

Data Centre Strategy in the Digital Enterprise

Why workload location matters

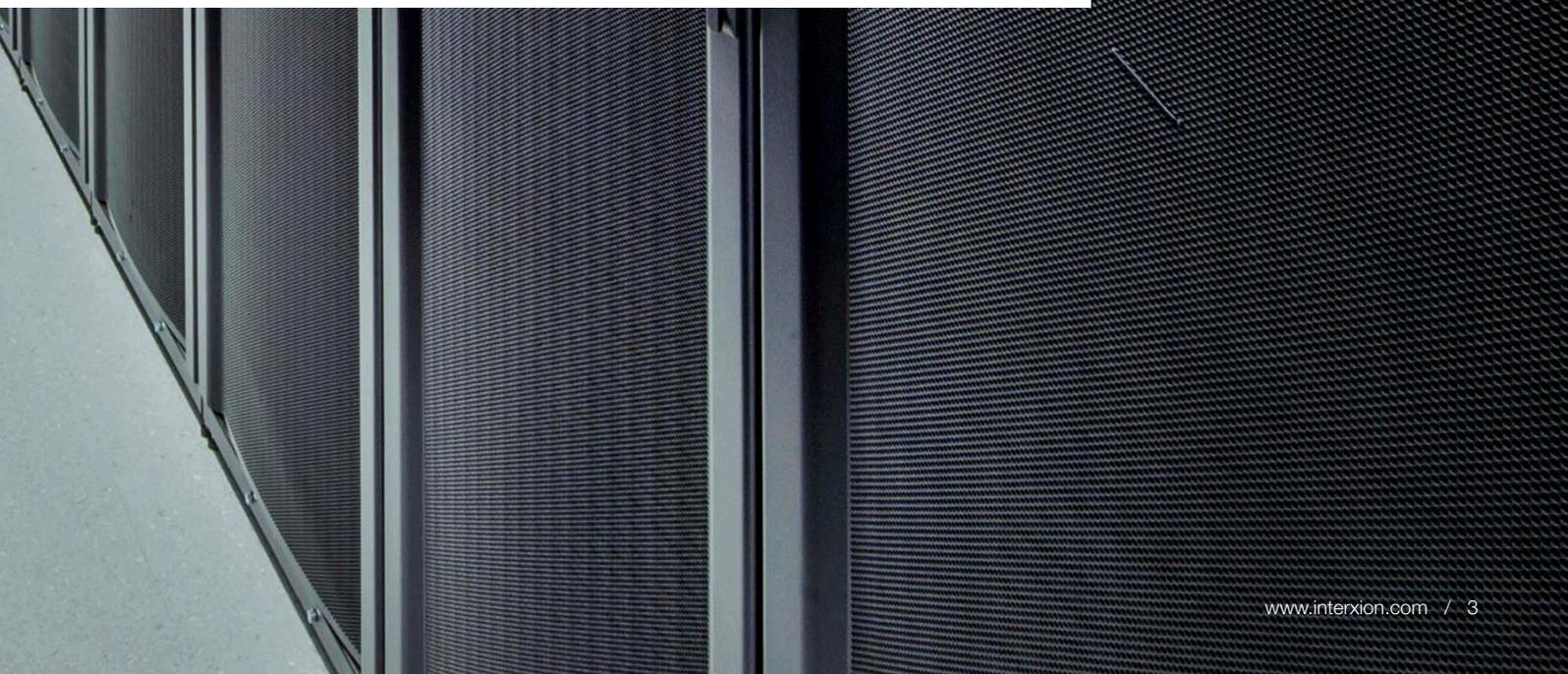




INTRODUCTION

This briefing paper provides IT and business professionals with insights into the impact of the digital transformation on data centre strategies.

In these unprecedented times businesses have had to adapt to remote working models putting pressure on their infrastructure to be powerful and reliable enough to deliver the services and experiences that their customers expect. This adds to growing evidence that placing workloads in colocation centres needs to be a component of the data centre strategy of a Digital Enterprise.





THE JOURNEY TO THE DIGITAL ECONOMY

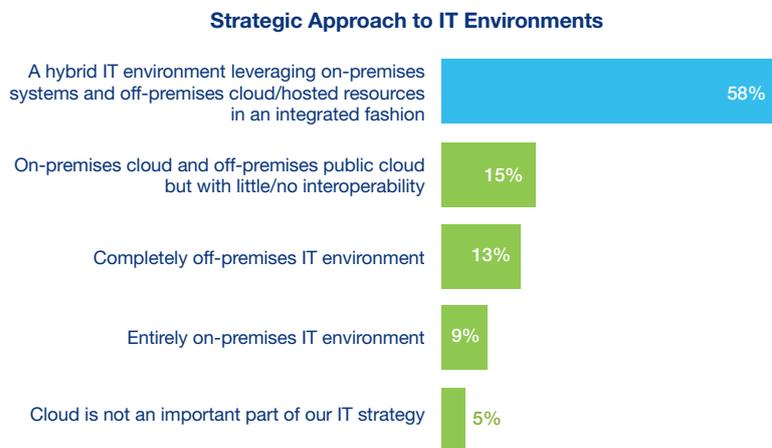
Enterprises across most industries are adopting digital technologies to increase business agility, gain a competitive advantage and enable new business models. The organisations at the forefront of this journey to the digital economy are the **Digital Enterprises**, which are characterised by being **highly interconnected** with their customers, business partners and suppliers, as well as digitising their internal processes and communications.

To facilitate this digital transformation and avoid unnecessary capital expenditure, Digital Enterprises are adopting IT delivery models that are delivering greater agility. As a result, they are increasingly embracing third party IT infrastructure services rather than installing the complete hardware and software stack in on-premise data centres.



A recent survey from 451 Research reveals that 58% of Enterprises are adopting a hybrid IT environment.

Figure 1 - Hybrid IT Now Main Approach



Q. Which of the following best describes your organization's existing or planned IT operating environment? (n=528)
Source: Voice of the Enterprise: Cloud, Hosting & Managed Services, Vendor Evaluations, 2019

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History tells us that the IT delivery strategy of IT organisations does not change overnight. It rather shifts more gradually in waves of IT transformation sparked by events such as cloud adoption, infrastructure refresh, hybrid cloud strategies or consolidation initiatives, capex optimisation efforts and, increasingly, the digital transformation of the enterprise.

All these events have a significant impact on the data centre strategy of an enterprise, but since data centres are increasingly at the heart of the digital economy, it is particularly important to analyse the role that the digital transformation plays in shaping such strategy.

In a Digital Enterprise, IT strategy is inextricably linked to business strategy to an extent never seen before. IT is no longer an enabler, but a core component of the business, as technology drives business value in multiple ways²:

- Enhanced **connections** with customers, employees, partners and suppliers
- Improved **decisions**, based on big data and advanced analytics
- **Automation** of manual tasks, replacing low value-adding labor with technology
- **Innovation** of products and services, business and operating models

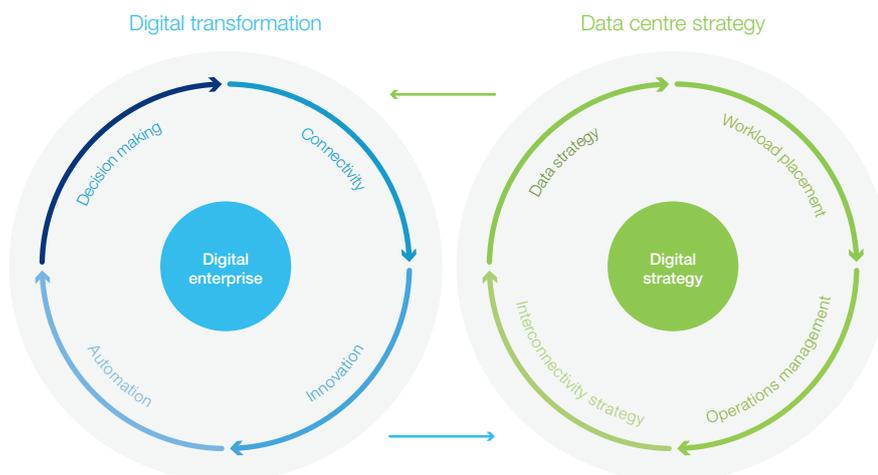
These four elements are becoming the business drivers of any effective digital transformation initiative, and enterprise IT must devise an IT strategy that delivers tangible value against each of them.

The data centre strategy is, in turn, a critical component of the IT strategy and, consequently, it must be closely aligned to the business drivers mentioned above. In the cloud-mobile era, data centres become part of the fabric of the Digital Enterprise, and the data centre strategy is built around the applications that drive the digital transformation initiatives, as illustrated in figure 2.



IT is no longer an enabler, but a core component.

Figure 2 - Interlinking business and data center strategies



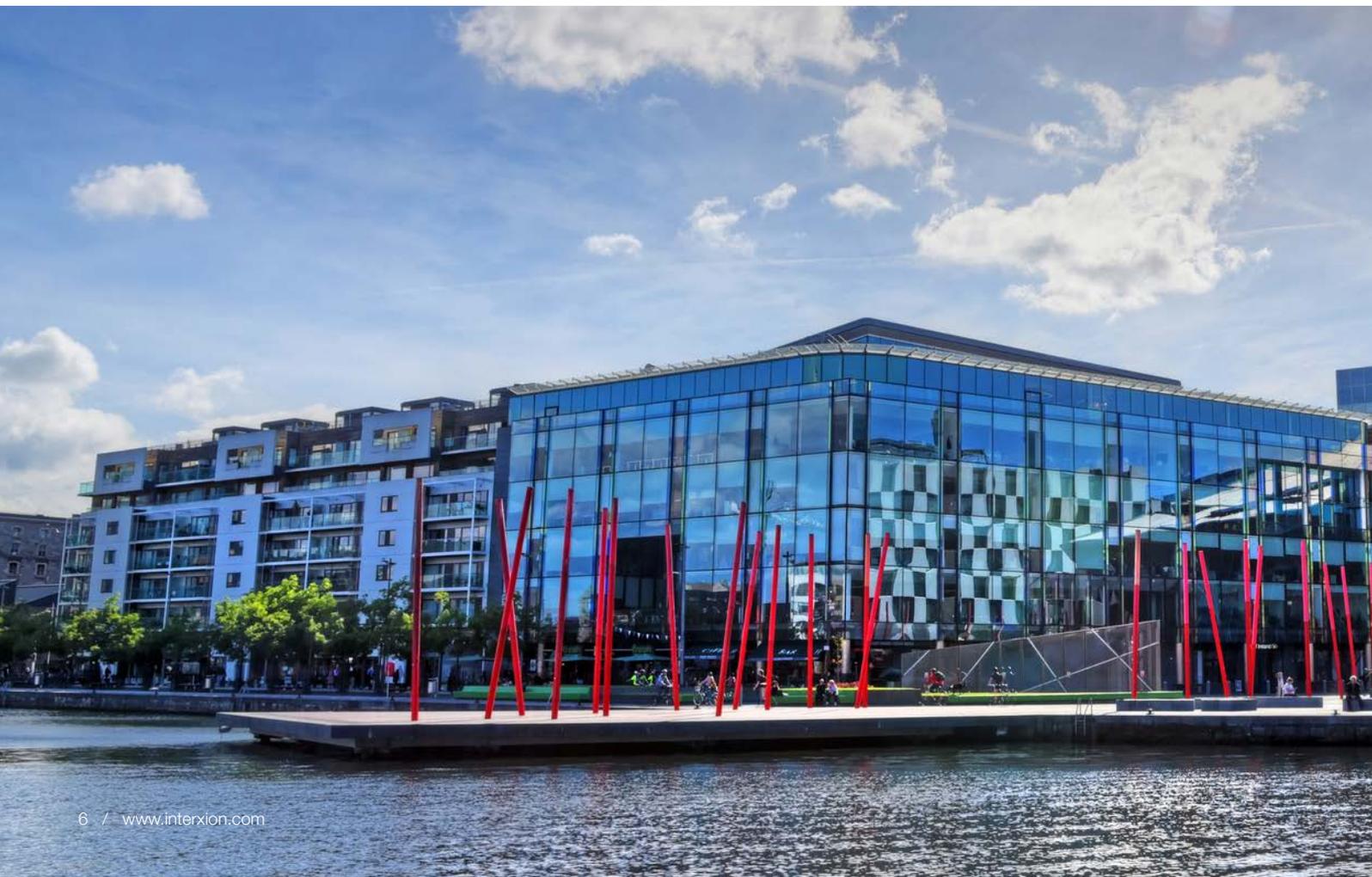
² Finding your digital sweet spot, McKinsey.

A successful data centre strategy places the application strategy firmly at its core, by analysing which applications are key to the enterprise's digital transformation and how they should be enabled by the underlying infrastructure. The key elements in support of the application strategy to consider are:

- **Data Strategy:** which data sets are key to the application strategy and what is the data architecture to optimise the application performance?
- **Interconnectivity Strategy:** how to connect dispersed applications and the associated data in most effective and economically viable way?
- **Workload Placement Strategy:** what is the best data centre location for specific workloads, based on mission-criticality and performance impact on customers?
- **Operations Management Strategy:** what skills, resource and processes are required to manage the applications and the underlying infrastructure in a way that reduces cost and mitigates risks?

Different applications require different answers in each of these four areas, and the IT organisation needs to evaluate the appropriate model to support them. More specifically, they need to look at the requirements of individual workloads³, as these are the units of deployment in an agile IT infrastructure.

³ A workload is the amount of processing that a system has been given to do at a given time. A workload consists of an application interacting with endpoints connected to the application.

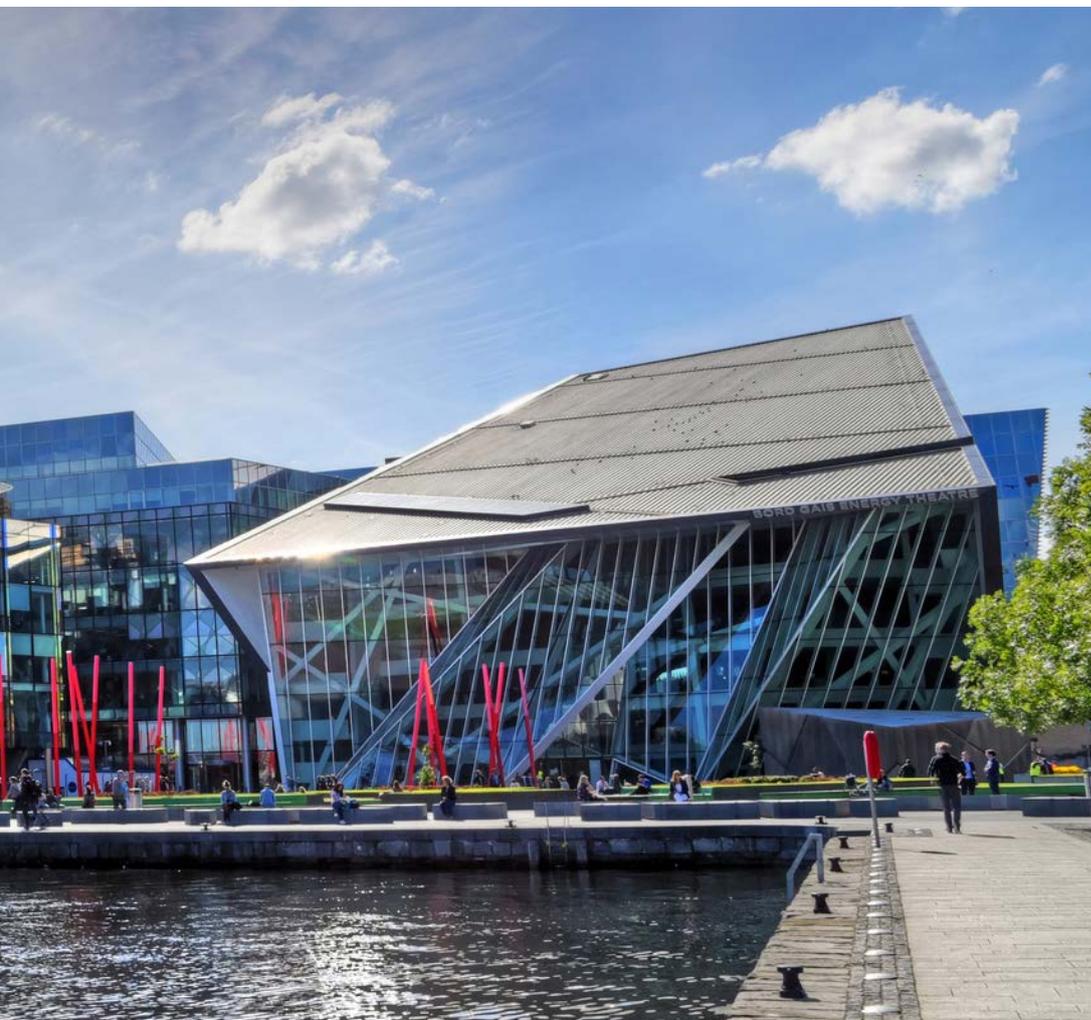


WORKLOAD CLASSIFICATION

There are many effective ways to classify workloads. Microsoft's model⁴ focuses on the criticality scale breaking workloads into 6 categories:

Critical	Description
Mission-critical	Affects the company's mission and might noticeably affect corporate profit-and-loss statements.
Unit-critical	Affects the mission of a specific business unit and its profit-and-loss statements.
High	Might not hinder the mission, but affects high-importance processes. Measurable losses can be quantified in the case of outages.
Medium	Impact on processes is likely. Losses are low or immeasurable, but brand damage or upstream losses are likely.
Low	Impact on business processes isn't measurable. Neither brand damage nor upstream losses are likely. Localised impact on a single team is likely.
Unsupported	No business owner, team, or process that's associated with this workload can justify any investment in the ongoing management of the workload.

⁴ Microsoft: Business criticality in cloud management 2019



In the cloud-mobile era, data centres become part of the fabric of the Digital Enterprise.



Enterprises with a hybrid strategy (combining public and private clouds) grew to 58 percent in 2019 from 51 percent in 2018, while the number of organisations with a strategy of multiple public clouds or multiple private clouds declines slightly.

Source: 2019 RightScale® STATE OF THE CLOUD REPORT From Flexera

Plotting workloads is important to gain an insight into where and how to invest, because each of the four workload categories demands a different approach:

1. **Invent:** Core applications in Dev-Test stage start out as non-mission critical applications, and are typically designed to provide a competitive business edge. Agility to facilitate innovation is the key infrastructure and operations requirement.
2. **Deploy to scale:** When core applications are deployed in a production environment, they become mission critical. As a result, the infrastructure and operations requirement shifts to reliability and performance.
3. **Manage scale:** When mission-critical applications are no longer core and become mainstream (e.g. ERP systems), the infrastructure and operations requirement shifts to efficiency.
4. **Offload:** When context applications are neither mission critical nor core (e.g. email), or cease to be, they can be offloaded to a deployment model suited to the most efficient use of resources (e.g. SaaS).

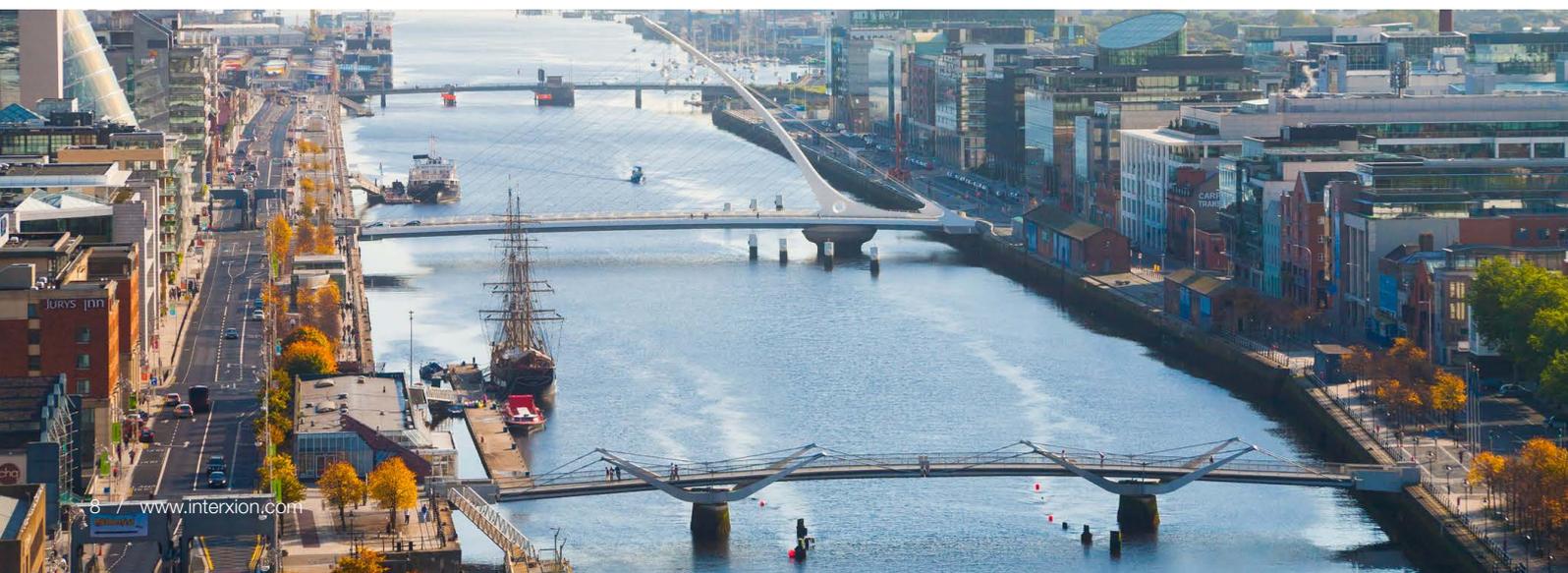
Most mid- or large-sized enterprises have workloads in each of these four categories, and there are no absolutes in terms of preferred deployment models for each of the four categories, as different performance, compliance, data sovereignty and/or customisation requirements apply.

The probable conclusion from a workload classification exercise is that for most enterprises a hybrid IT environment is desirable, as different workloads have different infrastructure and operational requirements. For instance, IT organisations recognise the benefits of deploying non-mission critical applications in the public cloud, but also the need to keep some mission critical applications in a private environment.

In a hybrid model, people, processes and applications are connected to each other, yet sourced from multiple locations and from a variety of providers. This creates at least two new challenges for IT organisations that are on the journey to becoming a Digital Enterprise. Firstly, how to seamlessly and securely interconnect the different public and private IT environments, and, secondly, how to create an agile IT delivery model allowing workloads to shift from one environment to the next or back.

This does require organisations to rethink all components of their data centre strategy, including data, interconnectivity, workload placement, and operations management, which we will examine in turn in the next chapter.

⁵ <https://www.interxion.com/whitepapers/digital-enterprise/>



ELEMENTS OF THE DATA CENTRE STRATEGY

Once workloads have been classified, it is possible to address the key questions arising in each element of the data centre strategy outlined above.

1. Data strategy

Data is the most precious commodity in a Digital Enterprise, as it becomes the currency of the digital economy and permeates every aspect of the digital transformation.

Big data and advanced analytics initiatives provide the foundation to decide what data is important to an enterprise, and how it can be used to drive better business decisions, improve customer experience, mitigate business risks, increase operational efficiency and create a digital value chain with suppliers and business partners.

The applications underpinning the business strategy rely on the associated data sets to deliver an excellent experience to customers and business value to the internal stakeholders. Therefore, a successful digital transformation depends on the creation of a data architecture that provides optimal access to the relevant data in a timely, secure and reliable manner. For applications where response time and performance are paramount, the data architecture needs to support close proximity between a workload and the data that it needs to access. For applications where security is the primary concern, the data architecture needs to provide the adequate access control and data protection mechanisms. For applications where reliability is key, the data architecture needs to support data redundancy and synchronisation to ensure that no data is lost or compromised.

As the term itself indicates, data centres are the places where the data lives, and a successful data centre strategy starts with a deep understanding of what types of data needs to be accessed by the workloads that are served out of a data centre. In a Digital Enterprise supported by a hybrid IT environment, applications are distributed in nature and workloads are dispersed across multiple physical locations. Consequently, data typically needs to be duplicated and synchronised across multiple data centres in order to meet stringent performance requirements and service level agreements.

To support the emerging data architectures that the digital transformation demands, it is paramount to select data centres that meet the highest standards of security, reliability and availability. However, it is equally important to tie the data strategy to the other three elements of the data centre strategy: interconnectivity, workload placement and operations management.



Data is the most precious commodity in a digital enterprise, as it becomes the currency of the digital economy.



Selecting the right colocation centre has become a key enabler to successful digital transformation.

2. Interconnectivity strategy

In a scenario where workloads and data sets are dispersed across different physical locations, a key step towards defining a successful data centre strategy is to address interconnectivity requirements.

Connecting different types of applications and the data sets within those applications, with the associated security, performance and service level requirements is creating a new networking challenge for enterprise IT teams.

Traditional enterprise network architectures relied on a corporate wide area network (WAN) typically designed to connect the company's offices and enterprise data centres. In this model, that is still the norm across most enterprise, the data centre is the hub within the enterprise WAN and hosts most or all private applications and data. This network topology is constructed for an on-premise workload placement strategy, and the role of the WAN is to provide employees access to private workloads, while the Internet is mainly used for non-mission critical applications.

With the emergence of cloud services as an alternative to traditional IT, and with end users accessing mission-critical applications through mobile devices outside the corporate network, this architecture is rapidly becoming obsolete. Enterprises that are embracing a digital transformation are rethinking their networking strategies, as the role of corporate networks is changing. They are orienting their network architecture towards Interconnection Hubs at the edge of the corporate WAN, where they can gain private access to cloud services, and where they can privately and securely exchange traffic with other networks to extend their reach beyond the corporate WAN into customers, business partners and suppliers.

This new approach has profound implications on the workload placement strategy that we will discuss in the next chapter.

3. Workload placement strategy

Workloads should be placed in the physical location (data centre) that provides the best fit with the objectives set within the digital transformation initiative. Basically, there are 3 options for workload placement:

- 1. Enterprise data centre:** a data centre (or server room) controlled (owned and/or operated) by the enterprise IT team.
- 2. Third party, single-tenant data centre:** a data centre controlled (owned and/or operated) by a third party, but dedicated to a single enterprise.
- 3. Third party, multi-tenant data centre:** a data centre controlled (owned and/or operated) by a third party, and shared between multiple organisations.

It is unlikely that a Digital Enterprise will be able to operate high performance applications solely from their traditional enterprise data centres owned and operated by enterprise IT.

Third party, multi-tenant data centres (aka colocation centres) are becoming an increasingly popular option for enterprises embracing digital transformation. Not only because colocation facilities typically are state-of-the-art data centres, but predominantly because they provide the additional benefit of direct access to other organisations located in the same facility. A workload placed in a colocation centre is a short connection away from other organisations' workloads in the same location, simplifying interconnectivity to customers, business partners and/or IT infrastructure providers such as network and cloud providers.

A colocation centre with a high density of network providers is referred to as an Interconnection Hub (as mentioned in the Interconnectivity Strategy section), while a colocation centre that provides access to multiple cloud platforms is referred to as a Cloud Hub.

Since network and cloud providers are rapidly expanding their presence in colocation centres, enterprises can dramatically improve the performance of their applications and reduce the cost of their network infrastructure in these facilities. For instance, an enterprise that serves its customers via mobile applications could benefit from being colocated next to mobile operators, while enterprises that burst their hybrid cloud applications into one or more public clouds benefit from being colocated with their cloud platform(s) of choice.

Additionally, as more and more enterprises chose to deploy their workloads in colocation centres, they are likely to be able to establish private connections to customers, business partners and suppliers. This would allow them to dramatically reduce the complexity and the cost of their interconnectivity strategy. Therefore, a key criterion in the choice of a colocation provider will be the access to the communities of interest that an enterprise can connect to within a colocation centre. The larger the number of customers, suppliers, business partners and service providers that an enterprise can connect to in a colocation centre, the more valuable it will be for them to deploy infrastructure in that location.

Colocation has always been an option for enterprises, but they primarily considered the service when their IT footprint did not justify building their own data centres (or occupying a dedicated third party, single-tenant data centre), or when they needed a dual site for their back up solutions. For Digital Enterprises, gaining access to the right colocation centre becomes the key enabler to achieve a success digital transformation.

On the other hand, a fully informed decision on where to place a workload needs to take into consideration the decision on who manages the IT infrastructure, which is part of the Operations Management Strategy that will be discussed in the next section. This reflects the fact that placement **and IT delivery decisions are becoming increasingly intertwined with the emergence of cloud** computing as an alternative to traditional IT.





A more complex digital enterprise... is more likely to implement a hybrid it delivery model.

4. Operations management strategy

The quality of service delivered by an IT organisation is highly dependent on the quality of the IT operations management. In a Digital Enterprise, it is critical to choose the operational model that best fit each individual application, as different workloads are likely to be placed in different locations.

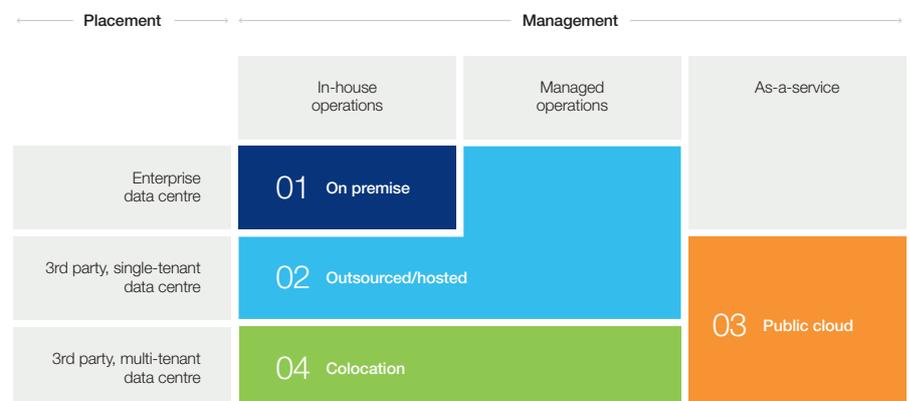
In particular, a decision must be made on which applications should be supported by the internal operations team and which should be supported externally. The spectrum of possible delivery models for IT Operations is fairly complex, but could be summarised into three main options:

1. **In-house Operations:** the internal IT organisation is responsible for the management of IT operations.
2. **Managed Operations** the management of IT operations is outsourced to a third party provider with dedicated personnel in a dedicated environment.
3. **As-a-Service:** the enterprise consumes SaaS, PaaS and IaaS services sourced from public cloud providers, who deliver the services with personnel that manages a shared environment for multiple customers.

The choice of operations management model depends on the workload classification and specific requirements of the organisation. For some companies, especially start-ups, the choice is relatively easy, as they can move to the public cloud outright, through either a single-source public cloud or multi-cloud strategy. However, a more complex Digital Enterprise that has to juggle compliance constraints, performance requirements and legacy applications, is more likely to implement a hybrid IT delivery model, leveraging a combination of the three options above.

If one looks at the combination of operations management and working placement models, the following matrix emerges:

Figure 4 – Four IT delivery strategies



From the perspective of an enterprise having to make decisions related to application performance and cost of networking infrastructure, the matrix translates into four **IT delivery strategies** to consider:

1. **On-premise:** In this strategy, workloads are housed within the enterprise data centre and managed in-house by the enterprise IT team.
2. **Outsourced/hosted:** In this strategy, enterprises may outsource operations management, outsource the data centre operations, or system infrastructure ownership to a third party (other than colocation or public cloud providers) .
3. **Public Cloud:** In this strategy, workloads are managed as-a-service by the cloud service provider, who own the entire application stack and determine the best combination of placement options to deliver the services.
4. **Colocation:** In this strategy, enterprises retain full control of the application as well as operational control of their dedicated space within the data centre (either directly or through a third party service provider). Additionally, if the colocation centre is highly connected, they have access to the communities of interest that are collocated in close proximity.

Since a Digital Enterprise is likely to require a hybrid IT environment, the ability to simultaneously manage a variety of IT delivery models is a key capability to enable the success of the digital transformation initiatives.

Historically, the majority of workloads began their lifecycle on-premise and while some are being migrated to the cloud, the vast majority of legacy applications will remain where they are. On the other hand, in today's mobile and cloud-based world many new workloads are either born in the cloud (SaaS, PaaS or IaaS) or, when more control is required, a private cloud (either managed directly by the enterprise or managed by a third party service provider).

Table 1 - IT Infrastructure delivery characteristics

Features	Description	On-premise	Outsourced	Public Cloud	Colocation
Control and customisation	Level of control over applications and facilities	Very high	High	Low	High
Data localisation	Local data storage	Yes	Yes	No*	Yes
Service levels	Availability SLAs	Case-by-case	Case-by-case	99.9 – 99.999	99.999
Access to networks	National and international carriers	Limited	Limited	Limited	High
	Public peering points (Internet Exchanges)	Not available	Not available	Not available	Yes
Access to clouds	Private connectivity to public cloud platforms**	Remote	Remote	Proximity - single-cloud	Proximity - multi-cloud
	Indicative latency to public cloud platforms	20-40ms	20-40ms	1ms	1-10ms
Access to communities of interest	Proximity of end customers and business partners	Remote	Remote	Remote	On-site

* Some public cloud services are now offering local storage of data. For example, Microsoft has announced a local instance of their Azure cloud in Germany, delivered from local data centres only.

** For example Microsoft ExpressRoute or AWS Direct Connect.



It is crucial for enterprises to select the right IT delivery strategy for each specific application. Workloads and associated data should be placed in the location providing the best fit for their specific performance, risk and cost requirements. Within the four IT infrastructure delivery strategies, colocation is the only one to inherently offer the interconnection features that best serve mission critical, data traffic-intensive workloads.

Colocation, especially at Interconnection Hubs, represents the ideal solution to achieve this interlock, as it allows for a comparable level of control as the on-premise or outsourced model, while offering proximity to multiple cloud platforms and connectivity providers. Such a setup fits the majority of organisations that are embracing a hybrid IT model.

CONCLUSION



Digital Enterprises are increasingly embracing third party infrastructure services as an alternative to traditional IT to drive their digital transformation. As workloads continue to shift, on-premise data centres are shrinking and cloud is doubling. To optimize the effectiveness of this transformation, IT organisations must implement a viable data centre strategy to support different categories of workload.

To optimise the effectiveness of this transformation, IT organisations must implement a viable data centre strategy to support different categories of workload.

Data centre strategy in a hybrid IT environment will be defined by the mission critical, traffic-intensive workloads that rely on public cloud connectivity. This type of workloads are best placed in an environment that provides access to networks and clouds, with low latency and high service levels.

Enterprise data centres were not designed for this purpose. Therefore, as organisations move further into their journey to become a Digital Enterprise, they will need to seek out purpose-built data center environments that provide sufficient levels of interconnectivity to facilitate interactions with customers, business partners and suppliers.

Colocation data centres are the ideal location to enable this digital transformation, with their extensive access to networks, private connections to multiple public clouds, and community of local and international customers, while providing an excellent operational environment.





About Interxion

Interxion: A Digital Realty Company, is a leading provider of carrier- and cloud-neutral data centre services across EMEA. With more than 700 connectivity providers in over 100 data centres across 12 European countries, Interxion has created connected communities of connectivity, cloud and content hubs. As part of Digital Realty, customers now have access to 44 metros across six continents.

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