Data Center Digital Transformation

White Paper

Running the data center like a cloud
to maximize capital and operational efficiency.

serverfarm™

Executive Summary

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This white paper offers a perspective on the challenges facing business and IT leaders in the era of digital transformation.

Whether your digital assets are hosted on IT located in an owned and managed facility, spread across private, hybrid or public clouds or completely outsourced to multiple public clouds, the foundation of a successful digital transformation strategy is the data center.

For many enterprise organizations a heritage of investment in data centers is often suboptimal from a capital return and operational efficiency perspective.

As a partner who understands data center capital investment, digital real estate, operational efficiency and IT transformation ServerFarm brings a unique set of capabilities to the market.

This white paper provides guidance on the changing nature of the enterprise data center in the era of cloud and digital transformation. How cloud like flexibility can be brought to owned, third party and cloud data center operations putting the enterprise in control of costs, in a better financial position and laying the foundation for sustainable and successful IT strategies.

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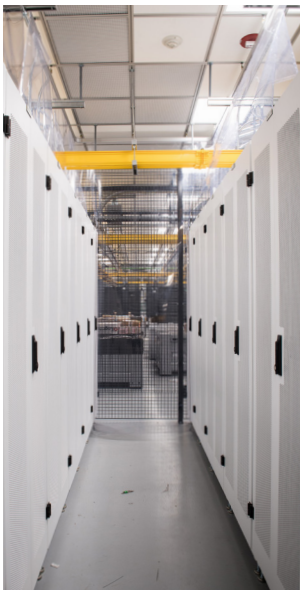
DC operations a business perspective:



The hyperscale companies driving disruption and digital transformation of markets through the power of their data center infrastructure have a granular understanding of their business costs for everything from energy to application delivery.

To compete with web scale disruptors and keep pace with customers in a world of billions of connected devices generating exabytes of data it is access to high performance data center hubs which will be 'table stakes.'

Fully optimized high-performance digital infrastructure as the foundation of new value creation is becoming accepted in boardrooms across a broad spectrum of industries. This is surfacing in b2b and b2b2c players such as telco, traditional media, e-health, mobile and financial services.

But boardrooms lack understanding and visibility on costs and value to formulate the best strategies. The old 80/20 rule that IT could only ever invest 20% on innovation while spending 80% on 'keeping the lights on' has become a good deal more complicated. Taking advantage of newly available, innovative platforms will allow IT to prove its flexibility to meet today's and tomorrow's agile business challenges.

Thanks to colo, clouds and the rise of infrastructure, platform and software as a service (SaaS) today's CIOs face a myriad of choices.

Selecting the right approaches provides opportunities for CIOs to pursue effective cost control and maximize return on investments.

This white paper will address:

- The demand drivers for today's data center investment strategies
- Thriving in new digital economies - the business and technical challenges to understanding cost of goods and new value creation
- The most effective approaches to capital and operational cost and operations efficiency for running data centers and multiple clouds
- The success factors of a flexible partnership-based relationship as the foundation digital transformation

Part 1: Data Demands – The drivers behind the current data center strategy thinking

This section covers: Housing Zettabytes of data. Box 1: How big is a Zettabyte? New infrastructure topologies. How big will the hyperscale data center market get? How big will the public clouds become? How big will your enterprise data center estate be? Sentiment research on attitudes to data center ownership. Complexities and challenges when considering cloud migration

There are a number of mega trends impacting current data center thinking. These include the Zettabyte Era driving demand for space, power and cooling; The availability of instant, almost infinite compute brought about by the rise of the Super Seven cloud hyperscalers; The impact that they are having on the data center industry; The fundamental changes in attitudes to data center ownership within end user enterprises.

Welcome to the Zettabyte

With each forecast the volume of digital data expected to be generated, captured, stored, analyzed and archived outstrips those that came before.

One 2018 figure forecast that by 2025 the world will generate over 163 zettabytes of data. (Source: Seagate.) One zettabyte is one thousand, million, million, million bytes. A single byte being made up of eight binary numeral characters.

The processing, storage, networking, transportation, management and archiving of this vast pool of data is driving demand for well-run physical data center assets.

How Big is a ZETTABYTE?

1 ZB = 1021bytes = 10000000000000000000bytes = 1000 exabytes, = 1 million petabytes, = 1 billion terabytes = 1 trillion gigabytes

In terms of how much of data will move between data centers and from data centers to devices and back over fixed networks annual global IP traffic will reach 3.3 ZB by 2021. In 2016, global IP traffic was 1.2 ZB per year or 96 exabytes (one billion gigabytes) per month. Global IP traffic will increase nearly threefold over the next five years and will have increased 127-fold from 2005 to 2021.

Cisco Global Cloud Index showed IoT has the potential to generate 275 times more data than IP traffic by 2020: 600ZB for IoT vs. 2.3ZB for global IP traffic.
Source: Data Center Knowledge

These figures give some sense of the scale of data the world is about to generate while being a key indicator to data center physical infrastructure that will be required.

The impact of cloud hyperscalers on the data center industry

Physical data center assets will be split between hyperscale facilities, enterprise data centers, and commercial multi-tenant locations. At the same time data center topologies are shifting with centralized hubs connected to thousands of edge data center computing nodes.

The hyperscale end of the market is expected to grow from US$25.08bn in 2017 to US$80.65bn by 2022, at a Compound Annual Growth Rate (CAGR) of 26.32%. One forecast points to 500 hyperscale data centers being in operation around the world by 2025.

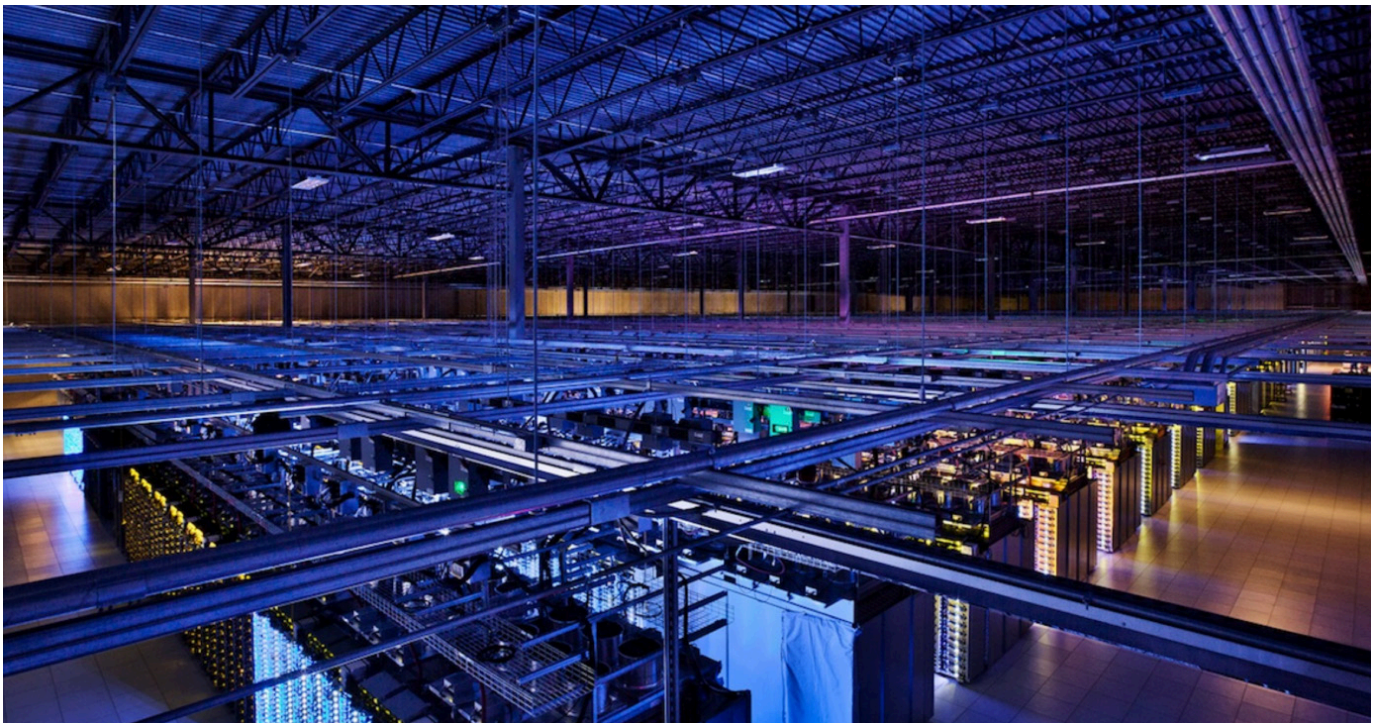
Source: Hyperscale Data Center Market by Solution, Service, End-User, Data Center Size, Industry And Region - Global Forecast to 2022; Transforming Network Infrastructure Industry News, January 31, 2018

Enterprise attitudes to data center ownership

In the broader market space, the 2018 Data Center Survey of 1,000 professionals by AFCOM found 48% reported that their current data centers are between 5,000 and 50,000 sq. ft. About 50% said their data centers will be between 5,000 and 50,000 sq. ft. over the next 12 months. Another 16% stated that their data centers are between 100,000 and 500,000 sq. ft. Looking three years out, 26% that their data centers will be between 100,000 and 500,000 sq. ft.

In terms of data center growth, AFCOM found ownership, renovations, and building were on the upswing. 58% of respondents currently own between two and nine data center facilities. 19% said they own 10 or more data centers. The average number of data centers each organization manages sits around 8.1 today. Responders indicated that on average 5.3 data centers will be renovated by the owning organization. That number increases to 7.8 data centers over the course of 12 months.

In the third data center sector, that of commercial colo, investment continues apace. The global market is estimated to see investment of $31 billion by 2023. In the U.S. alone one forecast estimates over $11 billion will be invested in commercial data center construction over the next three years.



Hyperscale Cloud Data Centers

Even 163 zettabytes and data center numbers don't yet tell the full story. Hyperscale cloud providers such as Microsoft Azure, Google Compute Platform, Amazon Web Services, and Alibaba Cloud make headlines whenever they invest in data centers. Hyperscalers are investing with a view to be the platforms of choice for many enterprise workloads. This helps create a view that public clouds are already data utilities.

Public clouds have some utility like attributes - they can be turned on and off on demand and are pay-per-use for certain services.

The direction of travel seems to be towards a cloud first approach for business, but clouds are not yet a utility for all enterprise business IT needs.

However far the pendulum swings to public cloud for enterprise IT workloads, it has been forecast at 70%, 80% or higher, the final number is probably irrelevant as when it peaks it will account for a significant portion of the $1.6 trillion enterprise IT industry.

At least one analyst believes leading indicators such as shifting IT deliverables point to the enterprise data center as we know it today being dead within 7-10 years. "The role of the traditional data center is being relegated to that of a legacy holding area, dedicated to very specific services than cannot be supported elsewhere, or supporting those systems that are most economically efficient on-premises," says Gartner VP David Cappuccio.

This is clearly a time of great change and enterprises are reassessing their data center and IT strategies. Enterprise organizations look on as hyperscalers appear to be gaining positive reactions from investors with each new facility that is announced. Would an enterprise get a similar investor reaction if it announced data center construction project priced at hundreds of millions of dollars?

- Is the enterprise data center itself dead?
- Will the only market differentiator be the competition on cost and services between the hyperscale cloud providers?

The journey to utility or grid computing is far from over.

Cloud and data center attitudes

Some attitudes on how data centers are viewed was revealed in the results of a U.S. survey carried out by ServerFarm partner company CBRE. This focused on how the sentiment towards the sector and data centers as investments is changing:
In its 2018 Sentiment Survey of U.S. senior management, CBRE found:

- 75% of occupier executives ranked lack of knowledge/experience in space as their biggest obstacle when forecasting data center needs.
- 55% of data center occupiers selected changing business requirements as their largest forecasting obstacle for their future IT needs.
- 57% of end users and occupiers report that their biggest data center industry concern is the total cost of ownership.
- 78% of respondents predict that they will move some or all their IT to the cloud over the next 5 years.

Source: Data Center Solutions 2018 Sentiment Survey: Building Advantage in New Territory; CBRE

Whatever the use case or business case for a non-specialist company continuing to own and operate a data center fleet a combination of factors is changing attitudes to ownership and operation.
For those enterprises with significant IT operations there are certainly challenges. The changing nature of IT workloads, the demand for responsiveness, the reluctance to invest in underutilized depreciating IT and data center assets, accessing the right skills. These present a range of complex issues. For those with traditional responsibility for data center and IT delivery the role of the CIO-led IT department is transitioning to becoming more focused on application delivery and less about infrastructure provision and management.
Yet, any CIO with a legacy of investment knows it is too simplistic to believe that the many applications on which organizations run today can be simply 'moved to the cloud.'

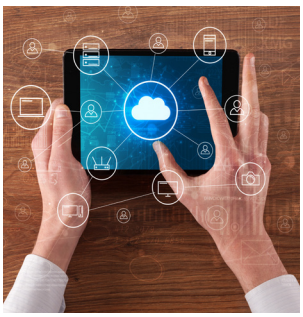
Even if one accepts that the public or hybrid cloud hosted on hyperscale platforms is the destination for all enterprise workloads, the real competition is in the journey through the transition.
Large enterprises face complex considerations and are looking for innovative approaches to meet their capital and operational needs.
The converging forces of increased demand, new technologies, available and scalable public cloud IT (in the past IT always planned for scarcity but now it can plan for limitless abundance) are causing a re-evaluation of the ownership and operation of enterprise data centers.
Enterprises often have 30 plus years of sunk capital in physical data center assets and this isn't about to be shut down and written off.

Part 2: New Technologies and New Disruptions set to cause more disruption and add more complexity to data center decisions – and the solutions available

This section covers: Focus on applications. Complexity and Cost. Box 2: The CIO 2019 Playbook. Box 3: Questions that CIOs are asking. Cloud migration considerations where there is no one size to fit all. How utilizing existing assets is key to digital transformation. How the multi-tenant data center business has changed

Understanding the costs and value creation of application driven data center operations across On Prem, Multi-Tenant and Multi Cloud

Becoming application-focused



The business wants IT to be closer to the application and for the management of the infrastructure assets to be automated and efficiently provisioned.

Business requires greater cost transparency – especially in an era of hybrid and multi-cloud solutions. Managing complexity is the requirement. Gaining visibility to available options is the solution.

Being application driven is at the top every CIO agenda. For many CIOs the objective is to be someone 'that doesn't own any servers.' That means examining all options when considering everything from the data center shell to multiple clouds. Whether IT resides in a cloud as a service, in a hybrid mix of the physical data center and cloud-based service or wholly physically within an owned or leased data center asset, the heart of the question is: How much will it cost to run over time?

Enterprises face choices. A major choice is determining which application belongs where.

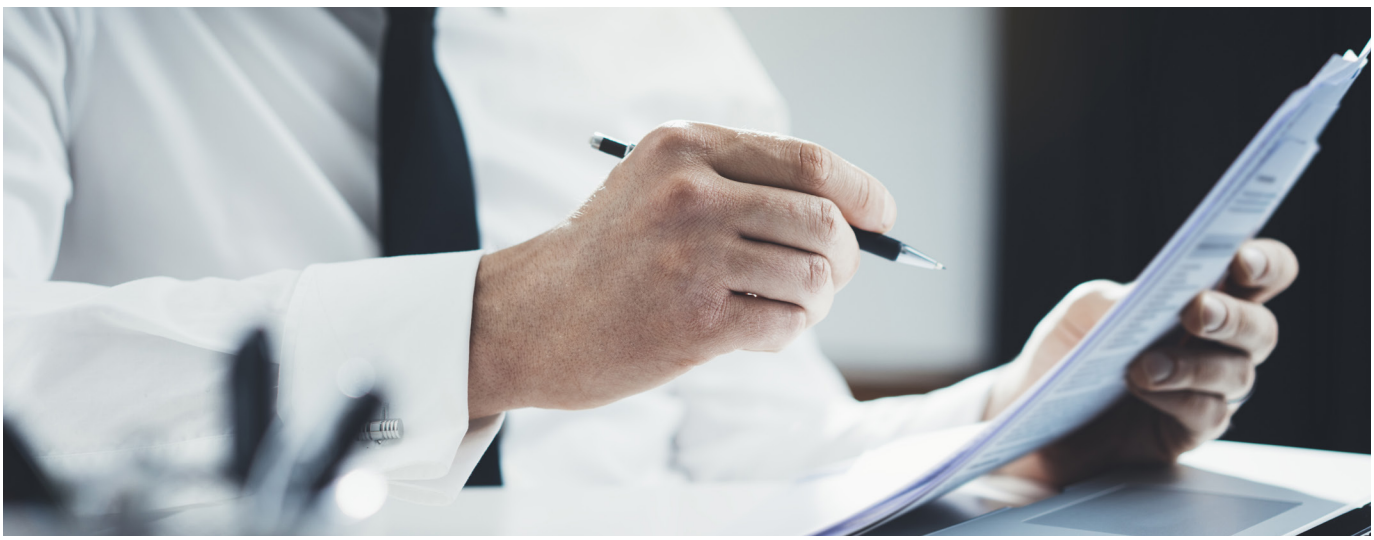
One question that needs to be answered is how the criticality of the workload is matched to the correct physical infrastructure, which offers the right level of availability, resilience, performance, headroom, and cost, preferably with the added agility to migrate when necessary.

For most, this is not a binary question of whether all IT will be in the cloud and all other data center operations must cease. It is not a zero-sum game. We are in the time of multi-cloud where one size does not fit all requirements. In these massively distributed environments, the management of many different cloud suppliers, each with its own proprietary APIs, databases, connectivity requirements, terms and conditions could prove cumbersome.

Without a disciplined approach that starts in the right place, a multi-cloud strategy threatens to add layers of complexity with the potential for driving up total cost of ownership.

The 2019 CIO Playbook

A 2019 checklist for CIOs/CTOs/I+O may contain at least some of the following:
i. End of life and decommission 25 yr old data centers
ii. Migrate workloads to existing on premise facilities
iii. Migrate workloads to private cloud hosted in a combination of commercial colo and on-prem
iv. Migrate workloads to public clouds
v. Audit, classify and shut down or migrate away from public clouds all workloads spun up in last ten years not providing value
vi. Establish a flexible cloud and data center strategy where resilience, availability, performance of infrastructure (5 nines, N+1, N+N) matches the criticality of the application or workload – and can provide the agility needed to respond to changing business needs
vii. Create flexibility so workloads can migrate seamlessly between on-prem, private, public and hybrid cloud (multi-cloud)
viii. Realize capital efficiency by divesting under used data centers
ix. Plan cost effective capacity headroom for all current enterprise workloads (10 years)
x. Plan cost effective infrastructure capacity headroom for all new workloads, IoT, Video Content, AI and Machine Learning (10 years)
xi. Manage and reduce costs



Cloud migration Considerations Solutions and Discussion Points

There are many reasons why wholesale migrations of entire back end IT and data center operations to the cloud are rare. Given the legacy of 30-40 years of enterprise applications, proprietary operating systems and Unix based servers, mini and mainframe computers still in use, it would require a migration of vast proportions.
Workload and application considerations include:

- What is classified as mission critical?
- What is unsuitable for migration?
- What is subject to regulatory control?

For those with legacy hardware, software infrastructure and applications that are reaching end of life the first consideration is what happens to my existing data centers?

Without a ‘one size fits all cloud’ what choices are there?

As CIOs consider their journey to the cloud, whatever happens to existing assets can become the foundation stone of a successful strategy.

Where an owner-occupied data center is in play, the first step to a successful digital transformation is understanding the options available for gaining the maximum return on capital already deployed.

Begin by gaining a granular understanding of the assets under ownership or management. This will provide the basis for managing the data center as a cloud. This cloudifying of the data center will provide choices of what, when and how to migrate workloads to preferred cloud destinations as part of the digital transformation strategy when it best suits the needs of the business.

In the quest to secure capacity, enterprise companies have requirements that go beyond being locked in to simply signing multi-year multi megawatt deals.

If a data center is underutilized and has stranded capacity available, it is possible to achieve a positive business outcome that goes beyond the traditional sale leaseback.

It is important to understand changes that are happening in the colocation market. Innovative large-scale colocation players with multiple sites have evolved away from customer engagement based on either/or definitions of wholesale and retail.

Questions That CIOs Are Asking

Can the organization get better value from data center and IT investments?

Is hyperscale cloud driving down the price points in the data center? Can I benefit? If so, over what time frame? What are the key factors? How can cloud/s TCO be measured?

Can an agile approach be found for allocating resources for applications?

What are the key considerations – criticality to cost?

If I opt for cloud how simple is it to migrate to the cloud

How easy to migrate back?

In the cloud – is it sensible to simply land and expand?

What does my cost base look like in five years?

How could I run my IT business on a cloud?

The industry has responded to the need for flexibility

Companies such as ServerFarm are driving these changes in response to customer needs. This desire to share the risk is relatively new. Instead of picking one model of forecasting a requirement for three, five or ten years, companies want shorter more focused engagements with the option to expand in response to internal demands and market conditions

In today's highly competitive data center market, with more and more capacity coming online, truly progressive colocation suppliers have developed flexible business models in response to shifting customer expectations based on where they are in their journey to the cloud. A cloud migration strategy will not happen overnight and could be a three, five or even ten-year project.

Ask what type of relationship can take your organization on a ten-year journey?

- One based on value?
- One based on transparency versus one based on opacity?
- One based on partnership?
- One based on shared objectives?
- One based on mutual benefits?

Part 3: ServerFarm's unique approach to relationship building for shared digital transformation objectives and outcomes

This section covers: Contracts, collaboration and creativity. How ServerFarm has developed data center business and engagement models that propel digital transformations. ServerFarm's unique approach to creating business value from existing assets, maximizing CapEx and OpEx efficiency, optimizing colo and cloud use. Partner based relationships with shared objectives; Agile contracts and engagement; Agile services; Flexible management.

Total cost of ownership (TCO) concerns can be addressed through informed understanding and insight into how the data center sector operates.
Any failure to address the key TCO issues could push buyers into bad practice where the focus is on fear of failure and not on creating a value-based relationship.
A client who is unsure about the technologies and contractual responsibilities is more likely to embark on a wrong approach to squeeze every piece of fiscal return from a contract.
The same could often be said for supplier behavior. When treated like a sweat shop production line, a supplier is less likely to offer anything beyond what's contractually enforceable. When treated like a cash cow to whom every action is billable, and costs only ever rise, a client has every right to respond in kind.
People find it hard to have an emotional investment when their feet are held against the fire each month. Instead, an approach that builds on trust and mutually beneficial objectives is more likely to succeed. The emphasis should be on measuring value creation and outcomes – not line items such as another cross connect with automatic annual subscription renewal.
In the data center sector, the management of customer relationships has never been more important. For long-term return on value, it is crucial to create a partnership of shared objectives.

Agile contracts

Contracts are important for key objectives and should be detailed enough to be clear about services provided and where responsibility and accountability between the firm and its provider begin and end.
But in a fast-moving environment driven by technological change writing a fat contract is not a panacea. When flexibility is required this can be a hindrance. Agile contracts can embed trust as part of the deal. Big centralized contracts written in faraway offices with enforcement as a watchword won't provide agility. Separated as they are from the day-to-day operations, it instills behavior where partners are disenfranchised from forming relationships and collaboration. It pushes decision making based on cost and fear.

If both sides engage properly the supplier and the client gain mutual understanding of where each business is trying to get to. Contracts should be managed as locally as possible. They should be based on outcomes. Those who act locally know what's happening and provide appropriate responses.

Measurement is vital. By focusing on key measurable metrics, value can be applied when dealing with change.

- Ask if your supplier is set up for this?
- Are sales teams measured purely on increased revenue per customer?
- Is everything based on a time and materials approach?

As noted in the previous section, it is in the flexibility of the engagement that positive outcomes are found. There are many proof points for this.

For example, data center customers who operate at scale will in many instances take down large blocks of data center space and power. This could be defined as classically wholesale. Afterwards, they will want to add smaller blocks in a flexible manner which could be defined as retail deals.

Flexible and agile deal structures

To provide an example. A client engages a sale and leaseback contract and moves ownership and operating responsibility to ServerFarm. This monetizes stranded capacity and frees up capital.

As part of the deal structure the asset will convert from being owner occupied by a single user to becoming a commercial colocation facility. As the transition from a single-user data center to a multi-tenant data center is executed, a flexible contract will ensure room for expansion for the original owner.

It will always vary on a case by case basis but for example, a base requirement might be for a five- or ten-year deal for a certain amount of power and space provided on a wholesale basis. But where the customer is forced to forecast demand and then must commit to it, this is inflexible. It is better that customers are provided with more flexible solutions that reflect not simply what they want but when and how they believe they will need data center capacity. And equally important is that they are not penalized when they need to change those options.

It is not a case of a supplier saying, "What are your requirements? Here's what we have, take it or leave it." It is a case of "tell us your needs and we'll build solutions to meet them."

ServerFarm will build in flexibility around a multi-year deal that allows the customer to up or downsize based on the customer strategy (and how easily it can be executed.)

As described above, at a time of rapid digital transformation, when looking out three or five years an organization may today only have a partial view on its evolving edge requirement, or the volume of data generated by its AI strategy. A flexible approach around the deal structure could accommodate this.

If a customer is undergoing a strategic transformation which involves consolidating IT, moving workloads to the cloud and deploying new technologies and their progress is slower than forecast, they should not be penalized for that.

Flexible management

This is a partnership-based approach and it provides a huge amount of reassurance because customers will not have to 'crystal ball' gaze and look 3 to 5-years out or create hostages to fortune.
The flexibility is in-built to the contract and services to ensure customers do not suffer financially while retaining the headroom to expand as and when necessary.
This approach to cloudifying the physical asset and making DC and IT infrastructure available on an as needed basis is unique to ServerFarm.

Conclusion

Whether your destination is the digital transformation of B2B relationships and partnerships across the supply chain or meeting the needs of technology rich digitally native consumers what is clear is that Digital Transformation will be a multi-year journey for enterprise IT.
Workloads will live on multiple platforms including in existing data centers. Continuing to operate a 25-year data center asset without a clear understanding of the technology it will host going forward is no longer a viable data center strategy. Yet not everything can move to the cloud immediately. Companies with owner managed data centers should explore the options available to commercializing their assets through sale leaseback to free up capital, maximize use and deliver the digital transformation which adds real value to the business.
Make it a 2019 business priority.

ServerFarm holds a unique position as a commercial data center operator with many years of experience in the property, I+O efficiency and enterprise IT markets delivering data center strategies to global enterprises.
Speak with ServerFarm about how to put the data center at the heart of your Digital Transformation Strategy.
Contact:

About ServerFarm

ServerFarm is a global expert in data center real estate and operations. Our mission is to maximize data center and IT infrastructure efficiencies by providing a holistic approach to building, integrating and managing data center environment and IT deployments. Through our innovative InCommand Services, we provide customers with staffing, training, workflows and a data center portal that provide unprecedented process consistency, knowledge management, and KPIs to regulate IT infrastructure.

With more than 17 years in the industry, ServerFarm delivers complete data center oversight from facility to IT infrastructure management, which enables our customers to concentrate on growing their businesses.

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