January 2023

Jones Lang LaSalle Incorporated

Greystoke Land

West London Technology Park

Woodlands Park Landfill Site Land South of Slough Road Iver, Buckinghamshire, UB8 2FX

Need, Location, Sustainability Significance

Technical Note

Jones Lange LaSalle Developments Ltd

January 2023

Contents

1. Scope of Technical Note

Jones Lang LaSalle

1.1 Jones Lang LaSalle's (JLL) research team delivers intelligence, analysis and insight through market-leading reports and services that illuminate today's commercial real estate dynamics and identify tomorrow's challenges and opportunities. Our more than 400 global research professionals track and analyse economic and property trends and forecast future conditions in over 60 countries, producing unrivalled local and global perspectives. Our research and expertise, fuelled by real-time information and innovative thinking around the world, creates a competitive advantage for our clients and drives successful strategies and optimal real estate decisions.

1.2 The EMEA Data Centre Transactions team is part of JLL's Data Centre Solutions group which covers project management and facilities management. The transaction team provide end to end transactional advice on all stages of the data centre real estate life cycle including acquisition, asset management & consultancy and disposals , working with the wider Data Centre Solutions team and the global JLL network to support our client on every stage of their journey.

1.3 Across the spectrum of data centre users — from cloud providers to colocation operators to large enterprises and institutions — JLL have a steadfast reputation as the most-trusted, reliable and proven partner in the industry. Combining decades of experience and the industry's top market intelligence and data platforms, JLL uncover new build and lease opportunities for cloud providers. We track all available colocation capacity in the marketplace and create best-in-class leasing strategies.

1.4 With extensive knowledge and transactional experience in the data centre sector, JLL are positioned to help clients drive the most value from existing assets and seek the best opportunities in the market. JLL provide clients with a range of services tailored to specific needs and help achieve ambitions at all stages of the business cycle including, site provisioning, scheme disposals, site acquisitions, asset repositioning, strategic consulting, benchmarking, colocation acquisitions, lease consultancy and company mergers and acquisitions.

1.5 JLL (NYSE: JLL) is a leading professional services firm that specialises in real estate and investment management. JLL shapes the future of real estate for a better world by using the most advanced technology to create rewarding opportunities, amazing spaces and sustainable real estate solutions for our clients, our people and our communities. JLL is a Fortune 500 company with annual revenue of $19.4 billion, operations in over 80 countries and a global workforce of more than 102,000 as of June 30, 2022.

Introduction

1.6 This Technical Note ('Note') addresses the matter of the need for Data Centres at a National level (UK), Region level (London), and in the site proximity (West London Technology park (WLTP), and the specific location. It sets out why a data centre development at this location is appropriate given the very distinct set of operational and business necessities. This Note is intended to build on JLL's previous evidence submitted within the planning application stage (PL/21/4429/OA). It is noted that within the Case Officer's Report it is accepted that "*the Council does recognise that given the growing need to store data there is a need for data*

centres, and this proposal would assist in addressing some of that need" however this is now a matter of disagreement within the Statement of Common Ground (SoCG). The Case Officer's Report also recognised that the proposals have specific locational requirements but also concluded that it was not demonstrated why other locations around London have not been investigated. This position is also reflected within the SoCG whereby Buckinghamshire Council have not agreed on the Alternative Site Assessment.

1.7 This Technical Note therefore focusses on the following:

a. The need for digital infrastructure in response to the extraordinarily rapid growth to Global Data Sphere,

b. The locational sensitivity due to specific and exacting operational and business necessities, and

c. The role of sustainable Data Centre solutions to address the global requirement to prioritise energy efficiency and the need to reduce CO_2 emissions.

1.8 In seeking to quantify the scale of the need in order to address the growth in the Global Data Sphere, which is measured in Zettabytes, this Technical Note also defines the number of Hyperscale data centres facilities needed to keep pace with identified need, demand and market share and its impact on the UK economy as addressed by Stephen Nicol.

1.9 This Technical Note seeks to provide detailed evidence on the economic and social demand for digital data and digital transformation, and the role of digital infrastructure to operate even the most basic commerce in the 21st Century. The detailed evidence supporting the economic benefits is being provided to the Inquiry by Stephen Nicol an expert on economic development and economic need & benefits.

1.10 This Technical Note addresses the physical necessities of a functional data centre in relation to why this specific site is critically appropriate for Data Centre construction. This Technical Note also summarises the role of Slough and Hayes/West Drayton data centre hubs which forms the second largest data centre hub in the world, second only to North Virginia USA.

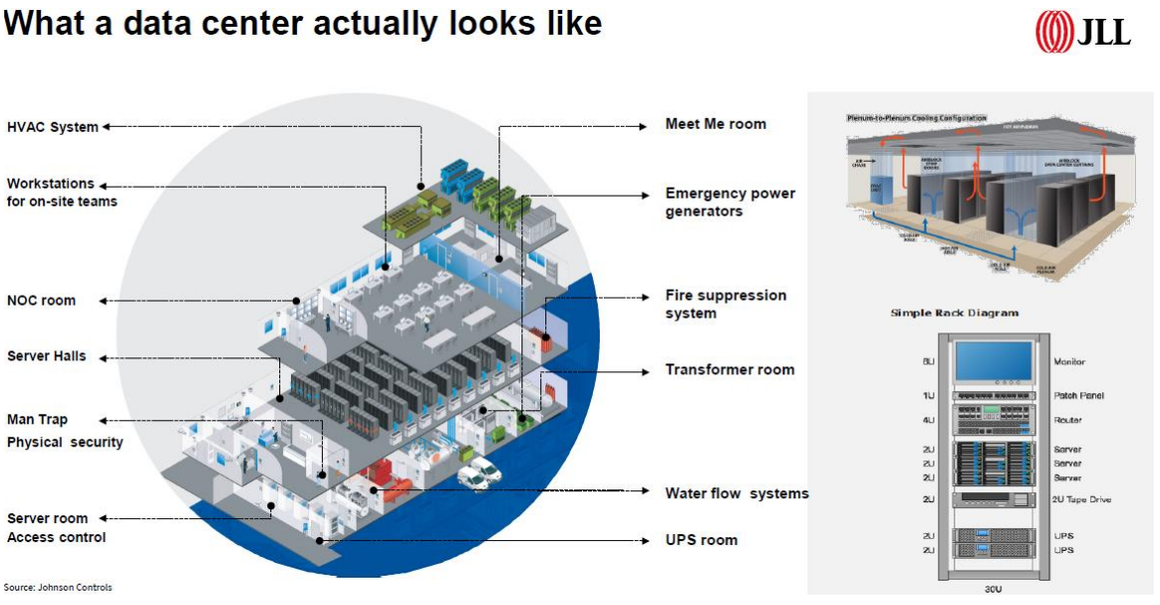
1.11 Regarding the topic of possible alternative sites that could meet the need for hyperscale datacentres, this is addressed in the Proof of evidence of David Hutchinson of Pegasus Planning. This Technical Note will address the suitability of such sites regarding site evaluation based upon the critical requirements of environmental / man made risk, power, fibre, and proximity within the existing Availability Zone.

MAYBE WE DO THIS HIGH LEVEL INTRO.

2. What is a Data Centre?

2.1 A data centre is a highly secure facility that houses IT infrastructure, for example, servers, storage systems, switches and other components that make up a large IT network. It can be thought of as a larger version of the server and infrastructure that might be located in an office. As the name suggests, it is a facility within which digital information resides and is exchanged. Data Centres are the power houses of cloud computing and the 'inter-connectors' of the internet.

2.2 A data centre must always remain operational within strict parameters of continual electrical supply, temperature, and humidity, all without interruption. This means that within a data centre you will also find electrical equipment infrastructure, uninterruptible power sources and ventilation-cooling systems. These are all designed specifically for near 100% availability and functionality of the devices and data housed withing the facility.



What is a data centre used for?

2.3 The main purpose of a data centre is to store, process/compute and transmit digital data. These facilities provide the essential space, power, cooling, network, and security adhering to the required strict environmental controls necessary for complex digital equipment. They can take various shapes and sizes, for example, you can store subset of company files or provide an entire IT network using a data centre. In particular to the Appeal proposition, hyperscale data centres are the home-place of the 'Cloud' which house the services and core elements that allows cloud internet to exist.

Do all businesses need a data centre?

2.4 Most businesses (almost all) are transitioning to cloud-based IT solutions. According to a recent Cisco survey of 2,500 IT decision makers, 82% have already deployed a hybrid cloud strategy to their business[1]. Hybrid

[1] Cisco 2022 Global Hybrid Cloud Trends Report

cloud systems can ensure organizations have full control and highest security over their core data. Whilst very few businesses need a dedicated data centre of their own, it is difficult to think of any UK business that can survive without the need for data centre amenities and functionality. Through cloud computing, businesses can take advantage of superior IT infrastructure, enhanced security, and guarantied availability of their business-critical data. In fact, many businesses find it more economically viable to manage their IT infrastructure in this manner.

2.5 Organisations spent $53 billion on cloud infrastructure services globally in the first quarter of 2022, reaching an all-time high and accounting for roughly 24% year-over-year growth compared to 2021. Hyperscalers accounted for 60% of this revenue share during the same period. Globally, annual spending on cloud services reached $178 billion in 2021 compared with $129.5 billion in 2020, and the cloud services sector in 2022 is expected to grow to $200 billion annually by the end of this year[2]. To engage in any form of commerce (trade, production, service, import/export, buy, sell, view, or listen, in any marketplace setting) data centres play a vital role.

2.6 The current state of the cloud market is that the rapid development of the internet has opened new opportunities for the cloud technologies, business decision makers and governments. In a research paper by Oleksii Romanko "*Digital opportunity: how cloud computing changes the shape of the UK economy*" (KCL) states *"The Cybersecurity Ventures forecasts that by 2022 there will be 6 billion Internet users in the world, whereas by now there are around 4.4 billion. According to ONS, in 2018 the UK was ranked third out of all EU countries by the number of internet users, with a rate of 95% (Figure 2)."*

2.7 In the first quarter of 2022, the public cloud ecosystem generated $126 billion in revenue, up 26% year-over-year compared with the same period in 2021. The public cloud markets are expected to grow by 10%–30% every year from 2020 to 2027. This highlights an increasing trend where organisations are evolving toward a cloud-based solution. Additional evidence provided by the Office of National Statistics shows that UK Cloud computing is one of the fastest growing activities that is directly linked to internet penetration[3]. Anticipating the rapid growth, OECD forecasts that global public cloud computing market revenue will reach $331.2 billion in 2022, which is 54.5% higher than the 2019 estimate. It is expected that the cloud market in the UK will be worth around £9 billion by the end of 2023.

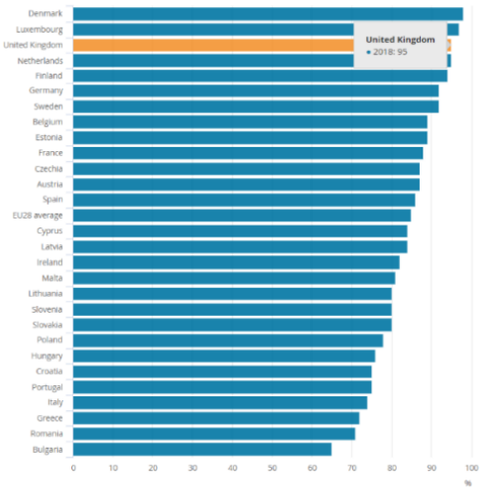


Figure 2. Recent internet users, adults aged 16 to 74 years, EU, 2018. Source: ONS, Internet users, UK

[2] JLL 2022 Global Data Centre Outlook
[3] ONS Tech UK "Cloud 2020 and beyond. Unlocking the power of the cloud". July 2019

How can data centres be used by businesses?

2.8 Data centres can be used by businesses in many ways from hosting their entire IT network to supporting just one specific element of it, such as email or telephones. The capabilities of a data centre are vast in comparison to the technical requirements of many businesses, meaning a data centre can be used for many different things as they are very versatile.

2.9 Each business will have different requirements for the technology and IT within their business, but in most circumstances, a data centre will be able to assist. A data centre makes it easier for businesses to use services, particularly at a lower cost as the data centre is likely to be superior to one which any company can afford individually. This, therefore, makes it an extremely effective way for many businesses, individuals, governments, "user-group" to take advantage of better technology, without an overwhelming cost.

2.10 Depending on the business requirement, the business can acquire some or all elements that the Cloud has to offer. Starting with the basic service, which is storage, network & servers (known as Infrastructure as a Service **IaaS**); through to an operating system, networking or virtual servers and platforms (known as Platform as a Service: **PaaS**); all the way to the complete cloud offering of software applications (known as Software as a Service **SaaS**).

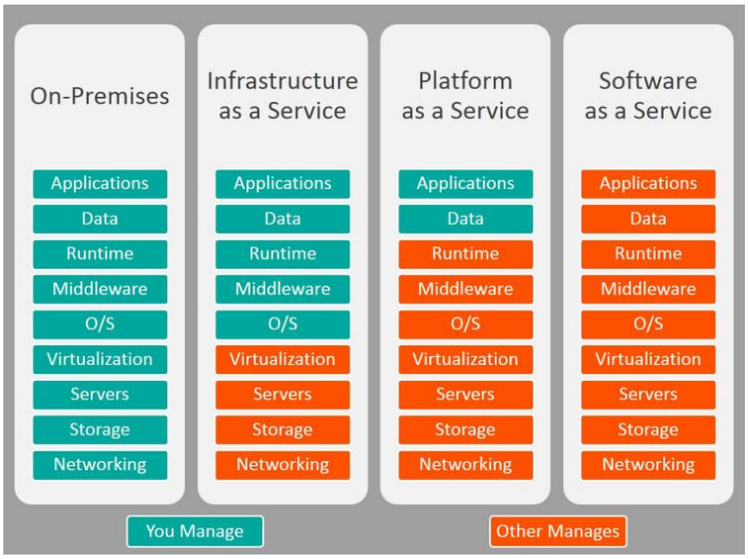


Figure 2: On-premises IT services vs three models of Cloud Service[4]

Datacentre types

2.11 In assessing the Appeal proposal, it is critical to understand that there are several different types of data centres which are classified into five main groups and there are some similarities and some key differences. The different types of data centres are:

2.12 **Enterprise data centres**: or sometimes referred to as "On Premise" This group represents the traditional data centre, and they are tailored to a standalone 'owner-operated' facilities (operation/ maintenance may be outsourced). Traditionally in the same building or very close to the user group, they often grew organically linked directly to the growth of the company and differ greatly in design. The primary focus is

[4] SaaS vs PaaS vs IaaS: What's the Difference & How to Choose by Stephen Watts and Muhammad Raza

uptime rather than energy efficiency or sustainable in design. Note: Uptime is defined as “Uptime is a computer industry term for the time during which a computer is operational. Downtime is the time when it isn't operational. Uptime is sometimes measured in terms of a percentile. For example, one standard for uptime that is sometimes discussed is a goal called five 9s - that is, a computer that is operational 99.999 percent of the time.

2.13 **Co-location Data Centres**: or sometimes referred as Multi-tenant Data Centre (MTDC). These are operated by a single business or data centre operator who specialises in building and running data centres as their core business. The internal “white space / server space” is shared by several other business units. The space is leased, sold, or dedicated in different portions and for specific periods. Depending on the scale it may be named “retail” colocation. A “wholesale” colocation data centre is where the data centre operator provides the whole data centre to a single third-party business.

2.14 **Edge Data Centres**: Smaller in scale (1MW – 4MW) and located at the edge of connectivity coverage. Typically used where time dependent activities require lower latency. The subject of latency will be addressed later in this report (see Availability Zones), in short latency is the measure of delay between two points along a network as data moves through it. These are often used in conjunction with larger data centres which will manage the heavier workloads and data backups.

2.15 **Portable** – Mobile Data Centre: These are similar to edge in size 1MW – 4MW, however are mobile, and can be lifted and shifted. These units are stand alone with dedicated power supply, connectivity (sometime satellite not fibre) standalone cooling, fire suppression & security. Often containerised.

2.16 **Hyperscale Data Centre**: These data centres are a very specific form of data centre used by the large technology companies. Major cloud and internet service providers (Public Cloud, Private Cloud, & Hybrid Cloud). Hyperscale data centres are typically owned and operated by one company. As the name suggests size or scale is the key differentiator. Typically, the largest form of data centre, may start off relatively small but can scale-up rapidity. The Appeal development is for a Hyperscale data centre.

What is the Cloud?

2.17 The cloud is a virtual storage space where people can place their digital resources such as software, applications, files, and different forms of data. The cloud is often confused with the internet; however, the cloud is only one part of the internet and is more accurately the computing technology which allows people to use digital resources stored in data centres.

2.18 The cloud exists through highly interconnected data centres (typically Hyperscale) and is the technology that allows people and businesses to share information and applications without being restricted by their physical location. Cloud computing technology allows people to use digital resources stored in the virtual space by way of networks. It allows people and businesses to share information and applications across great distance, at speed with highly secure access to their data and numerous applications.

The role of Hyperscale

2.19 Hyperscale data centres are often defined by their functionality of interconnectedness, this is necessary to provide high availability and fault tolerant domain, which in turn provides user’s access to their data. Given

the global reach of cloud computing, they require massive storage and computing capacity which is at scale in its design.

2.20 A hyperscale data centre is a facility owned and/or operated by the company it supports. This includes companies such as Microsoft, Amazon Web Services (AWS), Google, IBM, Oracle, Facebook and Apple. They offer far-reaching, scalable digital infrastructure hosting IT applications that can manage and process big data. They can service both individuals and businesses.

2.21 There is no one single definitive definition of what is a hyperscale, but the most common is 'Power Capacity', which is the number of servers and scalability of the building. The following criteria are ways of measuring a hyperscale facility:

1. **Power capacity**: The typical power consumption in a hyperscale data centres has been defined as an average of 20-50 megawatts (MW) and often grow to 100's of MW.

2. **Number of servers**: A typical definition of hyperscale suggest that they would need a minimum of 5,000 server racks, and often house up to 50,000+ server racks.

3. **Size and Scale**: Scale of hyperscale buildings vary, both in terms of configuration and in lifecycle of the actual development. Unlike enterprise data centre ramp up (single build–and go live) Hyperscale data as the name suggest are very much scalable to align with On Demand ramp up. The number of server rack drives the area of "white space" (*which is the space that is specifically allocated for IT equipment and server rooms*). The very minimum size of a hyperscale data centre would start at circa 10,000 sq. ft or 500 servers as a start point, growing to 100,000 sq. ft and housing upwards of 5000 server racks (circa 9,300 sqm of white space).

4. **Energy**: The consumption is also quite significant, and a reflection of the workload. Data Centres use energy to power both the IT hardware (e.g., servers, drives and network devices-in the "white space-IT halls) and the supporting infrastructure (e.g., cooling equipment or grey space outside halls). Given the current focus of climate change access to reliable renewable energy, green energy brings in the critical factor of Sustainable data centres, a complex area in which the Hyperscale is leading the way and represents the most efficient form of data storage (this is discussed further in section 10, 11 and 12 of this report). The data centre industry is taking sustainability very seriously, which is reflected in the 2021 Climate Neutral Data Centre Pact. The first of its kind "self-regulatory" mandate intended to drive to Carbon Net Zero. In setting out the roadmap designed to drive energy efficient of data centres.

5. **Availability Zones**: Availability Zones are often associated with Hyperscale Data Centres. Comprising of a number of isolated data centres located within specific regions which are all equipped with independent and redundant power, cooling and networking infrastructure all housed in separate facilities. These interconnected data centres provide the platform in which public cloud services originate and operate. Availability Zones typically consist of 3 data centres configured within a defined radius; this proximity is necessary in order to provide near 100% uptime availability of digital services. Participating data centres in an Availability Zone connect to each other over a redundant, high-speed, low-latency private network link, and all zones in a region connect through the same sort of network links.

3. Digital Data

3.1 Before addressing the need for data centres, this section addresses the concept of 'data' as this is the commodity which is stored within the digital infrastructures housed within the data centre. It is the actual global growth in data driven by society and the economy which is generating the need for data centres.

What is digital data?

3.2 Although most of the discussion around the data centre is related to the physical building (the centre), the main purpose of these facilities is more related to the data which is stored within the building. The importance activity or content of the data centre, the "data", is often overlooked in the discussion around data centres, the core reason why people and businesses need data centres is because of the data they contain.

3.3 Prior to digital technology, electronic transmission was limited to analog technology, which conveys data as electronic signals of varying frequency or amplitude that are added to carrier waves of a given frequency. Broadcast and phone transmission has conventionally used analog technology.

Communication with digital technology

3.4 Digital technology is primarily used with new physical communications media, such as, servers, storage devises, processors, switches, routers, satellite and fibre optic transmission. A modem is used to convert the digital data into information format for human readable form.

3.5 The importance of data to society and the economy cannot be overstressed. We are living in the digital era as the digital transformation unfolds and data will help improve the quality of life for people. Data is intrinsic part of all our daily lives, it impacts in countless ways both direct and indirect. This ubiquity is best exemplified in "Internet Infographic" published by AllAccess.com and Lori Lewis.

APRIL 16, 2021 | DOUG AUSTIN

Data as a valuable asset

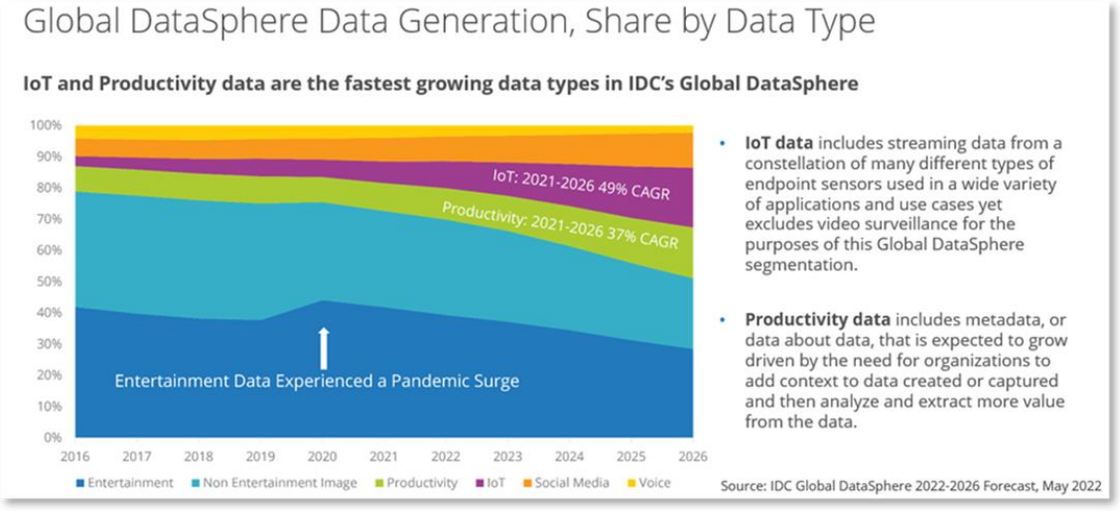
3.6 Treating data as a valuable asset or as an investment helps us put the importance into some tangible perspective. Companies spend significant resources to protect assets and hire the right talent to fully utilise them. As nations, countries, companies, groups, institutions & individuals, we have the opportunity to obtain and gain meaningful insights which help improve our general wellbeing and overall quality of our lives.

"*The world's most valuable resource is no longer oil, but data*" Clive Humby, British mathematician in 2016/2017.

4. Data Centres Post Covid

Digital Transformation at a Global Scale

4.1 The importance of data (thereby data centres) and the cloud are becoming increasingly obvious as we undergo a digital transformation. A key turning point was the Covid Pandemic as society and businesses managed to maintain functionality thanks in part to the advantages of data centre.



The rise of data centres in a post-Covid world

4.2 Covid-19 has caused a dramatic shift in the way many people work, with many companies forced to shift to working from home, resulting in a huge surge in demand for cloud services. James Witts writing in Clear Engineering Recruitment states that "*A year later, with many businesses planning to continue remote working for the remainder of 2021, or, in some cases, permanently, our reliance on data centres is becoming clear, and subsequent investment in the industry is increasing*" [5].

4.3 Digital infrastructure has never been so important to the world economy as proven during the pandemic. Faithful and Gould's '*Why Data Centres are Crucial Whilst we Face Challenges from COVID-19*' notes that "*Data centres are a fundamental asset at present, supporting technology that is helping governments, corporations and individuals navigate through uncertainty*".

4.4 The pandemic has profoundly changed the way society live and work. Tim Berners-Lee, the creator of the web, notes that Covid-19 has highlighted the fundamental importance of internet connectivity. So, it's perhaps no surprise that data centres have come to be regarded as the fifth utility, as critical as water, electricity, gas, and telecoms. In fact, Data centre staff across the world were categorised as key workers during the Pandemic, critical element to maintaining the basic fabric of society.

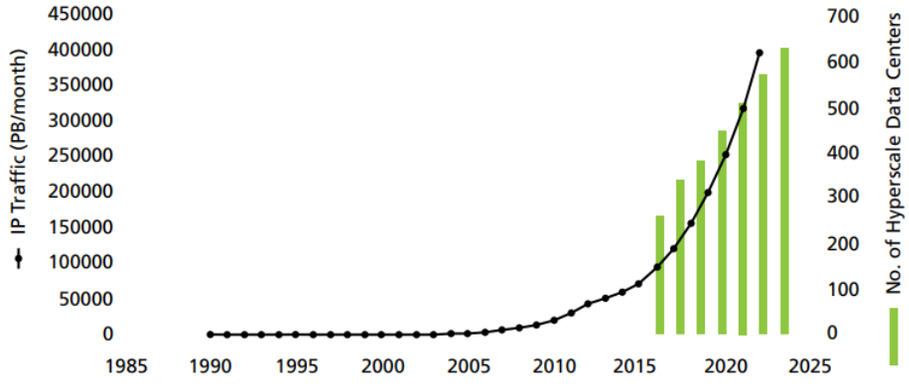
[5] The Rise of Data Centres in a Post-Covid World

5. The Need for Hyperscale Data Centres

Data Centre: Hyperscale and Cloud

5.1 The Data Centre market has moved towards cloud and Hyperscale model, which is driven out of data growth and the need to respond to the underlying demand. There are several drivers which brought about the emergence of Hyperscale, the primary driver is in response to the underlying need which coincides with the time when cloud services became ubiquitous. As data traffic accelerated, the growth in Hyperscale doubled over ten years. There has been a market transition from a traditional enterprise model where businesses and people had a personal computer tower unit under the desk, to off-site server rooms and now to an interconnected web of dedicated interconnected data centres.

No. of Hyperscale Data Centers Vs. IP Traffic[30]



[30] Cisco Global Cloud Index: Forecast and Methodology, 2016-2021 White Paper

5.2 Traditional data centres do not have the scale of design point to deal with the need for storage/ compute and demand for near 100% access to the data stored.

5.3 The market dominant hyperscale operators are Microsoft, Amazon Web Services (AWS), IBM, META (Facebook), Google and Oracle. The key characteristics and features of hyperscale cloud data centres are summarised below.

5.4 **The Need for Economies of scale and assessable data** allows for agile flexibility and distributed workload in a robust – high "always available" data access due to the independent power, cooling, and high-speed connectivity. Given the critical demand for "always available" useable data, Hyperscale architecture is designed to meet the demand for massive scale and the desire for always available data.

5.5 **The Need for Sustainable Data Centres.** It is a well-documented fact that Hyperscale data centres use less energy and have a lower **Power Use Effectiveness** rate than traditional data centres. Through innovation and the latest technologies Hyperscalers are **leading the transition to Net Zero**.

5.6 **The Need for Data dependence & security,** almost all business sectors rely on access to data for their businesses to function, for basic internet, email, voice & video calls, intricate computational data processing, storage, and communication. Data privacy, individuals personal, financial, and private needs to secure in country with strict data security regulatory requirement applied.

5.7 **The Need for near 100% availability,** as data has become so critical to our daily lives, society has become very dependent on real time access to data, medical records, bank records, communication, trading, entertainment, traveling, indeed any form of commerce import/export/trade/transaction it's impossible to think of any element which society engage in that does not rely on the digital infrastructure.

5.8 **The Need for Availability Zones (Architecture):** There is a need for 100% availability and dependence on access to our data, but standalone single data centres alone cannot achieve guaranteed near 100% availability that the market demands today. To achieve near 100% availability data centre configuration developed into Availability Zones. These Availability Zones are geographic areas in which typically 3 data centres with independent power, cooling, high speed network is interconnected in such a way that is one of the data centres failed the other two data centres would seamlessly pick up the digital transaction and as such provide near 100% access to digital data. Availability Zones are one of the very special circumstances that the operators must exploit if the country is to generate the required future economic growth.

5.9 **The Need for Availability Zones support businesses by ensuring near 100% access to their data**: In simple terms that the user does not put all its eggs (data) in one basket, and if required, can spread even a single egg (data instance) across multiple (3 or more) baskets. In doing so, can achieve the most sought after near 100% available access to their user data. An ideal situation for mission critical or personal private data.

5.10 **The Need for Proximity:** For near 100% availability to function the physical distance between data centres within an Availability Zone is limited by the speed of light. Distance between data centres is limited to allow data packages to travel at speed between data centres/ servers. The distance between sites drives what is what referred to as "latency" or lag and is measured in milliseconds and depending on the fibre route to achieve single digit millisecond latency operators need to a maximum of 10km – 15km fibre distance. This distance has also led to data centres been "clustered" which is where Hyperscalers deployed capacity in Hayes and Slough in London. This creates a data blast radius between the existing data centre in Slough / West Drayton (world's second largest digital park) and the appropriate location for Hyperscale Data centres to be located. If the data centres are outside this radius, then they will fail and be unable to function as an Availability Zone.

6. Demand for Data

6.1 The International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. The Global DataSphere is a service provided by the IDC which quantifies the amount of data created, captured, replicated in any given year. This body of research measures and forecasts the amount of new data created and stored across the globe annually. The research segments data creation across a number of metrics, including the location of data creation, the type of device creating and/or storing data, cloud and non-cloud, data type, data creator and/or custodian, and structured versus unstructured.

6.2 While data is growing in volume, the nature and location of data is also changing. Alongside structured data like relational and transactional data in SQL databases, there has been a meteoric rise in unstructured and semi-structured data, or big data, which has altered the data landscape.

6.3 IDC predicts that 80% of global data will be unstructured by 2025 because the way society use and consume data, and what consumers expect of it has changed. Rather than data being stored in fixed, known locations which can be controlled and managed easily, data is, literally, everywhere.

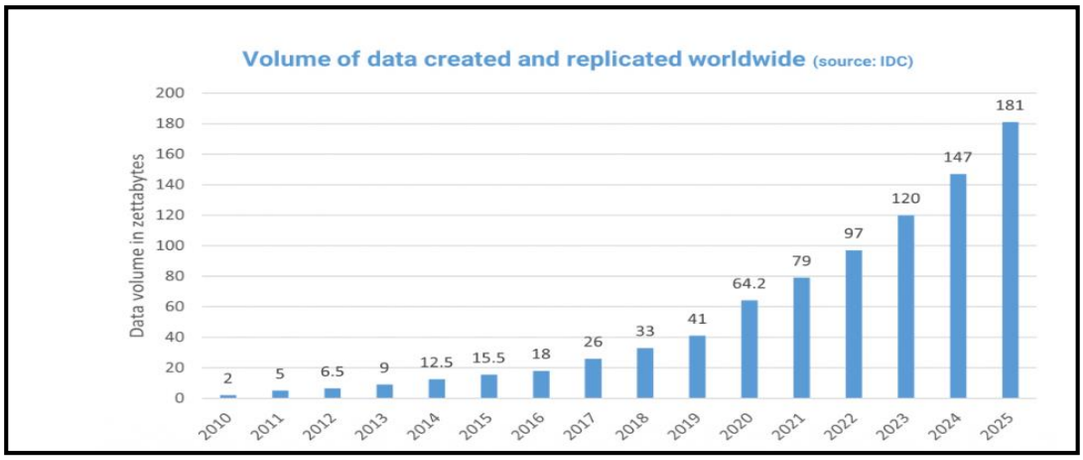
6.4 A lot of the growth of data storage will be in the cloud as both consumers and businesses find greater reasons to store their data in the cloud (internet accessible data centres). IDC stated that in 2019 more data is now stored in the enterprise core (mostly in the cloud) than in all the world's existing endpoints.

6.5 Most people are familiar with the capacity of storage to be defined as megabyte and gigabyte through advertised storage on our phones, music players, laptops and desk top computers. Data growth projections are currently measured in "Zettabytes" which is 1 followed by 21 zeros.

Abbreviation	Unit	Value	Size (in bytes)
b	bit	0 or 1	1/8 of a byte
B	bytes	8 bits	1 byte
KB	kilobytes	1,000 bytes	1,000 bytes
MB	megabyte	$1{,}000^2$ bytes	1,000,000 bytes
GB	gigabyte	$1{,}000^3$ bytes	1,000,000,000 bytes
TB	terabyte	$1{,}000^4$ bytes	1,000,000,000,000 bytes
PB	petabyte	$1{,}000^5$ bytes	1,000,000,000,000,000 bytes
EB	exabyte	$1{,}000^6$ bytes	1,000,000,000,000,000,000 bytes
ZB	zettabyte	$1{,}000^7$ bytes	1,000,000,000,000,000,000,000 bytes
YB	yottabyte	$1{,}000^8$ bytes	1,000,000,000,000,000,000,000,000 bytes

6.6 It is estimated that in 2022 the Global DataSphere is circa 97ZB zettabytes of data and will grow to 120 zettabytes in 2023.

6.7 Accounting for a variety of sources, growth in global data has constantly been revised upwards across multiyear horizons. According to the IDC, at the beginning of 2022 it was estimated that the Global DataSphere by 2025 would be circa 175 ZB, in December of 2022 the IDC are now projecting that figure to be close to 181 ZB.



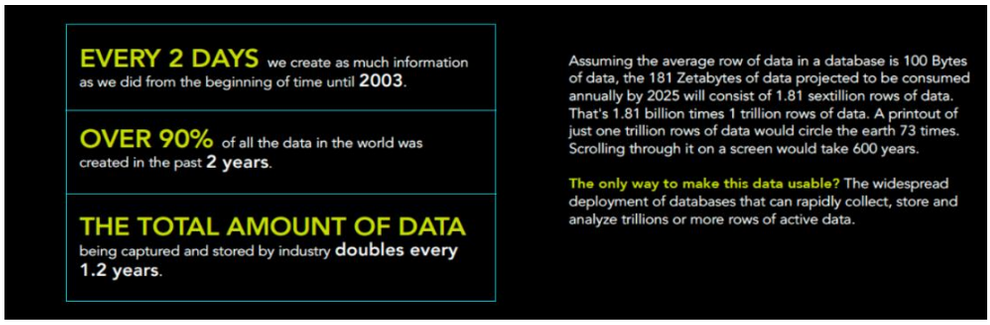
Volume of Data Created and Replicated Worldwide (Source IDC)

6.8 To put into some relevant context to better understand just how large this additional 6.7 ZB of data actually is, a single zettabyte is equivalent to about 250 billion DVDs. Therefore, the increased projection of 6.7 ZB in less than 12 months is about 1.675 trillion new high-definition DVD's.

6.9 There are several technologies which drive the growth in generic data. These are well known as they become part of our everyday lives, as an example:

1. Cloud Computing: Internet – Public, Private, Hybrid Cloud
2. IoT – Internet of things
3. AI: Artificial Intelligence
4. AR: Augmented reality
5. Mobile devices: connected devises (phones, laptops, CPU's, sensors)
6. 4G, 5G, 6G: Advance generation connectivity

6.10 To better understand just how extraordinary the rate at which data is growing, one only needs to look at the increase over the past 2 years. According to recent research "*The Global DataSphere is expected to more than double in size from 2022 to 2026*" John Rydning, research vice president of the IDC Global DataSphere.



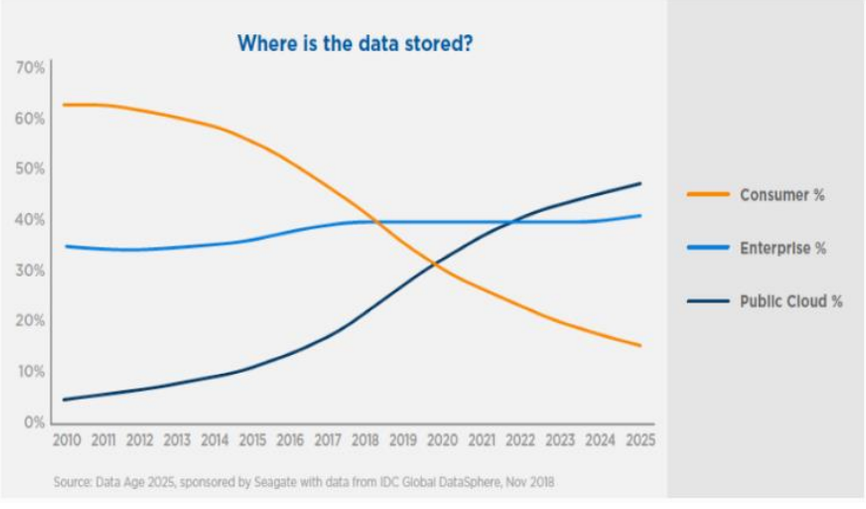
6.11 The emergence of new technologies could affect almost every sector of the economy and enable new business models. In health care, problems like misdiagnosis or mistreatment could be prevented, while the length of drug trials could be shortened (point in case, Covid: New Vaccine). In transportation, self-driving car technology could potentially lead to a reduction in traffic congestion and car accidents, resulting in increased productivity. In financial services, data technologies can be applied to risk management, portfolio management and trade clearing, improving efficiency. The growth of data in an internet / cloud supports new ways of working – new work life integration – a new norm.

6.12 There are multiple infographics available, which show just how digital engagement has changed over the past 5 to 10 years. Social media, online engagements have increased. The massive increase in the use of digital tools for both personal and business needs, has led us to the phrase "Data Never Sleeps". All around the world, data is being created every minute of every day, from clicks, likes, and shares, to rides, transactions, and streaming content.

Data Storage

6.13 This IDC study presents a forecast for the worldwide IDC "*Global Storage Sphere for 2022–2026*". It measures the size of the installed base of storage capacity, storage utilization (or data stored), and the amount of storage available each year. The IDC predicts a five-year **Compound Annual Growth Rate of 19.2% over the forecast period. Furthermore, the IDC states that over the next five years storage capacity will need to increase by 240%.** To achieve this, additional infrastructure and servers will be required to accommodate the transfer and storage of data.

6.14 A lot of the growth of this storage will be in the cloud as both consumers and businesses find greater reasons to store their data in the cloud (internet accessible data centres). Other projections include that nearly 30% of the Global Datasphere will be real-time by 2025. By 2025 every connected person in the world (about 75% of the total population at that time) will have a digital data engagement over 4,900 times per day, about once every 18 seconds. The IoT devices generating much of this data will generate over 90 ZB of data in 2025. The data will be increasingly stored in the public cloud as shown in the figure below.



7. The Need: Megawatt IT Load and Data Centre Requirement

The Need

7.1 In 2017, publications such as The Economist used attention grabbing headlines such as "*The world's most valuable resource is no longer oil, but data*" acknowledging the importance of data in everything we do. Data centre "Titans" such as Alphabet (Googles parent company), Amazon, Apple, Meta, and Microsoft and small and medium enterprises (SMEs) have attributed their growth and success to the monetisation of data. This monetisation is enabled via the computing and storage capabilities of data centres. Googles search engine, Amazon Prime with one day (or less) deliveries, Facebook's social media platform, Instagram, WhatsApp, Waze and thousands of other companies are reliant on the global data centre industry to deliver their products to corporations, governments and individuals. Their revenue generating capability is dependent on data centres. Our growing dependence on real time data, for example, the immediate transfer of money from one account to another, NHS patient management systems, algorithmic trading platforms, gaming in virtual worlds, listening to music, or a host of other digital products and services has deemed reliable, resilient 24 hour, 365 days a year infrastructure (data centres) a necessity, to deliver these products without interruption or outage.

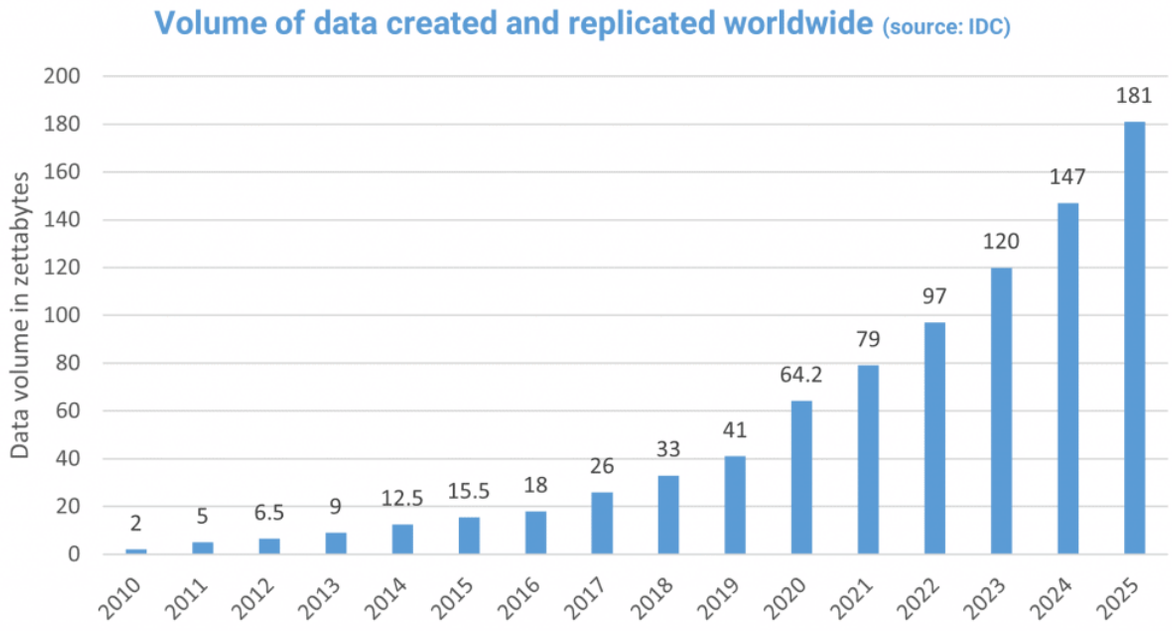
7.2 When data centres stop working businesses suffer and such is the importance of data to businesses, any interruption in service can have a negative immediate impact to a business, government or individual.

7.3 As detailed earlier in this report, there is a critical need for 100% accessibility to data so that products and services associated to the data can be provided. This can be as simple as assuring your Word document in Office 365 is available to having certainty that all the exchange live data streams used in an algorithmic real-time trading platform is available. The topology where a single data centre in the past could manage our digital products and services has evolved to where clusters of data centres have emerged including the very large data centre entities we're familiar with today, referred to as Hyperscale data centres. They are arranged in a way to ensure resilience whereby if one of the Availability Zones fails another zone can pick up the workload.

Something on buffer is good?

7.4 Amazon, Microsoft, Google and TechTarget have each provided information on how they describe Availability Zones. Each portray similar but not identical descriptions, there are nuanced differences, but the underlying implications are the same. Data centres cluster in specific areas for technical and operational reasons to ensure they mitigate the risk of these compute and storage facilities, these critical infrastructure components (data centres) from failing their customers.

7.5 As discussed in section (2.4 & 6.7) the growth in the Global DataSphere is increasing more rapidly than at any time in history; doubling every 1.2 years. Statista's "IDC's" analysis of new data/information created, captured, copied and consumed worldwide from 2010 to 2020, with forecasts from 2021 to 2025 indicates that between 2010 and 2020 we went from 2 zettabytes of new data being created to 64.2 zettabytes being created in 2020. **IDC's forecast between 2021 to 2025 takes this number to 181 zettabytes** of new data being created in 2025. Given this exponential growth in data creation, hyperscale data centres are needed for housing the storage and compute capabilities required to monetise the data and deliver the services we have come to expect.



7.6 This increased creation of data correlates directly to the increased amount of power used by and number of data centres. More data = more compute and storage = more data centres. The trend is not abating.

7.7 At a European level, Savills (December 2022) reported there is "*an insufficient pipeline of data centre development planned for Europe over the next three years to meet the forecasted increase in demand*." Savills estimate that the number of data centres will need to increase by almost 2.5 times, through the construction of more than **3,000 data centres**, providing almost **20,750MW**, to meet demand in **2025**.

7.8 Gartner analysts state more than 85% of organisations will embrace a cloud-first principle by 2025; as a result, organisations will choose in the first instance to use cloud-based services which are housed in cloud provider's Availability Zones. Further, the report notes that these organisations will not be able to fully execute their digital strategies without the use of cloud-native architectures and technologies. Gartner also report that "*new workloads deployed in a cloud-native environment will be pervasive, not just popular and anything non-cloud will be considered legacy*." Given the advantages inherent within the design principles and technological capabilities which are available in the cloud, it is a valid conclusion. For example, in September 2021 Microsoft pledged to increase its cybersecurity investment to $20 billion over the next five years which will be to the benefit of their customers.

7.9 The case for "Need" is predicated and has been demonstrated on the increased amount of data we, the consumers, are creating. The remainder of this section will focus on the UK and specifically the area in the UK that is home to our country's Availability Zones, which is in and around London, including for example Slough, Hayes and Docklands.

The Need Evidence

7.10 JLL forecasts the total demand (colocation, carrier neutral data centre and Hyperscale data centres) for data centre capacity within the UK to increase by c. 2,250MW to 3,100MW over the six year period 2022 and 2027, with a central forecast of 2,665MW.

7.11 The forecasts of the total capacity required by 2027 is based on:

- JLL's market intelligence on the levels of demand and future need for several of the key global market players over this period to meet the growth in data centre capacity needed (including demand in 2022 that has not yet been fulfilled)

- Grossing-up to overall market need based on current market shares.

7.12 JLL do not have market information to allow it to forecast reliably beyond 2027 at present. However, for all the reasons set out in this Technical Note, it is inconceivable that there will not be strong demand beyond 2027 as well.

7.13 There is inevitably a degree of uncertainty as to the precise level of future demand and need, hence the range that is quoted. The scale of future overall demand for data centre capacity forecast is broadly consistent with the earlier assessment for the whole of Europe by Savills and indeed arguably more cautious.

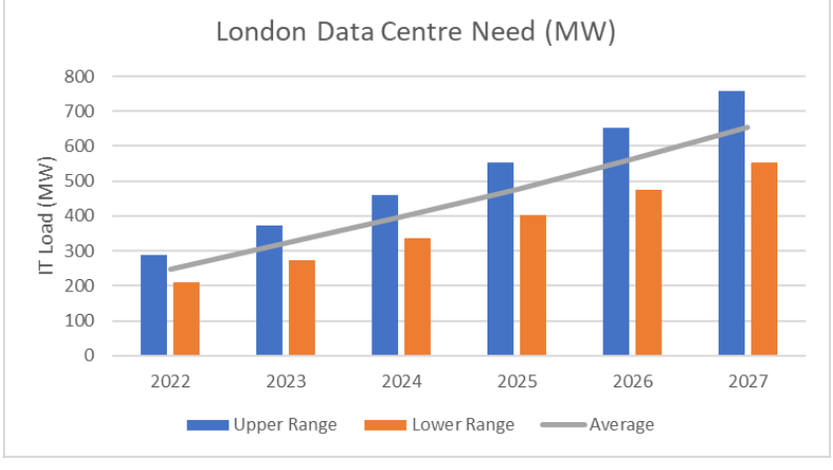
7.14 Savills assesses total need for extra capacity in EMEA as 20,750MW for the three years 2023, 2024 and 2025, or around 6,900MW each year. Over the same three year period JLL's forecast is for between 1,010MW to 1,385MW (a central estimate of 1,200MW) of extra capacity needed in London, or just 5% to 7% of this overall assessed total need across the EMEA area as forecast by Savills. The UK currently has a global market share of between 5% to 7% according to Synergy Research Group of which the Slough and Hayes Availability Zone accounts for 65%.

7.15 It is important to explain why our forecasts are for a strong upward growth in the need for data centre capacity in London (compared to the historic annual growth for co-location data centres alone by other estimates). This reflects:

- All the drivers for growth in overall data generated and stored and shift to cloud computing set out above, which are leading to a very strong upsurge in demand for data centre capacity

- A degree of catch-up in London

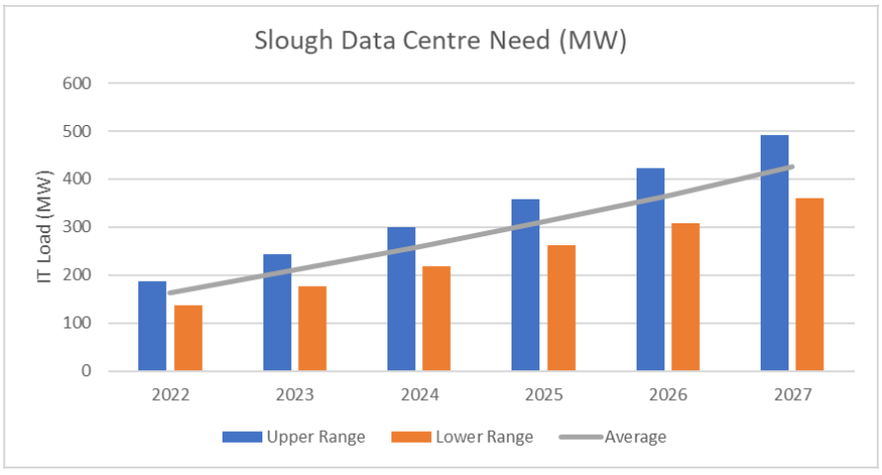
	2022	2023	2024	2025	2026	2027	Total
Upper Range	288	374	459	552	651	758	3082
Lower Range	210	273	335	403	475	553	2248
Average	249	323	397	477	563	655	2665



7.16 Based on JLL's information on current capacity, the Slough Availability Zone accounts for 65% of the total capacity across the whole London (albeit some estimations place it at 85%). Given the concentration of existing capacity and quality and quantity of fibre connections there are strong reasons to expect this share of the overall London region to continue into the future. This translates to circa from around 1,460MW to 2,000 (a central estimate of 1,730MW) of additional required capacity in the Slough Availability Zone between 2022 and 2027. Clearly as with the total London forecasts there is a degree of uncertainty in such estimates. However, the work points clearly to a very substantial level of demand for new capacity in the Slough Availability Zone area by 2027.

7.17 JLL's forecast of total data centre capacity needed in Slough Availability Zone 2022 to 2027.

	2022	2023	2024	2025	2026	2027	Total
Upper Range	187	243	299	359	423	493	2003
Lower Range	137	177	218	262	309	359	1461
Average	162	210	258	310	366	426	1732



7.18 Meeting this demand in the Slough Availability Zone is critical if the UK is to maintain its competitive advantage and attraction for inward investment into data centres, and our European #1 position within the digital economy. Given the scale of the growth, Hyperscale data centres are the only solution available to address this need. The alternative would be that growth occurs in Germany, the Netherlands and/or France who are also seeing significant growth and investment in colocation, carrier neutral datacentres and Hyperscale data centres.

7.19 **This represents a need to build multiple new Hyperscale data centres to support the demonstrated demand. Based on the scale of proposed development at the WLTP, the Slough Availability Zone would require an estimated 12 to 15 additional Hyperscale facilities by 2027 to deliver the forecasted demand of 1,730MW.**

7.20 It is understood that the UK National Grid's Iver Electrical Substation (a Grid Supply Point – major distribution point for power in the Slough Availability Zone) has applications for power that combined are estimated to be c. 1,500MW.

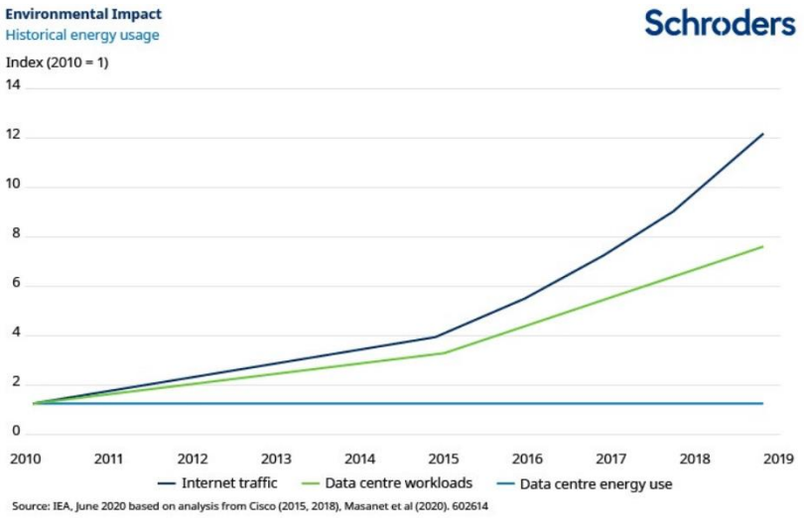
7.21 The West London Technology Park scheme has secured power from the Iver Substation. If planning is approved this will enable the scheme to commence immediately.

7.22 This demand reflects the significant underlying need for digital storage and compute capacity as a direct result of the continuous growth in global digital data.

8. Hyperscale: CO_2 Emissions and Energy

Hyperscale: CO_2 Emissions

8.1 The previous sections have set out that there is an exponential growth in data and therefore the digital infrastructure through hyperscale data centres need to correspondingly grow. Against this backdrop, it is tempting to assume that the consumption of energy will likewise increase. Although data centre infrastructure has increased significantly since 2010 and accelerated in 2015 due to introduction of Hyperscaler in the market (para 5.1). The figure below shows that the use of energy has remained relatively flat due to the technological advancement:



The main reason why these predictions were so wrong was the innovation that took place in three key areas. Firstly, the operation and construction of data centres; secondly, the transferral of private data to the cloud; and finally, the design of IT equipment. By analysing each of these areas in more detail it is easier to understand why energy consumption by data centres has managed to remain static despite the data boom.

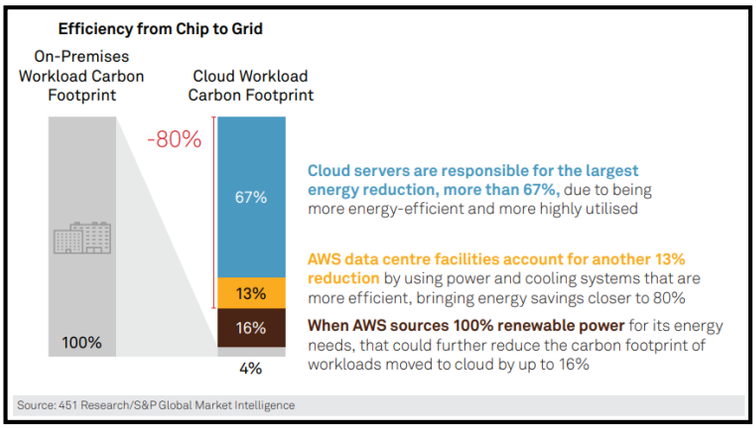
8.2 A key driver of this efficiency is the migration to the cloud. As hyperscale is more sustainable as the cloud has two main benefits regarding sustainability: carbon reductions and energy efficiency.

Data Centre Efficiency

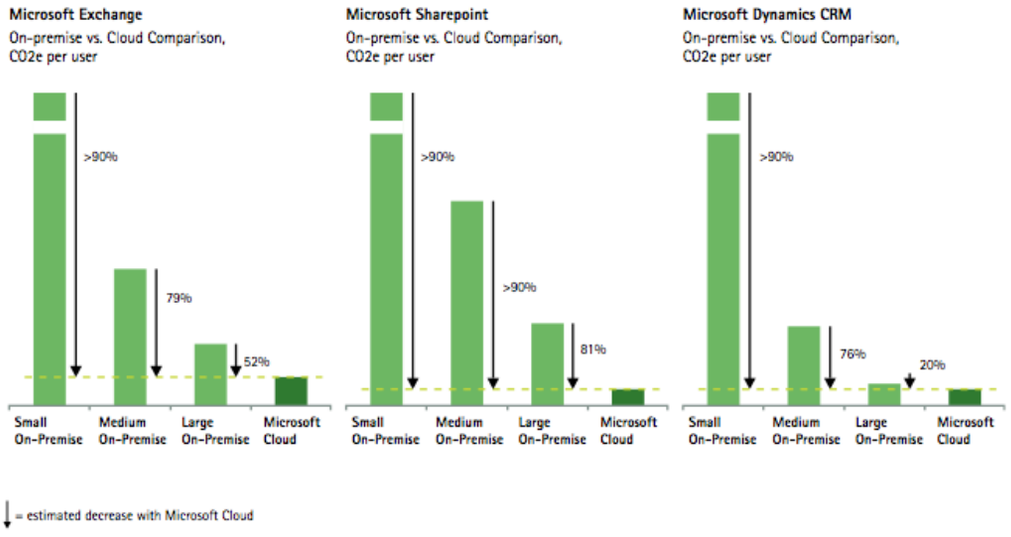
8.3 The results of the analysis shown in the figure below shows a significant decrease in CO_2 emissions per user across the board for cloud based versus on-premises. On average typical carbon emission reductions by deployment size are:

1. More than 90 percent reduction in CO_2 for small deployments of about 100 users
2. 60 to 90 percent reduction in CO_2 for medium-sized deployments of about 1,000 users,

8.4 The cloud advantage is particularly compelling for small deployments, because a dedicated infrastructure for small user counts. However, even large companies serving thousands of users can derive efficiencies from the cloud beyond those typically found in on-premises.



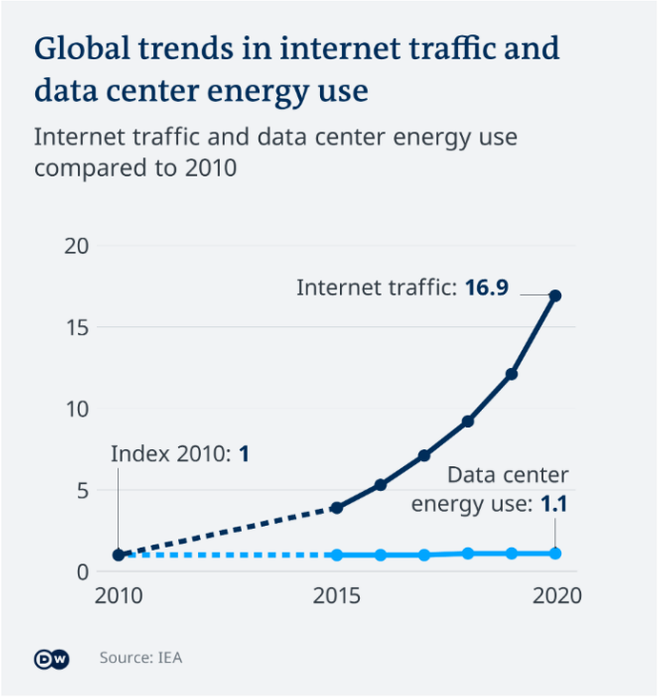
8.5 In 2018, Microsoft published a study called "*The carbon benefits of cloud computing*". Per the study, the results show that the Microsoft Cloud is between 22 and 93 percent more energy efficient than traditional enterprise data centres, depending on the specific comparisons being made. When taking into account renewable energy purchases, the Microsoft Cloud is between 72 and 98 percent more carbon efficient.



Hyperscale: Energy Efficiency

8.6 Currently there are 7.2 million data centres in the world, according to the German statistics office. The United States has the largest number with 2,670, followed by the UK with 452, Germany with 443 and then China, the Netherlands, Australia, Canada, France and Japan.

8.7 Data centres need electricity to run their equipment and keep the machines cool. Currently, estimations show that data storage and transmission in and from data centres use 1% of global electricity. This share has hardly changed since 2010, even though the number of internet users has doubled, and global internet traffic has increased 15-fold since, according to the International Energy Agency.



Global Trends in Internet Traffic Use and Data Centre Energy Use.

8.8 There is overwhelming evidence to support the fundamental environmental advantages of Cloud computing which have a direct positive benefit to our environment, in particular when compared to current On-Premises or Legacy data centres.

8.9 The statistics below demonstrate that cloud migration will reduce energy consumption and thus cut down CO_2 emissions associated with data storage and processing:

1. A study suggests cloud computing can help companies reduce their per-user carbon footprint from 30% (large enterprises) up to 90% (for small businesses).

2. When it comes to the AWS cloud environmental impact, Amazon claims that its cloud computing resources can accomplish the same task with an 88% lower carbon footprint than their traditional counterparts.

3. Based on a study from Microsoft, their cloud is 93% more energy-efficient and 98% more carbon-efficient than an on-premises data centre.

4. Google reported that while the number of cloud data centres increased by 550% in 8 years (from 2010 to 2018), the amount of energy that was consumed during this period grew by as little as 6%.

8.10 Traditionally, On-Premise Data Centres have an extremely low utilization rate, using on average as little as 15% of their capacity.

8.11 Cloud computing has the power to cut the amount of greenhouse gases (GHGs) that are pumped into the atmosphere significantly. Traditional, on-site data centres create a considerable amount of GHGs. If companies switch to cloud computing, these emissions could be considerably reduced.

8.12 In fact, Equinix which runs one of the three data centres used for Prodec Networks' cloud services, operates its facilities so efficiently that it has avoided emitting over 260,000 metric tons of carbon dioxide (CO2) since

2011. Indeed, a recent forecast by market research company International Data Corporation (IDC) showed that the continued adoption of cloud computing could prevent the emission of more than one billion metric tons of CO_2 from 2021 to 2024. This would, therefore, be no small contribution to a greener future.

Higher equipment refresh speed

8.13 Many companies use their on-premises servers for long periods of time and because new technologies are usually more energy-efficient than their predecessors, a faster refresh time reduces electric power consumption in the long run.

New methods to reduce energy consumption & reduction in e-waste

8.14 Cloud providers use sophisticated cooling equipment with higher energy efficiency rates. Others go even further.

8.15 This is because it enables greater 'dematerialisation', which refers to the replacement of physical equipment with virtual equivalents. As the UK reportedly generated the second most waste electrical and electronic equipment (WEEE) per capita in the world in 2019, this is a pressing environmental issue that urgently needs to be addressed.

Shift to renewable energy

8.16 All the major cloud service providers are gradually moving to "green" energy sources. For example, AWS is said to exceed 50% renewable energy usage and is now building four new wind farms.

8.17 Microsoft is also powered with green energy by more than 50%. What's more, by 2050, the company is planning to remove all the carbon they've emitted since 1975. Google compensated for all the CO_2 they've produced as early as 2007

Remote working

8.18 Environmental benefit of moving to the cloud is that it enables employees to collaborate remotely. People who work from home don't have to use transport for daily commuting, which translates into saving 3 million tonnes of CO_2 emissions a year. Additionally, by replacing air travel with video conferencing tools, you are also minimizing your carbon footprint.

Awakening to the Benefits of Cloud

8.19 In the near term, cloud adoption for research will be enabled by government and institutional stimuli and initiatives to modernize universities and academic research. For instance, Horizon Europe, the European Union's main research and funding program, will invest around €4 billion in core digital technologies, including cloud computing. It also aims to improve access to cloud. One of the projects it funds, the Open Clouds for Research Environments (OCRE) aims to democratize data-intensive research through ready-to-use service agreements that bring together cloud providers and the research community.

8.20 In the U.K., the government is investing £213 million in universities and research institutes to equip them with state-of-the-art scientific equipment, software, and hardware upgrades, c.2 £34 million is earmarked

for data and digital research infrastructure that offers advanced analytical capability and enhanced capacity to pre-identified research institutions.

8.21 We are ensuring that the growth of the digital economy aligns with net zero by providing £315 million of funding to support sustainable transitions in industry, including in the data centre sector (BEIS).

9. Why Build a Data Centre Here?

9.1 Site selection and site location for hyperscale and other data centres is influenced by **existing infrastructure**. The cloud is not a virtual environment high in the sky, but it is a physical set of highly connected and resilient data centre buildings. Data centres are arranged in logical clusters, arranged in such a way that they provide 100% availability to our data (this is addressed in detail further down). The proximity of these data centres is driven by physics (speed of light) ensuring they are close enough to function as an interconnected entity.

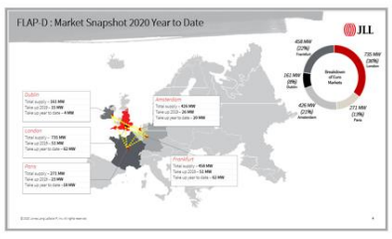
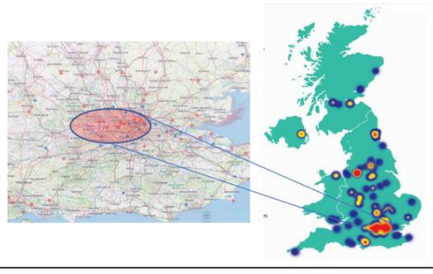
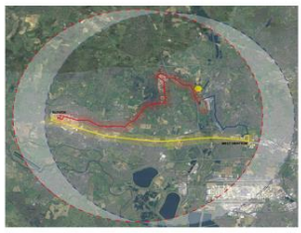
9.2 The key hubs of Slough and Hayes/West Drayton are historically positioned to take advantage of fibre and power, the two fundamental prerequisites necessary for Data Centre functionality. The existence of these clusters is what makes this available site the ideal, most suitable location for a Green Sustainable Hyperscale Data Centre to meet the mission critical demand today.

9.3 To better understand the current design configuration of Hyperscale Cloud Data Centre, we need to take a step backwards. Traditional (legacy) data centre architecture design concept was based on a single site location. This provided availability of less than 100% and the overall design relied totally on the resilience of the individual components within a single site. Therefore, if the site went down, then availability and access to data was lost.

Why Here ?

Regional	National	Local

○ UK is a strategic location west EU
○ European Financial super power
○ Highly interconnected to FLAPD
○ Largely service based economy
○ Highly developed economy
○ Large skilled workforce
○ Globally trading nation
○ Brexit !
	○ London and the southeast engine room
	○ Existing Data Centre cluster – AZ's & RZ's
	  ○ Slough
	  ○ West Drayton
	  ○ Dock lands (Financial district)
	○ Power density aligned with CBD & eyeballs
	○ Connectivity Backbone fibre infrastructure present (Railways)
	○ Existing & previous critical mass
		○ Proximity to DC Centre of gravity
		○ Critical Mass – Infrastructure
		○ Available High Voltage Power - Iver
		○ Demographic Skills
		○ Key link in connectivity network
		○ Sustainable DC development ,
		○ Negative impact resulting from lack of investment

		
Sustainable – Power – Fibre – Scale - Location	**Available** – For Sale – not in use - zone	**Sustainable** - Bio Diversity – Green

9.4 It is important to highlight that traditional data centre were intended to support a specific business and their unique needs. Cloud and Hyperscale Data Centres address and serve a greater need, that of the wider public.

9.5 In order to increase availability, it was necessary to improve the overall availability beyond the individual site to achieve as close to 100% availability to the user which is an absolute necessity for Cloud. This has led to the emergence of a different architecture which requires data centres to become highly resilient and highly interconnected.

Availability Zone

9.6 The approach to improve resilience and connectivity was the creation of Availability Zones involving at a low-latency network connectivity (low-latency is milliseconds) to provide almost real-time synchronous fail-over protection (if one data centre / virtual machine falls over then a second one drives into default to take up workload without interruption) and in turn guarantee 100% uptime.

9.7 Location is the key consideration when choosing a technology partner for these businesses. A good choice of location means an optimised infrastructure and application environment, capable of delivering a solution to meet the increasing technical challenges. Conversely, poor location can result in unstable connections and efficiency problems, outages, availability, and reliability issues which could seriously damage a business.

How many data centres are with each zone?

9.8 Typically, there are three data centres within one Availability Zone. This allows for high availability of data and 100% uptime. Each data centre must be equipped with independent power, cooling, and networking to run autonomously.

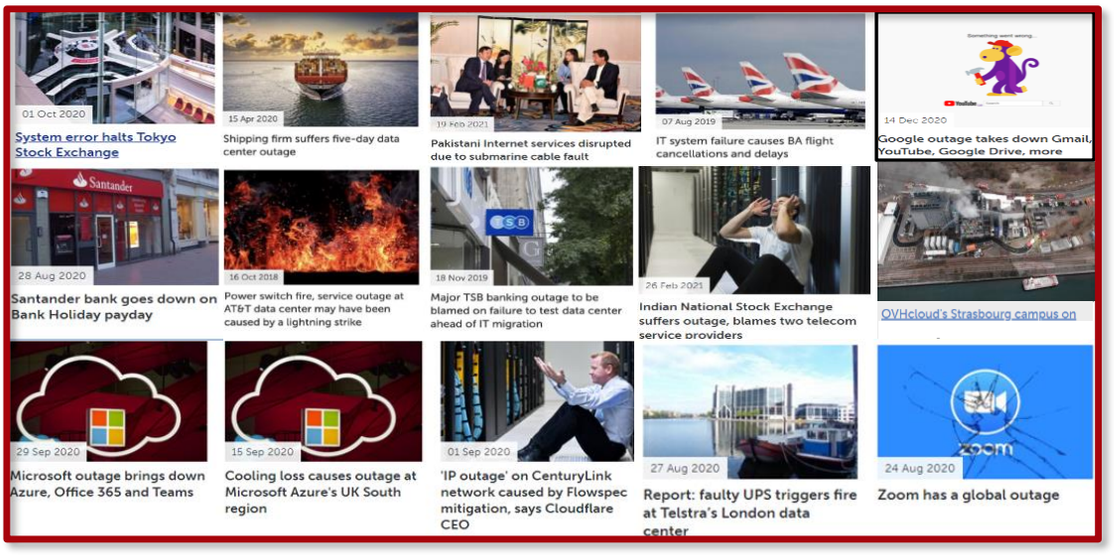
9.9 Increased downtime for cloud communications applications can have potentially devastating consequences, especially in certain industries. For example:

1. Healthcare: Patients can't reach doctors for critical information
2. Education: Students are not able to access lessons remotely
3. Public sector: Citizens can't reach critical government services
4. Financial services: Clients cannot execute their desired trade
5. Retail: When consumers are unable to reach an associate, 46% of shoppers will not buy intended product, 35% will switch to another retailer, 17% will write a negative review

9.10 The current need for businesses and society is to guarantee near 100% availability access to data at all times. For example, 95% availability equates to up to 18 days of downtime annually; this means unavailable to access necessary data. High end enterprise data centres are designed for 99.9% availability, but this equates to upwards of 9 hours annual downtime which in the world of high availability and cloud based Hyperscale would be considered as an “Outage”. Today users are demanding sub one minute (between 3 and 31 seconds) per year which equated to six to seven nines of uptime.

Availability %	Downtime per year[note 1]	Downtime per month	Downtime per week	Downtime per day
90% ("one nine")	**36.53 days**	**73.05 hours**	**16.80 hours**	**2.40 hours**
95% ("one and a half nines")	18.26 days	36.53 hours	8.40 hours	1.20 hours
97%	10.96 days	21.92 hours	5.04 hours	43.20 minutes
98%	7.31 days	14.61 hours	3.36 hours	28.80 minutes
99% ("two nines")	**3.65 days**	**7.31 hours**	**1.68 hours**	**14.40 minutes**
99.5% ("two and a half nines")	1.83 days	3.65 hours	50.40 minutes	7.20 minutes
99.8%	17.53 hours	87.66 minutes	20.16 minutes	2.88 minutes
99.9% ("three nines")	**8.77 hours**	**43.83 minutes**	**10.08 minutes**	**1.44 minutes**
99.95% ("three and a half nines")	4.38 hours	21.92 minutes	5.04 minutes	43.20 seconds
99.99% ("four nines")	**52.60 minutes**	**4.38 minutes**	**1.01 minutes**	**8.64 seconds**
99.995% ("four and a half nines")	26.30 minutes	2.19 minutes	30.24 seconds	4.32 seconds
99.999% ("five nines")	**5.26 minutes**	**26.30 seconds**	**6.05 seconds**	**864.00 milliseconds**
99.9999% ("six nines")	**31.56 seconds**	**2.63 seconds**	**604.80 milliseconds**	**86.40 milliseconds**
99.99999% ("seven nines")	**3.16 seconds**	**262.98 milliseconds**	**60.48 milliseconds**	**8.64 milliseconds**
99.999999% ("eight nines")	**315.58 milliseconds**	**26.30 milliseconds**	**6.05 milliseconds**	**864.00 microseconds**
99.9999999% ("nine nines")	**31.56 milliseconds**	**2.63 milliseconds**	**604.80 microseconds**	**86.40 microseconds**

Service Level Agreements guarantee the availability of cloud applications. Lower guarantees can lead to more downtime.



Availability Zones

9.11 Failures can range from software and hardware failures to events such as earthquakes, floods, and fires. Tolerance to failures is achieved because of redundancy and logical isolation of services. To ensure

resiliency, a minimum of three separate availability zones are present in all availability zone-enabled regions.

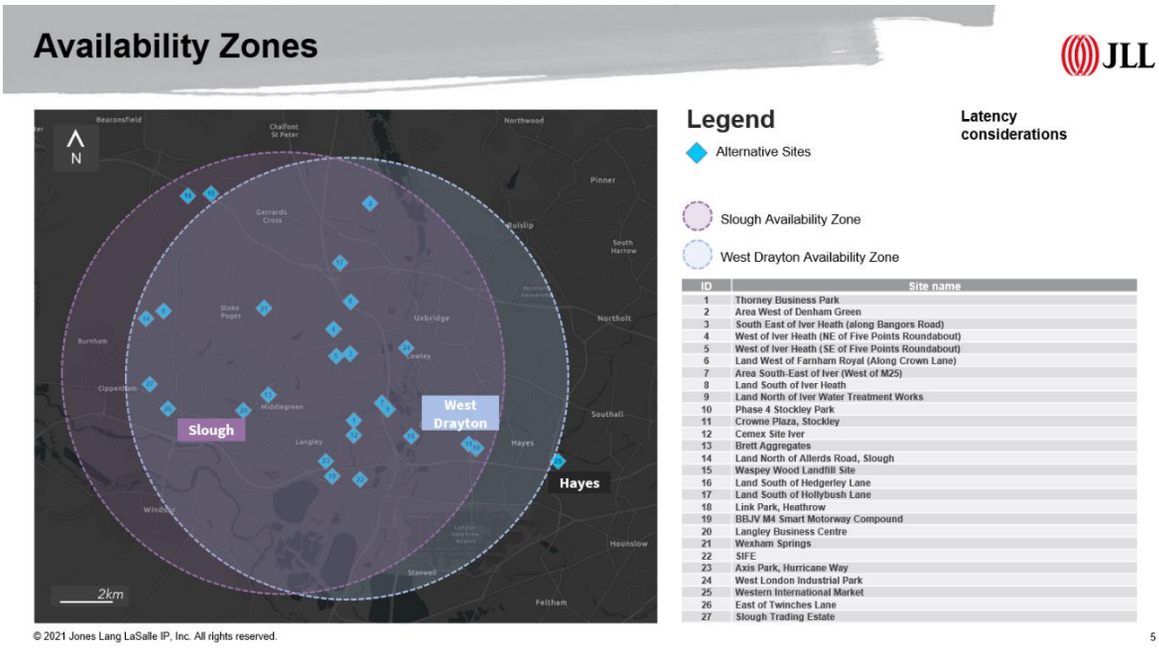
9.12 Availability zones are connected by a high-performance network with a round-trip latency of less than 2ms. They help data stay synchronized and accessible when things go wrong. Each zone is composed of one or more data centres equipped with independent power, cooling, and networking infrastructure. Availability Zones are designed so that if one zone is affected, regional services, capacity, and high availability are supported by the remaining two zones.

9.13 Data centre locations are selected by using rigorous vulnerability risk assessment criteria. This process identifies all significant data centre-specific risks and considers shared risks between availability zones.

9.14 With Availability Zones, you can design and operate applications and databases that automatically transition between zones without interruption. Availability Zones are highly available, fault tolerant, and more scalable than traditional single or multiple data centre infrastructures.

9.15 The selected site at West London Technology Park is ideally situated within the seamless proximity to the existing world class data centre clusters of Slough and Hays/ West Drayton and the substation at Iver makes this site an appropriate location for a Data Centre.

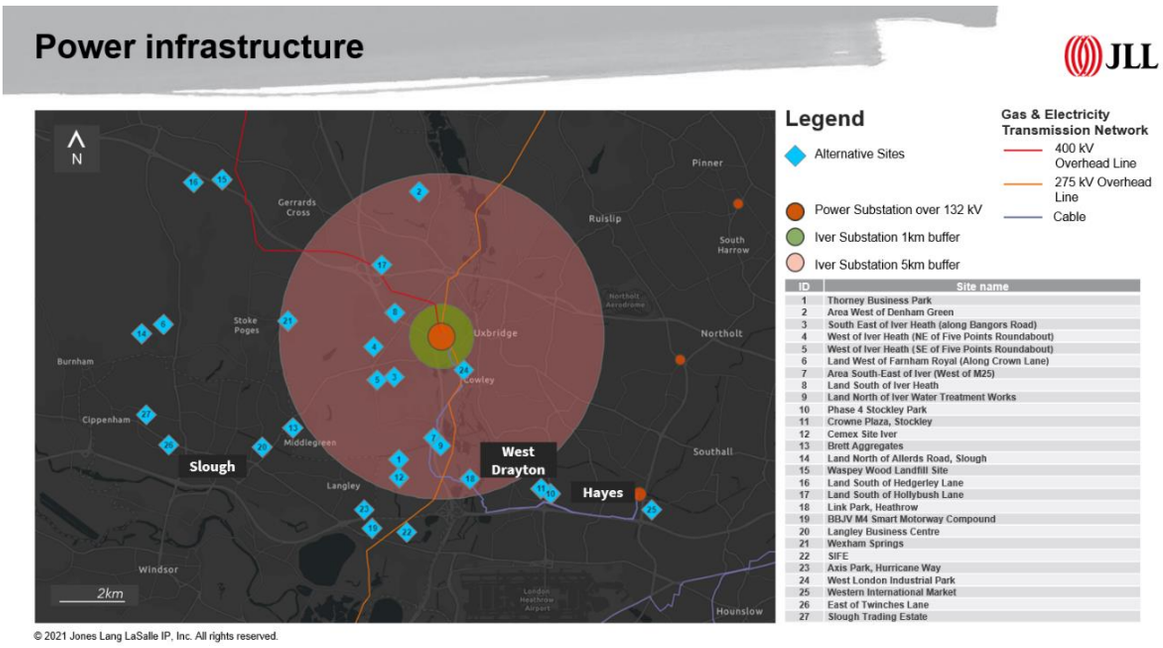
9.16 As discussed in this report, Data Centres exist within Availability Zones to ensure near 100% uptime. In London, there are three established locations. These are Slough, Hayes and London Docklands. This map highlights the Hayes and Slough/West Drayton availability zones which have the greatest number of data centres in the UK and where there is a very significant need to address the continuing demand for increased processing capacity.



9.17 Each of these Availability Zones has the existing necessary infrastructure that enables the efficient development of data centres with interconnectivity to other sites. It is this high speed (zonal configuration) interconnectivity that provides the 100% Availability and integrity of data.

9.18 Data Centres need to coexist within a defined set of physical and technological parameters and therefore, sites which sit in both the Hayes and Slough/West Drayton Availability Zones are best suited to meet the minimum functionality requirements. Data Centres which are located beyond these zones will fail to meet the minimum latency requirement necessary to provide near 100% accessibility to user data.

9.19 Data transfer rate between sites is also a critical consideration, although data travels at the speed of light through a straight piece of glass, the internet does not operate at the speed of light. Therefore, there are limitations to the maximum distance between the different sites (physical / Fibre & Optical distance) is important to avoid problematic latency.



9.20 Furthermore, not only does a site need to meet the physical and geographical parameters for functionality, but also must have access to adequate power. The majority of the grid transports power at 400KV or 275KV. A Data Centre facility typically requires power at 132KV, an output typically only available from a limited number of Grid Supply Point substations in specific locations. One such substation is in Iver and is highlighted in the above map.

9.21 The Iver substation provides the only viable source of power usable by a Data Centre within the relevant Availability Zones. The above map shows the power coverage of the Iver substation, the gas and electricity transmission networks and the land sites that would fall within their reach.

9.22 The closer a site is to these, the greater the security of supply, the lower the environmental impact and the lower the number of agreements required with third party landowners for cable easements. The availability of power today should increase the suitability and priority of this site as an ideal data centre today.

Slough Availability Zone

9.23 A fundamental inalienable factor is the existing data centre critical mass, with the top two primary Data Centre clusters in Slough and West Drayton being within 20km of Iver. This is the historic location of choice for Data Centre investment and location, and this is not going to change. The critical infrastructure, namely power and metropolitan network (back bone) is situated towards the M4 corridor providing a link-route

between London – Data Central – and the International subsea cable landing stations on the west coast of America.

9.24 As with all key national infrastructure (Road, Rail, Airports, Population, River, Port) Data Centres are strategically located in this area. Hence the attraction of this area for digital investment which is underpinning the countries future economic growth. Without this infrastructure at this strategic location the economy will struggle to prosper.

9.25 Considering the pre-requisites for Hyperscale development to take place (Power, Fibre, Proximity, Land) it's clear that Iver is the best location, and this particular site has power available immediately, the proposed development at West London Technology Park offers the opportunity to deliver hyperscale data centre in the immediate term.

9.26 The market demand is live and active today, hyperscale data centre operators who are willing to negotiate commercial terms to acquire the site upon the grant of planning permission to satisfy this Availability Zone.

9.27 It is imperative in the UK national interest that land is made available in the right locations to meet the needs, demands and requirements of the market as this is the location at which the market interest is directed. Without making the right choice it will be difficult to sustain the minimum economic growth the area requires.

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