

Data Center 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 center strategies.

In particular, it argues that, in the cloud-mobile era, workload location matters more than ever and that placing workloads in colocation centers needs to be a component of the data center 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 organizations at the forefront of this journey to the digital economy are the **Digital Enterprises**, which are characterized by being **highly interconnected** with their customers, business partners and suppliers, as well as digitizing 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 centers.

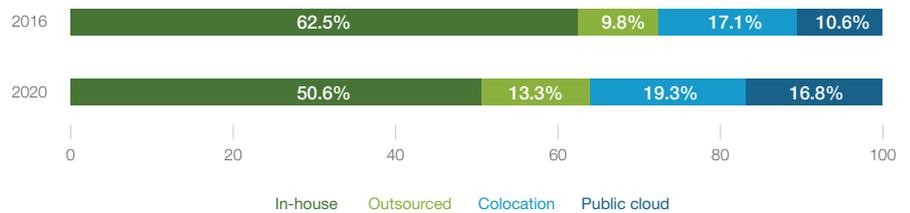
A recent survey from DCD Intelligence reveals that today – 2016 - 63% of IT infrastructure resides in on-premise enterprise data centers. This percentage will drop to 51% by 2020. By that time, on average 17% of IT infrastructure will reside in public clouds, 19% in colocation centers and 13% in outsourced data centers (see Figure 1¹).



Today, in 2016, 63% of IT infrastructure resides in on-premise enterprise data centers. This percentage will drop to 51% by 2020.



Figure 1 - Location and management of IT infrastructure 2016 – 2020 (global, weighted)



Calculated from Census information & DCDi Solutions survey 2016.

¹ **On-premise:** data center owned and operated by an enterprise for its own IT requirements; **Outsourced:** IT capacity or IT services sourced from or hosted with an external provider (other than colocation or public cloud providers). **Colocated:** Footprint hosted in a colocation facility that provides space, power, cooling, connectivity and physical security for housing the server, storage, and networking equipment of clients. **Public cloud:** IT capabilities and services sourced as a service.

The data shows that the IT delivery strategy of IT organizations does not change overnight. It rather shifts more gradually in waves of IT transformation sparked by events such as cloud adoption, infrastructure refresh or consolidation initiatives, capex optimization efforts and, increasingly, the digital transformation of the enterprise.

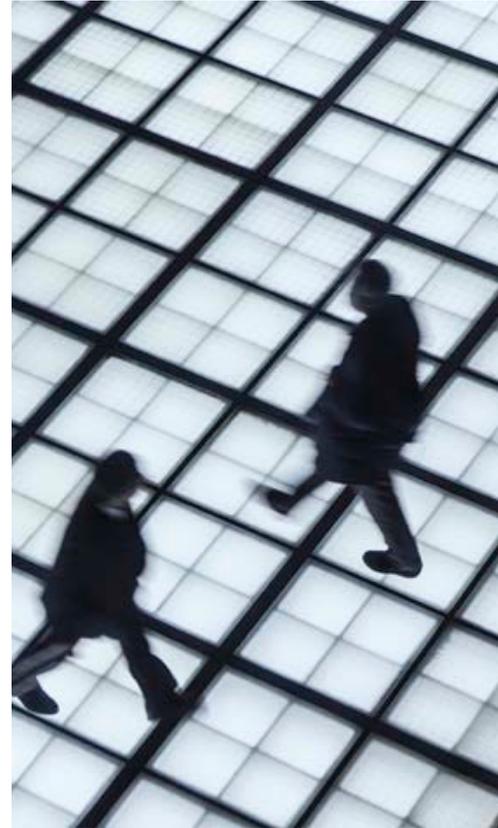
All these events have a significant impact on the data center strategy of an enterprise, but since data centers are increasingly at the heart of the digital economy, it is particularly important to analyze the role that the digital transformation plays in shaping such strategy.

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

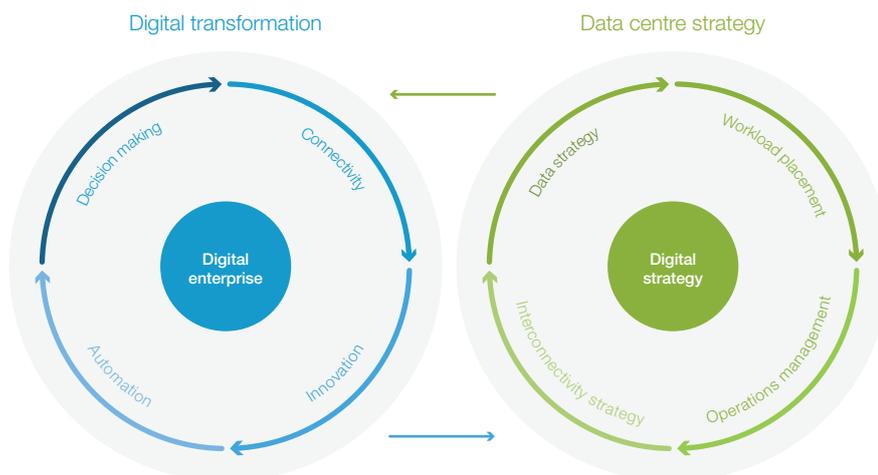
These four elements are becoming the business drivers of any effective digital transformation initiative, and enterprise IT must devise an IT strategy that delivers tangible value against each of them.

The data center 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 centers become part of the fabric of the Digital Enterprise, and the data center 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 November 2013.

A successful data center strategy places the application strategy firmly at its core, by analyzing 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 optimize 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 center 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 organization 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

An effective way to classify workloads, based on Geoffrey Moore's model⁴, is along the following two vectors:

- **Mission-criticality:** is a workload critical to keep the day-to-day business running or is it non-mission critical?
- **Business impact:** does a workload provide a direct competitive advantage (Core) or is it primarily supporting the business operations (Context)?

This can be represented in a two-by-two matrix (see figure 3):

Figure 3 - Workload classification

	Core	Context
Mission critical	Deploy to scale	Manage scale
Non-mission critical	Invert	Offload

⁴ Dealing with Darwin, 2005.



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



15% have already implemented a hybrid solution and a further 37% are planning to in the next two years.

Source: IDC survey of 752 IT decision-makers across Europe, commissioned by Interxion.

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 customization 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 organizations recognize 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. An IDC survey of 752 IT decision-makers across Europe, commissioned by Interxion, found that more than 15% had already implemented a hybrid solution and that a further 37% were planning to in the next two years.⁵

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 organizations 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 organizations to rethink all components of their data center strategy, including data, interconnectivity, workload placement, and operations management, which we will examine in turn in the next chapter.

⁵ [The IDC survey 'digital enterprise whitepaper' URL here](#)



ELEMENTS OF THE DATA CENTER STRATEGY

Once workloads have been classified, it is possible to address the key questions arising in each element of the data center 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 synchronization to ensure that no data is lost or compromised.

As the term itself indicates, data centers are the places where the data lives, and a successful data center 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 center. 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 synchronized across multiple data centers 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 centers 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 center 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 center 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 center 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 centers. In this model, that is still the norm across most enterprise, the data center 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 chapter⁶.

3. Workload placement strategy

Workloads should be placed in the physical location (data center) 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 center:** a data center (or server room) controlled (owned and/or operated) by the enterprise IT team.
- 2. Third party, single-tenant data center:** a data center controlled (owned and/or operated) by a third party, but dedicated to a single enterprise.
- 3. Third party, multi-tenant data center:** a data center controlled (owned and/or operated) by a third party, and shared between multiple organizations.

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

⁶ Additional information on how to leverage colocation to optimize the corporate network can be found in a new Interxion whitepaper on Interconnection Hubs.

Third party, multi-tenant data centers (aka colocation centers) are becoming an increasingly popular option for enterprises embracing digital transformation.

Not only because colocation facilities typically are state-of-the-art data centers, but predominantly because they provide the additional benefit of direct access to other organizations located in the same facility. A workload placed in a colocation center is a short connection away from other organizations' workloads in the same location, simplifying interconnectivity to customers, business partners and/or IT infrastructure providers such as network and cloud providers.

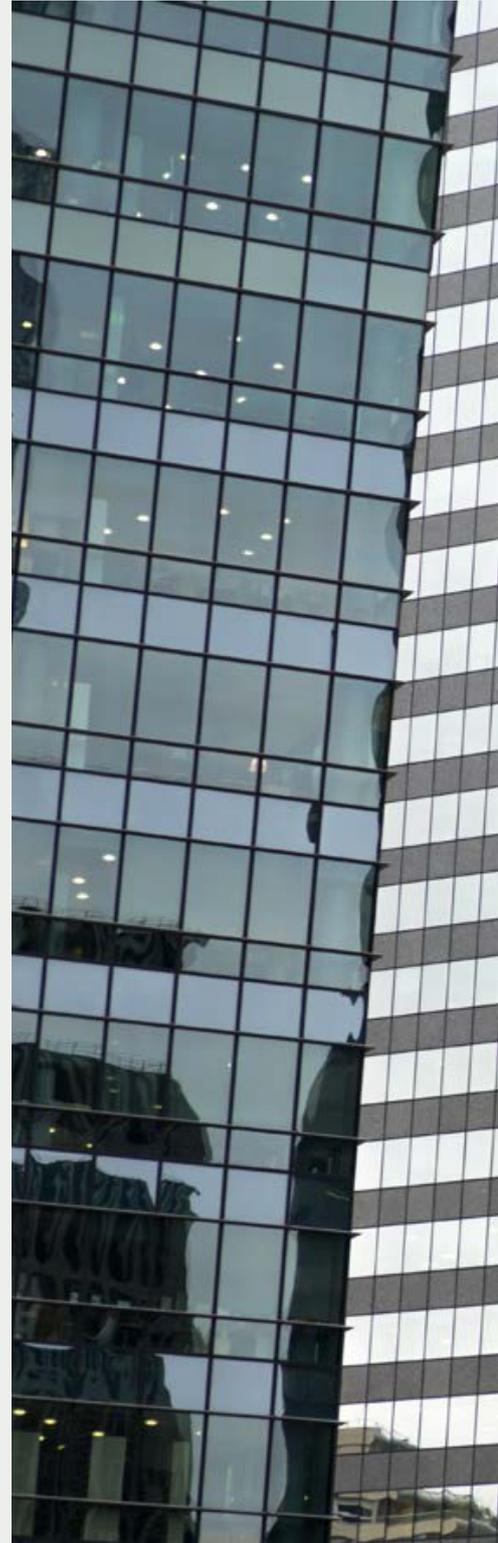
A colocation center with a high density of network providers is referred to as an Interconnection Hub (as mentioned in the Interconnectivity Strategy section), while a colocation center that provides access to multiple cloud platforms is referred to as a Cloud Hub.

Since network and cloud providers are rapidly expanding their presence in colocation centers, 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 centers, 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 center. The larger the number of customers, suppliers, business partners and service providers that an enterprise can connect to in a colocation center, 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 centers (or occupying a dedicated third party, single-tenant data center), or when they needed a dual site for their back up solutions. For Digital Enterprises, gaining access to the right colocation center becomes the key enabler to achieve a successful 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.





4. Operations management strategy

The quality of service delivered by an IT organization 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 summarized into three main options:

1. **In-house Operations:** the internal IT organization 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 organization. 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:

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

Figure 4 – Four IT delivery strategies

	← Placement →	← Management →		
		In-house operations	Managed operations	As-a-service
Enterprise data centre	01 On premise			
3rd party, single-tenant data centre	02 Outsourced/hosted			
3rd party, multi-tenant data centre	04 Colocation			03 Public cloud

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 center and managed in-house by the enterprise IT team.
2. **Outsourced/hosted:** In this strategy, enterprises may outsource operations management, outsource the data center 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 center (either directly or through a third party service provider). Additionally, if the colocation center is highly connected, they have access to the communities of interest that are colocated 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 customization	Level of control over applications and facilities	Very high	High	Low	High
Data localization	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 centers 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-intense 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



By 2020, half of IT infrastructure will reside in colocation environments, outsourced data centers and external clouds.

Digital Enterprises are increasingly embracing third party infrastructure services as an alternative to traditional IT to drive their digital transformation. By 2020, half of IT infrastructure will reside in colocation environments, outsourced data centers and external clouds. To optimise the effectiveness of this transformation, IT organizations must implement a viable data center strategy to support different categories of workload.

Data center strategy in a hybrid IT environment will be defined by the mission critical, traffic-intense 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 centers were not designed for this purpose. Therefore, as organizations 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 centers are the ideal location to enable this digital transformation, with their extensive access to networks, private connections to multiple clouds, and community of local and international customers, while providing an excellent operational environment.



About Interxion

Interxion (NYSE: INXN) is a leading provider of carrier and cloud-neutral colocation data centre services in Europe, serving a wide range of customers through over 40 data centres in 11 European countries. Interxion's uniformly designed, energy efficient data centres offer customers extensive security and uptime for their mission-critical applications. With over 600 connectivity providers, 21 European Internet exchanges, and most leading cloud and digital media platforms across its footprint, Interxion has created connectivity, cloud, content and finance hubs that foster growing customer communities of interest. For more information, please visit www.interxion.com

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