tailored advertisements and finally to increase revenue. Another example would be the usage of drones to automatically deliver products after the customer has placed the order. According to IHS, 100k retail drones were already sold worldwide in 2017, growing to 310k by 2020.
(Source: IHS, 2017)

**Governmental investments in smart cities are rapidly increasing**
Worldwide, governments have started to promote smart city initiatives in order to drive economic growth. In Europe, the lighthouse cities project will provide €69.5 million in funding, and another €44 million will be provided for sustainable cities through nature-based solutions. The main reason for governments to implement smart city initiatives is to increase citizen satisfaction through projects that drive economic growth.
(Source: IHS, 2017)

“**BY 2020, CYBER SECURITY HARDWARE WILL EXPECTEDLY DRIVE $1.8 BILLION**”

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FOREIGN DIRECT INVESTMENTS

Earlier in this report we mentioned that these days, data centers and related industries drive no less than 20% of Foreign Direct Investments (FDI). Considering the importance of FDI on the prosperity of the Dutch economy, we would like to elaborate on this topic a bit further.

The Netherlands has an outstanding reputation when it comes to logistics. Having gained more than a 1000 years of experience in this area, it has grown to be a significant gateway to Europe. Aside from the Port of Rotterdam and Schiphol Airport, a third Dutch international gateway has emerged. This gateway is called "the Digital Gateway to Europe," and its presence gains more importance every year.

Indeed, compared to its brothers, the Digital Gateway performs much better in terms of global rankings and growth, as companies from all over the world use the Netherlands as a distribution point for their data and as a domicile for their data centers and headquarters. As a result, the gateway plays a crucial factor with regard to Foreign Direct Investments: a smashing 20% of foreign investments is related to the Dutch data center and online services industry.

This percentage is unprecedented considering the relatively short existence of the industry, and it’s a strong indicator of the influence it will have in the future. Aside from the growth in revenue, an additional effect of FDI is job creation: even though the data center industry is labor extensive, it (indirectly) led to almost 1500 jobs in the supply chain. This is reflected in the image below.

In a nutshell: the key role of the Netherlands as digital gateway is widely acknowledged and this role will continue to gain even more importance over the upcoming years. This will result in an increase of foreign investments and job creation, and it will positively affect the Dutch economy.

Download the full report here: https://www.investinholland.com

Source: NFIA Foreign Investment results 2016
Data is the new gold! You could say we’re currently in a hyperloop towards the digital, data-driven economy. As a result, the data center industry is expanding rapidly. The question is: what is the best country to establish a data center? DDA and ICTRecht compared five leading European data hub countries to assess which country ranks best when it comes to international attractiveness.

The comparison is made based on the following indicators: strictness of privacy and data protection rules, the costs associated with doing business, the degree of digital advancement and the safety of storing your data at a local data center. In this report, the Netherlands, Germany, France, the UK and Ireland were assessed based on these indicators. We are more than proud to announce that the Netherlands comes out as the winner.

On the 25th of May in 2018, there will be a new European data protection legislation called GDPR. Even though each of the five countries currently has its own set of rules, they all share the same definition of data processing, require notification of the authorities to process personal data and they all impose sanctions in case a company doesn’t comply to the rules. Interestingly, only the Dutch and French data protection authorities don’t charge a fee for notifications. Even more interestingly; only France has no legal procedure in the event of data breaches.

From a financial perspective, it’s most beneficial to choose Ireland as a place to establish your business due to its low tax rates, friendly starting requirements and its attractive incentives. The Netherlands follows at a short distance, as it offers tax breaks for entrepreneurs, has no minimum capital requirements and because the registration process is a piece of cake. Germany comes last on the list as it offers few incentives for businesses and the registration procedure is rather complicated.

Digital advancement is the third point of comparison. Broadband connection, IT-talents and electricity costs are factors to be considered in this aspect. The Netherlands has consistently been ranked as the most developed digital country by the European Commission, due to its connectivity, its strong presence of IT-specialists and its advanced integration of digital technology by businesses. The UK comes in second and is similar in terms of connectivity. France - ranked third - offers the lowest energy costs for industrial consumers.

The final indicator is the degree to which it’s safe to store data in data centers. Hereby, the implementation of security standards, associated risks, uninhibited internet capacity and data center prices are considered. The Netherlands ranks first, offering a stable climate with low costs, reliable distribution networks, and a clear stance on net neutrality. Again the UK comes in as a strong second, offering the most Tier III and IV certified data centers, as well as the lowest risks for successful storage.

All five countries perform well and show a lot of similarities when it comes to the digital climate. However, the Netherlands differentiates itself with its excellent digital infrastructure. Furthermore, it offers a simple registration process, provides data centers with many financial benefits and it takes a clear stance on net neutrality. All together, it’s apparent that the Netherlands offers the most attractive environment to establish a data center.

Download the full report here:
https://www.dutchdatacenters.nl/publicaties

“The Netherlands is consistently ranked most developed digital country by the European Commission”
National tax laws are no longer a deal breaker when it comes to deciding on business localisation. These days, the more prevalent topic on the agenda seems to be the protection of privacy and personal data. DDA and its educational partner ICTRecht created a value proposition of Dutch and European data protection legislation, elaborating on the most important topics with regard to current and upcoming Dutch and European data protection legislations.

Nowadays, data protection within the Netherlands is based on the ‘Wet bescherming persoonsgegevens’ (Wbp). On the 25th of May 2018, the Wbp will be replaced by the General Data Protection Regulation (GDPR). The GDPR is implemented on a EU-level and allows the Union to become an obstacle-free playground that allows cross-border flows of personal data.

The concept of Privacy by Design within GDPR entails that privacy has to be taken in mind while developing products and services. There are two important protection principles with regard to this. First, the principle of purpose limitation forbids companies to process data for any other purposes than for which it was originally collected. Second, the principle of data minimization is to process as little data as possible. These principles apply to both private organizations and governmental institutions.

When it comes to data processing, a division is made between three parties. The controller is the company that determines the purpose of data processing, the processor is the company that processes the data on behalf of the controller and the sub-processor is enabled by the processor to process the information. Data centers usually belong to the (sub-) processor category when data is stored or processed in their servers.

The controller is at all times obliged to conclude a Processing Agreement. The general rule is that the controller is responsible for the security level provided for by the processor, and the processor for the security level provided for by the sub-processor. In case of a data breach, the controller has to notify the supervisory authority (Autoriteit Persoonsgegevens) within 72 hours after discovery of the breach. In some cases, the data subjects have to be informed as well. Non-compliance with the data protection rules could lead to fines that can add up to a maximum of €20 million or 4% of the worldwide annual turnover of a company.

Communication towards data subjects regarding personal data usage is usually included in a company’s privacy policy. On the side of the data subjects, it is possible to exercise the rights of access, rectification, erasure, restriction of processing, data portability, objection and to be no subject to an automated decision.

The Netherlands is heading towards a data protection system in which the privacy of companies and individuals is respected, while also enabling a cross-border data flow between all the EU member states. Especially the latter is expected to entail positive effects with regards to the international position of Dutch datacenters.

Download the full report here: https://www.dutchdatacenters.nl/publicaties

“THE EU WILL BECOME AN OBSTACLE-FREE PLAYGROUND THAT ALLOWS CROSS-BORDER FLOWS OF PERSONAL DATA”
Every year we grow more dependent on the internet. These days, downtime in the online services industry - even when it's just for a few moments - could have devastating consequences. There are several parties and factors that could cause a malfunction leading to downtime. For the party accountable, this could result in severe property damage or financial losses. In collaboration with Marsh Netherlands and AIG Europe, DDA created a report that reflects the risk factors that go hand in hand with our digital society.

Data centers are key when it comes to the performance of the digital economy. After all, they facilitate the use of internet related activities and they are indispensable when it comes to data storage. Over the past five years, the data center industry in Amsterdam has grown by 15% each year. With the expected accelerated popularity of IoT, it is expected that data centers will skyrocket in terms of data processing and storage.

When it comes to risk management, it’s important to consider both the short and the long term. Cyber attacks, technological developments, talent management, regulation and Brexit are considered the most prevalent short term risks within the only services industry. When it comes to long term risks, the most prevalent issues are climate change, migration (to big cities) and technological trends.

Within a data center specifically, there are several potential risks to be considered. Data centers are usually categorized as digital real estate and therefore they bear responsibility for the protection of the building itself and the physical objects inside. For example, fire damage could lead to enormous insurance claims, even though this is not common: research shows that around 0.14% of the damage occurring in data centers is due to fire outbreaks.

Secondly, even though a data center is labour extensive, it has to take into account the risk of workplace accidents. Finally, even though redundancy is a highly valued service for data centers, they have to bear in mind the possibility of downtime and the claims that may follow as a result.

In order to minimize risks like mentioned above, aspects such as location (for example: areas with a low risk of earthquakes are preferred), fire safety systems and construction techniques are important for a data center. However, there is another type of risk to be considered: as (end) users grow to be more dependent on data centers, the latter are pressured to ensure the quality of the infrastructure. Several parties are involved in maintaining an effective infrastructure, and data centers may in some cases be held responsible for the damage that their customers suffer. An example would be that a breakdown occurs due to an employee not following procedures (70% of data center incidents are a result of human error).

For this reason, a tailored prevention and risk management strategy is crucial for data centers as it helps to safeguard reputation and to prevent financial losses. Hereby, a data center needs to assess what the potential risks factors are, what the impact is of each factor and to what extent it is protected by law in case of claims and losses.

Download the full report here:
https://www.dutchdatacenters.nl/publicaties
We are living in a digitally driven society, and due to the velocity of digital innovations it’s impossible to make accurate predictions about the future. One thing is for sure though: the data center industry is thriving and its influence will only continue to rise. We explain this by highlighting 10 of the most prevalent trends that affect the data center market.

**Global data growth is skyrocketing**
Scientists have concluded that more data has been generated in the past few years than in the entire history of mankind. Indeed, the rate of data generation is intensifying: in 2017, we will generate an even bigger amount of data, this time in one year alone. Data centers worldwide need to prepare for this huge amount of data, by making sure there is enough capacity available to store and process the information.

**Dutch internet traffic volume continues to grow by 28%**
According to the Amsterdam Internet Exchange (AMS-IX), the overall internet traffic volume in 2016 has increased with 28% to 12 EB. Furthermore, the number of connected networks has increased to more than 800 (compared to 750 in 2015) and the exchange added 5.4 Tbps new capacity to its platform. This is an annual growth of 30% compared to 4.2 Tbps in 2015. This growth is also shown in a new peak internet traffic record of more than 5 Tbps. A final notable fact is that 92% of new AMS-IX customers in 2015 came from abroad, which indicates that The Netherlands is an attractive foreign candidate when it comes to digital infrastructure.
(Source: AMS-IX, 2017)

**On average, global IP-traffic will increase by 22% per year**
Overall, global IP-traffic will increase nearly threefold over the next few years. Monthly IP-traffic will reach 25 GB per capita by 2020, in contrast to 10 GB per capita in 2015. All data as mentioned passes or gets processed and stored in data centers. It is expected that the total of global data center IP-traffic will reach 15.3 ZB by the end of 2020, up from 4.7 ZB per year in 2015.
(Source: Cisco, 2017)

**4G mobile traffic is rapidly winning territory**
Mobile data traffic on a global scale reached 7.2 EB per month at the end of 2016, in contrast to 4.4 EB per month at the end of 2015. The traffic in 2016 has resulted in an 18-fold increase over the past five years. Remarkably, mobile video traffic accounted for 60% of the total of mobile data traffic in 2016.

Although 4G-connections represented only 26% of mobile connections in 2016, they already accounted for 69% of mobile data traffic in 2016. Furthermore, it is expected that the annual mobile traffic will exceed 0.5 ZB by 2021 and the monthly global mobile data traffic will be 49 EB.
(Source: Cisco, 2017)

**Internet of Things: 8.4 billion connected devices in 2017**
Over the course of the next years, IoT will skyrocket in terms of connected devices and revenue. Gartner forecasts that 8.4 billion connected things will be in use worldwide in 2017, an increase of 31% compared to 2016. By 2020, this amount is expected to exceed 20.4 billion. China, North America and Western Europe are predominantly responsible for the use of connected devices: together, they represent 67% of the overall IoT in 2017.

Even though consumers purchase more devices than enterprises, the latter overall spends more money on it. According to the report of Gartner, the use of connected things among businesses will generate $964 billion in 2017. In contrast, consumers are expected to generate $725 billion.

Consumers will mostly benefit from IoT in terms of smart TVs and digital set-top boxes, whereas smart electric meters and security cameras are most in use by businesses. It is expected that by 2020, consumers and businesses together will drive $3 trillion in terms of IoT.
(Source: Gartner, 2017)
**Big data will account for 27% of data center storage**

Big data and business analytics (BDA) revenue will grow by 12.4% to $150.8 billion in 2017, according to the International Data Corporation (IDC). Commercial purchases of BDA-related hardware, software and services are expected to grow 11.9% CAGR in 2020 with revenues reaching more than $210 billion. BDA is found to be an essential enabler for top executives when it comes to decision support and sometimes even decision automation.

IT and business services - including infrastructure, software and services - will account for more than half of BDA revenue in 2017 and the same applies to the forecast up to 2020.

Big data is forecasted to reach 247 EB by 2020, up almost 10-fold from 25 EB in 2015. Big data alone will represent 27% of data stored in data centers by 2020, in contrast to 15% in 2015. Remarkably, the amount of data stored on devices will be five times higher than data stored in data centers, which results in 5.3 ZB by 2020. The total amount of data driven by IoT (note that this data is not necessarily stored) will reach a smashing 600 ZB per year in 2020, in contrast to 145 ZB in 2015.

(Source: IDC, 2017)

**Public cloud expected to drive almost $250 billion**

According to the latest forecasting report of Gartner, the worldwide public cloud services market will grow 18% in 2017 to a total of $246.8 billion in revenue, up from $209.2 billion in 2016.

Cloud infrastructure services (IaaS) accounts for most of the abovementioned growth, which is expected to grow 36.8% in 2017 to reach $34.6 billion. Cloud application services (SaaS) will grow 20.1%, driving $46.3 billion. Platform as a Service (PaaS) will grow 23.5% to $8.8 billion and Business Process as a Service (BPaaS) to $43.8 billion dollars, an increase of 7.3%.

The International Data Corporation (IDC) predicts that the total spending on IT-infrastructure products (server; enterprise storage etc.) for deployment in cloud environments will increase by 15.3% in 2017 to $41.7 billion. Hereby, public cloud data centers are expected to account for most of this spending (60%).

(Sources: Gartner, 2017; IDC, 2017)

**In business, hybrid cloud is the preferred cloud solution**

RightScale’s State of the Cloud survey states that most enterprises choose for a hybrid cloud solution. However, private cloud adoption fell from 77% to 72%, therefore also bringing hybrid cloud adoption down from 71% to 67%. This is different from 2016, when a strong increase of private cloud use was detected.

Furthermore, 85% of enterprises will have a multi cloud strategy in 2017, up from 82% in 2016. A necessity here is to establish good partnerships between the service providers and all the leading public cloud providers, in order to guarantee the best solution possible for customers.

(Source: RightScale 2017)

**Datacenter outsourcing is trending up**

Many business decide to implement a data center outsourcing strategy, in which an enterprise outsources its IT-infrastructure and its corresponding management to third-party services that have expertise in deploying and maintaining data center facilities.

A report of Research and Markets states that the adoption of cloud computing, colocation and IT outsourcing is higher than ever before. In 2016 alone, CBRE tracked almost 195 MW of IT-load capacity leased across major markets, approaching the record setting highs of 2015. This is among others because most companies realize that their core competencies do not lie within the data center. Therefore, they are better served through outsourcing. Reducing costs, improving operational efficiency, and increasing reliability are mentioned as core drivers for companies to execute an outsourcing strategy.

(Source: Research and markets, 2017; CBRE, 2016)

**Amsterdam sets new record datacenter take-up**

In the key FLAP markets (Frankfurt, London, Amsterdam, Paris), data center take-up continues to grow. All four markets saw more take-up in 2016 alone than was the case in the previous two years combined.

Amsterdam continues to outperform London on new leases. The largest colocation markets within Europe leased a total of 155 MW of additional data center capacity in 2016. A smashing record, as CBRE puts it. Hereby, Amsterdam became the first market in history to see more than 50 MW of take-up in a single year, followed by London, Frankfurt and Paris. However, London will remain the data center capital of Europe for now, with 384 MW of existing capacity and a strong pipeline of upcoming projects.

(Source: CBRE 2017)
All disruption is coming from a data center near you

2017 DUTCH DATA CENTER REPORT STATE OF THE DUTCH DATA CENTERS

ROOM FOR GROWTH

DATA VOLUME
In 2017 alone, we will generate more data than in the entire history of mankind

PUBLIC CLOUD
$246.8 billion revenue by the end of 2017, a growth of 18%

IP-TRAFFIC
15.3 ZB global IT-traffic will be generated by 2020

DATA TRAFFIC WITHIN DATACENTERS
6,728 EB in 2017, with a CAGR of 26.8% up till 2020

MOBILE TRAFFIC
7.2 EB per month worldwide by the end of 2016, an 18 fold increase over the past 5 years

DATA STORAGE
915 EB of data stored by 2020, of which 27% will be Big Data

CONNECTIVITY
800+ networks are connected within AMS-IX

DATA TRAFFIC ON CLOUD
$246.8 billion revenue by the end of 2017, a growth of 18%

HYBRID CLOUD
With 67% hybrid cloud adoption in 2017, it is the most popular cloud solution

CYBER SECURITY
$750 billion spent on network security by companies

INTERNET OF THINGS
8.4 billion connected things are in use in 2017

All disruption is coming from a data center near you.
HYBRID CLOUD
With 67% hybrid cloud adoption in 2017, it is the most popular cloud solution.

HIN DATACENTERS
AGR of 26.8% up till 2020.

STORAGE
stored by 2020, will be Big Data.

SECURITY
work security by companies.

DATA CENTER GROWTH
Amsterdam became the first market in history to see more than 50 MW of take-up in a single year.

17.5% average growth in take-up the last 6 years in the Amsterdam region.

Data center outsourcing 195 MW of IT-load capacity leased across major markets.

www.dutchdatacenters.nl
THE NETHERLANDS: A LEADING DIGITAL COUNTRY

Most connected country: #1 in the world
The Netherlands once again retained its #1 position in the fourth edition of the DHL Global Connectedness Index 2016. This illustrates that The Netherlands is the most connected country in terms of cross-border flows of trade, capital, information and people. Europe as well remains the world’s most connected region.
(Source: DHL Global Connectedness Index, 2016)

Digital Entrepreneurs Support: #3 in Europe
Amsterdam ranks third in the European Digital City Index. The index describes how well different cities across Europe support digital entrepreneurs. Amsterdam achieved a top three ranking for both start-ups and scale-ups, and is known for its infrastructure and English language skills, proximity to European markets and generous tax regime. Altogether, Amsterdam makes an attractive environment for large international tech firms: companies such as Uber, Netflix, Tesla, Atlassian and Elastic have chosen Amsterdam as the center of their European expansion.
(Source: EDCI, 2017)

Best quality of living: #12 in the world
Amsterdam ranks 12th in the world and eighth in Europe when it comes to the quality of living. Hereby, Mercer has assessed factors such as infrastructure, healthcare, education and crime rate.
(Source: Mercer, 2017)

Most competitive country: #4 in the world, #2 in Europe
The Netherlands is fourth in the world competitiveness ranking and second in Europe. According to the annual report of World Economic Forum, The Netherlands has a solid performance on the topics of infrastructure, health and primary education, higher education and training, goods market efficiency, technological readiness, business sophistication, and innovation.
(Source: WEF, 2017)

Resilience to disruptive events: #12 in the world
The Netherlands ranks 12th in the world and 10th in Europe on the Global Resilience Index of FM Global. The Index ranks 130 countries and territories according to their enterprise resilience to disruptive events. Dutch organizations score especially high on the supply chain factor, which illustrates the efficiency and safety of the Netherlands as a true logistics hub.
(Source: FMGlobal, 2017)

Best business environment: #7 in the world
The Netherlands comes seventh in the latest ranking of the world’s best countries for business, compiled by Forbes. With this position, we surpass many other European competitors, such as Luxembourg (#14) Switzerland (#16), Belgium (#17) and Germany (#21).
(Source: Forbes, 2017)
Most sustainable cities: #11 in the world
Amsterdam ranks 11th in the world on the Sustainable Cities Index and ninth in Europe. This Index explores the three demands of People, Planet and Profit to develop an indicative ranking of 100 of the world’s leading cities. Amsterdam exhibits one of the best balances in the Index across the three pillars of sustainability, scoring especially high on the People pillar (#7).
(Source: Sustainable Cities Index, 2016)

Best average connection speed: #6 of Europe
The Netherlands is 12th in the world and sixth of Europe in Akamai’s “State of the Internet” report. Hereby, The Netherlands has an average connection speed of 17.4 MB per second.
(Source: Akamai Q1, 2017).

Foreign investments attractiveness: #5 in the world
The Netherlands ranks fifth in the Foreign Direct Investment (FDI) projects. EY’s Attractiveness survey provides first-hand information on the growth potential of a country or region. It shows a growth of foreign investments in the Netherlands of 47% compared to the previous year. Additionally: a different report created by EY shows that the Netherlands was identified as the second preferred destination for those investors moving out of the UK due to Brexit.
(Source: EY Attractiveness survey, 2016 & 2017)

Highest English proficiency: #1 in the world
The Netherlands has the first rank on the EF English Proficiency Index (EF EPI), a worldwide benchmark for measuring and tracking adult English proficiency over time. The Netherlands is also number one when it comes to global workspace English skills.
(Source: EF EPI, 2017)

“AMSTERDAM BECAME THE FIRST MARKET IN HISTORY TO SEE MORE THAN 50 MW OF DATA CENTER TAKE-UP IN A SINGLE YEAR, FOLLOWED BY LONDON, FRANKFURT AND PARIS"
DATA CENTER MYTHS

1

**MYTH:** The bigger the data center, the worse it is for the environment

**FACT:** The bigger the data center, the more efficiently it can allocate cooling and efficiently use electricity to power the servers, storage and network equipment. Data centers are far more efficient than in-house data centers. Without large data centers, a lot more energy would have been used.

2

**MYTH:** Data centers waste energy

**FACT:** Data centers are built for efficiency. Additionally, the more efficient data centers are, the less energy they use, the lower their costs the better it is for their competitive advantage. So why waste energy? A no-brainer.

3

**MYTH:** Data centers are not green

**FACT:** Due to their focus on efficiency, data centers are front runners when it comes to the green movement. In the Netherlands, a vast majority of the DDA data centers uses green energy. It will only be a matter of time before the entire industry is driven by green energy. Another ‘green’ measure of data centers is that they use heat pumps to store and exchange heat.

4

**MYTH:** You can grow a new digital hub in only a few years

**FACT:** The Digital Gateway in the metro Amsterdam is an eco-system of fiber, IP carriers, exchanges, cloud companies, content delivery networks, etc. Each data centers forms a special marketplace. Every customer want to be at the existing campuses because of that. You can’t build such an environment somewhere else. Actually, all the world key markets like Ashburn, Hong Kong, San Francisco, London, Frankfurt and Singapore are growing in the same way.

5

**MYTH:** You can combine data centers with residential areas

**FACT:** Data centers have no CO₂ emissions on site. The only by-product is the noise of the fans on the roof. Existing campuses, and especially the golden campuses of the Digital Gateway (Science Park, South East and Amsterdam Airport Schiphol) can’t be established near residential buildings because of this reason.
MYTH: Data centers employ a limited amount of staff

FACT: The direct employment of a data center is limited but the indirect effects of data centers are huge. The amount of industries that rely on data centers for their day-to-day operations is enormous. In 2014, Deloitte estimated that more than a 100,000 people are employed in the internet economy. With a growth rate of around 10% per year, more and more people have a job that is directly or indirectly related to this industry.

MYTH: Data centers don’t contribute to the economy

FACT: Due to the growth of the digital hub, many expert companies grew very big in designing, building and maintaining data centers. The data center and hosting & cloud sector is one of the biggest and most diverse in Europe. Many foreign providers and suppliers have established their EU HQ in the Netherlands because of its perfect infrastructure. Summarized in numbers, the digital sector drives 25% of GDP and accounts for 20% of foreign direct investments.

MYTH: Data centers are telecom

FACT: Data centers grew as the internet emerged and are often interchangeably mentioned with the telecom industry. The internet, or the digital infrastructure that makes the internet, works in a completely different way than the telecom world. In terms of connectivity, telecom incumbents and access providers have no or at most a marginal role in a data center. Almost all connectivity in and around data centers is provided by exchanges, international backbone carriers, fiber providers and in-house cabling.

MYTH: The digital infrastructure merely has a supporting role

FACT: The digital infrastructure sector is not only there to support the IT of other industry. It is a major sector itself. Internet access providers, backbone providers, hosting and cloud providers, internet exchanges, domain name registrars, facility and hardware suppliers, consultancy firms, design agencies, building companies, fiber providers, all together they form a unique logistical chain. On the international side, the Digital Gateway is a ‘mainport’/hub equivalent with the Port of Rotterdam and Amsterdam Airport Schiphol.

MYTH: Only university trained workers work in data centers

FACT: Data centers need to be always on. The people working in data centers, work with industrial size electrical and cooling equipment. True professionals that are aware of their important tasks. Additionally, 24/7 customer support is needed from engineers on site, to help customers who are not physically in the Netherlands. As we are growing, we are always looking for new professionals.
RECOMMENDATIONS
RECOMMENDATIONS

Create new SBI codes
Data centers and cloud & hosting companies are still categorized under SBI codes that are immensely outdated. For this reason, they fall under the same umbrella as many industries that don’t relate to the digital sector at all. As a result, it’s impossible to measure and establish the structure of the digital industry. The government needs to undertake action by introducing a new, digital SBI code. By acknowledging the industry and analyzing its structure, the industry will have more room for growth.

Introduce a new legislative framework
Just as is the case with SBI code, the legislative framework dates back to a time that the digital industry didn’t even exist. In collaboration with all stakeholders, the government needs to set up a new framework that reflects the needs of the 21st era, a digital era that is heavily dependent on a healthy digital infrastructure.

Promote the Netherlands as Digital Gateway to Europe
The Netherlands has a golden reputation as Digital Gateway to Europe, which is why 20% of foreign investments is due to this sector. Not only should we maintain our leading position, we should strengthen it. Up until now, we have been able to acquire a leading position as digital gateway without any promotion. Imagine the prosperity we can achieve when government and digital industries join forces to promote our position as a digital leader!

Establish fruitful collaborations
Every single person and organization contributes to the prosperity of the (digital) economy. In essence, everyone is an enabler and collaboration between the industry and its enablers will make the magic happen. Enablers include policy-makers, politicians, authorities, but also researchers, innovators, educators and so on. By creating a platform for knowledge and by setting up partnerships, we can create a policy framework that benefits all.

Initiate the circular economy
Contrary to what is often thought, data centers are front runners when it comes to the use of sustainable energy and energy efficiency. Now, we are ready for the new step: the circular economy. Hereby, data centers pass on their waste (green) heat to other parties. For example, the heat can transported to nearby households or companies. We believe renewable energy is the future, and no energy should be wasted. Unfortunately, the required heat networks are not deployed yet. By starting small, concrete projects and by sharing best practices and lessons learned, we can make the circular economy the standard. With the rise of smart cities this need to become an action point for governments to invest in. Let’s not waste this free energy.

Education needs to get up to speed
Educational programs are slowly moving towards are more digitally oriented focus. However, this process is way too slow and as a result, education is far behind in terms of IT. Hereby, we are not only referring to higher educated people. In data centers we also need people to maintain and operate the power equipment, cabling, cooling equipment and maintain security. Educational institutions must invest in upgrading their programs and they must raise awareness among their students, informing them about the opportunities that lie within the digital area. These measures are a necessity as there currently is a huge gap between demand and supply of skilled IT professionals on the labour market.

Cyber security is a top priority
Aside from physical safety, the digital economy requires us to ensure cyber security as well. After all, a vicious cyber attack could shut down vital systems and may have tremendous (financial) consequences. Again, collaboration between the digital industry, enablers and the government is key. We need to ensure (digital) safety to win trust within society and to maintain an attractive climate for foreign investors.

More research is needed to keep making progress
We are in the middle of a digital transformation, which has a higher pace than has ever been the case during any transformation. If we want to stay in control of this process and remain our leadership position as Digital Gateway, we need to keep measuring and researching what is happening during the transformation. Furthermore, we need to use this data to make predictions about what will happen or even what should happen in the (near) future.

Choose for greener, more efficient solutions
In-house server rooms are far less efficient than data centers are. This is why organizations, and especially those who want to lead by example in green actions, should closedown their in-house server rooms and migrate their IT to a data center. This will benefit the environment. The time is now.
Let’s not run out of power supply
As more and more IT gets centralized in data centers, energy use is obviously increasing in these specific areas. Especially in the Metro Region of Amsterdam, this is a huge problem. As it’s the biggest data hub of the Netherlands, and the Digital Gateway to Europe, it’s simply not an option to not have sufficient energy supply. The four main data center campuses, Science Park, South-East, West and Schiphol, need to continue their growth. Energy supply plans take time, so let’s prepare for the future and start now.

Let’s lead the way
On 17 November 1988, almost 30 years ago, the Netherlands was the second country in the world to connect to the Internet. Since then we have been frontrunners in building the digital infrastructure, developing protocols, doing research, providing education, improving sustainability and increasing security. Well-known institutions like Surf, NLnet foundation, Green IT Amsterdam and The Hague Security Delta have been major contributors and are centers of progress. Today, almost 30 years later, we’re still leading the way and even though competition is on the rise, we should actively work together to set the right example, leading the international agenda for Internet governance for the global public good. The ones who lead should guide the way.
A data center is a complex crossroad of many different fields of expertises. Although data center staff is normally limited in numbers, the knowledge areas in which they need be skilled are not. Below are the important areas of expertise.

**IT sector**
Data centers exist through customer demand. ISV's, Cloud providers and direct customers all have different needs in a disruptive market. Data center personnel need to have extensive IT knowledge to serve the customer. Also in the data center sector, the customer always comes first and is always right.

**Technical facilities**
A data center is a highly technical building. The technical facilities need to be in perfect condition, operated efficiently and get updated regularly in accordance with the latest standards and regulations.

**Power**
Power is the main “fuel” and main cost for data centers. The less power data centers use, the lower their costs and the better it is for the environment. To always maintain focus on this up-to-date knowledge of the energy pricing, laws and regulations, energy efficiency and green energy are key.

**Security**
To earn the trust of its customers a data center must be highly secure. Perimeter fencing, security gates, CCTV, 24/7 guards but also strict security processes are needed to maintain this trust.

**Connectivity**
Without connectivity data centers can't operate. Extensive knowledge of Fiber carriers, Backbone providers, CDNs and Internet exchanges is needed. This alongside other connectivity as Cloud, Ad, Mobile data, Media exchanges and knowledge of (in-house) patching.

**Real estate**
A data center is also known as 'digital real estate'. A data center leases wholesale, retail space or racks to its customers.

**Finance**
Data centers are expensive to build. A large data center can cost in excess of 150 million euros. Hyperscale data centers can exceed one billion euros. These huge investments require excellent knowledge of financial markets and possibilities of, for instance, financial lease constructions.

**Certifications**
In the data sector it is common to be certified in different areas. As a data center house critical IT systems, it needs to provide its customers with assurance that it meets certain claims. The most important certifications are:

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<tr>
<th>Certification</th>
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<tbody>
<tr>
<td>ISO 27001</td>
<td>Information security management</td>
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<td>ISO 9001</td>
<td>Quality management</td>
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<td>ISO 14001</td>
<td>Environmental management</td>
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<td>PCI-DSS</td>
<td>Credit card payments</td>
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<td>SOCI</td>
<td>Financial and internal controls covered by ISAE3402/SSAE16 (prev. SAS70)</td>
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<td>LEED/BREAM</td>
<td>Green building certification</td>
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All digital disruption are housed in a data center near you

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<th>BLOCKCHAINS</th>
<th>VIRTUAL REALITY</th>
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<td>ARTIFICIAL INTELLIGENCE</td>
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<td>E-COMMERCE</td>
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<td>BIG DATA ANALYTICS</td>
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<td>EDUTECH</td>
<td>PERSUASIVE COMPUTING</td>
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<td>SAAS</td>
<td>START UPS</td>
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Commercial data centers have three major customer groups:
1. Hosting/Cloud providers
2. ISVs/SAAS providers
3. Direct customers

1. Hosting and Cloud providers
Hosting and Cloud Providers provide IT infrastructure and platform services to third parties. The customers can be end customers or SaaS providers. Popular services are Infrastructure as a Service (IaaS), offering computers—physical or (more often) virtual machines - or Platform as a Service (PaaS), allowing customers to develop, run, and manage applications without the complexity of building and maintaining the infrastructure typically associated with it.

2. SaaS providers
SaaS stands for Software as a Service. SaaS is sometimes referred to as ‘on-demand software’ and is usually priced on a pay-per-use basis or using a subscription fee.

In the SaaS model, application software is installed and operated in the data center and users access the software from their premises. SaaS users do not manage the IT infrastructure and platform where the application runs. This eliminates the need to install and run the application on the user’s own computers, which simplifies maintenance and support.

The ISVs, Independent Software Vendors, have now almost all switched to a SaaS model.

3. Direct customers
These are companies or organizations that outsource (part of) their IT to a data center. These can be governmental, businesses and non-profit organizations. The customer outsources their compute, storage, security and networking equipment to the data center.
With the growing importance of “digital” and the continuity of IT services, more and more organizations are increasingly opting for external housing of their IT infrastructure at a data center provider. Preferably organizations around the corner, as organizations don’t want to ‘lose control’ over their IT systems. A data center in the region is able to service regionally-based companies and local governments to meet that need. Recent research of the Dutch research company PB7 shows that the demand for regional colocation services is increasing.

Innovation hotspots
Every province in the Netherlands has multiple data centers. Regional data centers profit from being located in the proximity of a digital innovation hotspots, where all kinds of digital players and startups can interconnect. What is so unique to the Netherlands, is that if you want to find a high quality, tier-III level data center within a 30 minute drive, there are hardly any blind spots. Apart from the Amsterdam notable data center campuses, there are those in the Rotterdam, Eindhoven and Groningen region.

Regional data centers obviously look for local opportunities. They often expect to find business with local businesses, healthcare or education, but have grown as a result of the business from local IT service providers, hosters and (cloud) software vendors. As a result, regional data centers do well when they are located at digital innovation hotspots, where all kinds of digital players and startups can interconnect.

Well connected
Need for connectivity is no longer an argument for specifically choosing colocation data centers in Amsterdam. All regional DDA data centers are carrier-neutral and many offer IX services. With the current fiber technology, a regional data center is also only a few milliseconds away from the major Internet exchanges in the Amsterdam area. For SMEs and Enterprise organizations this is a negligible number.

Regional data centers bring huge efficiency, scalability and flexibility benefits and provide a primary home for your servers at all times.
In Europe, having high speed internet access is now very common. Almost everywhere in Europe people and organizations go online via fixed and/or mobile broadband. The underlying infrastructure that makes it all possible to surf the web is called the digital infrastructure. The infrastructure that makes the internet work.

**Digital infrastructure**

The digital infrastructure is the combined fixed and mobile access networks, data centers, cloud & hosting providers, domain name registrars, internet exchanges, content delivery networks, etc.

Part of the digital infrastructure are international digital hubs, these are only present in a few countries around the world. These digital hubs are international intersections of connectivity and are the key commercial multi-tenant data center markets.

**Digital Hub**

Digital hubs consist of international backbone-, fiber- and IP-carriers, data centers, internet exchanges and major cloud providers. They have developed into an unique ecosystem of infrastructure, customers and suppliers.

The Netherlands is one of the most important Digital Hubs in the World. The Digital Gateway to Europe is centered around the Metro Region of Amsterdam. In the Netherlands it is seen as the 3th international hub, Mainport, next to the Port of Rotterdam and Amsterdam Airport Schiphol.

**Near the Digital Gateway**

For companies less dependent on latency or the need of being next to the special digital hub ecosystem, just being outside the Amsterdam region is good enough and in almost all the cases still better than anywhere else in Europe. As the Netherlands is a small country, this immediately means basically all of the Netherlands. Notable data center hot spots are: Rotterdam, Groningen and Eindhoven for commercial data centers.

Apart from multi-tenant data centers, the Netherlands is also home to hyperscale data centers. Main campuses are Agriport, north of Amsterdam and Eemshaven, Groningen in the north of the Netherlands.

"THE NETHERLANDS IS OFTEN REFERRED TO AS AMSTERDAM DUE TO THE SMALL SIZE OF OUR COUNTRY"
CAMPUSES

Commercial data centers/colocation
Locations: Amsterdam, Rotterdam, Groningen, Eindhoven

Links:
www.dutchdatacenters.nl
www.digitalgateway.eu

Amsterdam Metro Region
Locations: Science Park, South-East, Amsterdam Airport Schiphol, West

Links:
www.dutchdatacenters.nl
www.digitalgateway.eu

Hyperscales
Locations: Wieringermeer (Middenmeer) Eemshaven

Links:
www.dutchdatacenters.nl
www.digitalgateway.eu

All data centers can be found online. Visit the Dutch Data Center Map: www.dutchdatacenters.nl/map
Innovation & Research
on digital infrastructure and applications

Ecosystem
of innovation start-ups and developer

Laws and regulations
that foster innovation (incentives, less innovation barriers)

Talent
with the competencies and skills for the digital age

Financing
and capital for startups and innovators

Digital Infrastructure

Port of Rotterdam
Annual Growth '07-'13
1%
1250
Employs 177,000 FTE

Amsterdam Schiphol Airport
Annual Growth '07-'13
2%
1914
Employs 94,000 FTE

Core Internet Economy
Annual Growth '07-'13
7.5%
1995
Employs 333,000 FTE

Perfect connectivity
EU single market
Privacy regulations
Data-driven economy
International focus

Why the world’s top tech companies choose the Netherlands.

“If it’s a success in the Netherlands, It’s a success in Europe”

Source: Digital Economy in Europe

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Digital Gateway to Europe is home to several large internet exchanges and has the fastest growing data center industry in Europe. The digital hub consists of connectivity, data centers and cloud providers.

**Connectivity**

**Internet Exchanges**

Digital Gateway to Europe is home of three(!) of the largest exchanges in the world: AMS-IX is the largest internet exchange in the world in terms of traffic and has almost 800 members. The second largest Dutch internet exchange, the NL-IX, is number 8 in the world. The world number 6 exchange, Equinix, is also present at several locations.

**Connectivity**

**Backbone Fiber & IP carriers**

The metro Amsterdam area is known for its perfect fiber connectivity. With a large national network and many sea cables landing in the Netherlands we are directly connected to, for instance, the USA. Many customers only use fiber and operate and maintain the optical equipment themselves.

The major leading fiber providers leading are Eurofiber, EU Networks and Relined. The top IP backbone carriers present are NTT, Cogent, Level3, GTT, Hibernia and Telia Sonera.

Companies who choose the Netherlands as their digital hub enjoy the lowest average latency throughout Europe.

**Connectivity**

**In-house connectivity**

Organizations choose to rent space in certain data centers because of other relevant parties, verticals, CDN’s, cloud connects, etc. that rent space in that data center. In-house cabling connects them together.

**Data centers**

**Colocation**

Unique about the Amsterdam region are the multiple data center campuses near to each other: The Science Park campus (where it all began), the South-East-West Campus, and the Schiphol Campus.

**Cloud providers**

**International large cloud players**

The Netherlands is the only European country in which three out of the four top public cloud players are present with their own large data centers. Providing superior Cloud connections for Enterprise, Media and ISVs.

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**‘The third mainport’**

At the end of 2015 the Dutch parliament recognized the Digital Gateway as the third mainport of the Netherlands. ‘Mainport’ is a Dutch word meaning an intersection of major transport routes. The closest English word is hub.

The motion submitted by member of parliament Kees Verhoeven (D66) stated that the Dutch government should develop an economic vision with the relevant stakeholders and implement this vision to strengthen the position of the digital hub.

The adoption of the motion was an important milestone and great support for the Digital Gateway to Europe.

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**“TO STRENGTHEN THE 'THIRD MAINPORT' IS A NATIONAL PRIORITY”**
Diamond encrusted unicorns
The Netherlands is known for its ideal position as a launch pad to the rest of Europe. With its central location and perfect connectivity it has the best average latency times to any location in Europe to distribute data.

The well-developed digital ecosystem has attracted many foreign companies entering the European market. These include Google, Softlayer, GoDaddy, Huawei, Microsoft, Netflix, Uber and NetApp to name a few. Apple, to give one more example, has chosen to distribute all of the company’s software updates in Europe through the Netherlands.

Strategically located at the center of Europe’s largest markets, the Netherlands has also established itself as a magnet for international companies and a leading site for European or regional headquarters. A stable country with a supportive corporate tax structure, a highly educated, multilingual workforce and a superior logistics and technology infrastructure, the Netherlands offers companies a perfect climate to compete successfully in Europe. And with attractive quality of life.

For scale-ups, Fortune 500 leaders, diamond encrusted unicorns, small to mid-sized business, the Netherlands is a smart choice to locate international headquarters. Just ask major players like Cisco Systems, Palo Alto Networks, Netflix and Tesla or smaller operations like Optimizely, DoubleDutch, Advantech, Sun Pharma and Lux Research. Regardless of size, there’s nothing small about the results businesses see here.

Digital Gateway to Europe organization
The Digital Gateway to Europe organization is an industry & government backed initiative to promote the Netherlands as the Digital Gateway to Europe and orchestrate all activities around the digital hub.

It helps foreign companies that want to come to the Netherlands and helps Dutch digital companies that want to go abroad, it organizes trade missions and trade shows and provides training about this new sector.

Main activities:
• Portal Digital Gateway to Europe
• Trade missions
• Trade shows
• Industry events
• Reports & documentation
• Education
• Support & consultancy services

“THE NETHERLANDS HAS THE LOWEST AVERAGE LATENCY FOR DATA DISTRIBUTION THROUGHOUT EUROPE.”

More general information about investments in the Netherlands: www.digitalgateway.eu
In only 20 years the data center sector has grown to become an industry of major importance worldwide and especially in the Netherlands. For many years, this sector was almost unknown to the general public and government. You can say that the data center industry grew to its current size completely under the radar.

In general, internet related companies were for a long time not represented on trade association level. As the internet grows very fast, and tends to be disruptive, this sector did not connect to the existing traditional ICT and telecom sector and still feels different from it.

Only around five years ago, representation changed in the Netherlands, as Cloud and Webhosting providers started organizing themselves. In 2014, the other data centers followed and the Dutch Datacenter Association, the national trade association for data centers was formed. It currently represents almost all Dutch data centers and is the primary voice of the sector.

In the Netherlands we have a tendency to organize things. We have vertical or horizontal representations of every sector in our economy. All these groups and associations work together via the famous Dutch polder model. The polder model looks for solutions by “cooperation despite differences” for a greater purpose.

To make a more effective representation and to form one voice towards government, all parties in the digital infrastructure (data centers, internet exchanges, domain name registrars, internet backbone and access providers, cloud and hosting providers) formed an umbrella organization called DINL. (Digital Infrastructure Netherlands).

"THE DUTCH DATACENTER ASSOCIATION IS THE NATIONAL TRADE ASSOCIATION FOR DATA CENTERS."
The Dutch Datacenter Association (DDA) is the national trade association for data centers. It’s the representative of the successful Dutch data center sector, the foundation of our online digital economy and Europe’s Digital Mainport: Digital Gateway to Europe. With almost 90% of all data centers in the Netherlands being a member, the DDA is the voice of the industry.

Activities of the Dutch Datacenter Association:

- Driving awareness of the industry towards stakeholders such as government, the media and society at large. Expressing the views of the industry with regard to regulations and policy issues.

- Promoting the image and the economic importance of the data center industry. In the short as well as in the long run. The DDA publishes many publications including the annual Dutch Data Center Report.

- Leading by facilitating members to boost operational improvements in the form of best practices, promotion of education and contributing to technical standards with which the data center industry in the Netherlands and beyond can make the difference.

For the Dutch Datacenter Association cooperation is key. Therefore we are active participants of:
- Digital Infrastructure Netherlands (DINL)
- Digital Gateway to Europe (DGWEU)

Board of Directors:
Michiel Eielts - Chairman (Equinix)
Eric Boonstra - Secretary (EvoSwitch)
Michael van den Assem - Treasurer (Intersxion)
Gerben van der Veen - Member of Board (Dataplace)
Elvira van Bruggen (Digital Realty)

Executive Board:
Stijn Grove, Managing Director

For more information visit our website:
www.dutchdatacenters.nl
The Dutch Datacenter Association (DDA) is the trade organisation of data centres in the Netherlands, the bedrock of the Dutch economy. The DDA unites leading data centres in the Netherlands in a common mission: the strengthening of economic growth and the profiling of the data centre sector to government, media and society.

The DDA expresses industry views on regulatory and policy issues. It demonstrates leadership by facilitating and encouraging members to implement operational improvements in the form of best practices. The DDA promotes education and contributes to technical standards, which enables the data centre industry in the Netherlands and abroad to further distinguish itself.

The DDA is one of the founders of the umbrella foundation Digitale Infrastructuur Nederland (DINL). DINL unites organisations that facilitate the digital infrastructure within the Netherlands. The DDA closely collaborates with Digital Gateway to Europe, which promotes the Netherlands as international data hub. The DDA also actively collaborates with market operators, the government and other interested parties.

Dutch Datacenter Association
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For general inquiries contact us at info@dutchdatacenters.nl
To become a member contact us at info@dutchdatacenters.nl
Pb7 Research is an independent ICT research firm. We provide independent research and advice, aimed at the successful deployment of new technology in the European market, with a key focus on the Dutch market. Pb7 supports technology marketers and strategists by identifying and analyzing market and competitive opportunities and challenges, technology buyers in making well-informed decisions and we help policy makers with key statistics and market insights. Pb7 Research is a specialist in IT security, IT professional services, data center infrastructure and services, cloud, and other emerging technologies.

**Research methodology**

The research is based on desk research and a short survey among multi-tenant data centers. The anonymous survey was done among 100 data center decision makers from single and multi-tenant data centers. The desk research has focused on mapping individual multitenant and single tenant data centers. For this purpose, Pb7 Research used publicly available sources and online searches.

After identifying the multi-tenant data centers, we checked the current status via every individual website and did a double check based on addresses. This resulted in the removal of a number of data centers that went out of business or had changed owner and other double counts and in the addition of a number of data center locations that were not listed in other sources.

For a limited number of data centers we had to estimate the net floor space as there was only information about the number of racks (1 per 2 m²) or the gross surface.

While the overview of data center space per location was complete, we had information about the power capacity (MW) and the PUE for about 40% of the multi-tenant data centers and a small group of single tenant datacenters. By calculating the averages per m², we quantified the total capacity for multi-tenant data centers. De total capacity for single tenant data centers required more modelling and estimates for especially small data centers.
CBRE formed a special Data Centre team in 1994 to address the specialized technical real estate needs of high-tech firms such as telecommunications companies, data center operators and corporates.

Core technical real estate services provided by the CBRE Data Centre Solutions team include:

• Acquisition – One-off assignments, worldwide network rollouts
• Disposal – One-off assignments, multi-site marketing campaigns
• Investment
• Consultancy – Consolidation strategies, mergers & acquisitions
• Asset valuation – Bank, corporate
• Project management, development monitoring, due diligence, building and M&E surveys
• Research – Market reports, statistics, take-up forecasting

Data center research
CBRE quarterly European ViewPoint identifies data center supply, take up, demand and availability and forecasts the next quarter’s outlook. It provides an industry-leading analysis of data center space in Europe and a unique market opinion piece developed in partnership with iXNewsSearch.

The research relates only to the European Carrier Neutral Hotel Tier 1 markets. Accurately capturing the dynamics of all the categories of the Data Centre market is very difficult, especially when attempting to analyse vacancy within standalone Carrier, Web-Hosting and IT outsource data center facilities. The Carrier Neutral Hotel market caters for the full range of user/operator requirements so it is the best indicator of the underlying conditions in the Data Centre market.

Disclaimer
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The time that businesses let their location choice depend upon national tax laws has already been banned to the past for a long time. Nowadays, the really interesting and valuable good seems to be the protection of privacy and personal data. The aim of this factsheet is, therefore, to provide (potentially) interested companies with a short overview of the most important topics within current and upcoming Dutch and European data protection legislation.

**THE VALUE PROPOSITION OF DUTCH AND EUROPEAN DATA PROTECTION LEGISLATION**

In cooperation with
DUTCH DATA CENTER MAP

www.dutchdatacenters.nl/map