Digital Cloud and the Data Center: Repatriation and Understanding the Emerging Balance

A LOOK AT REPATRIATION TRENDS, IMPACTS ON DIGITAL INFRASTRUCTURE, AND A NEW UNDERSTANDING OF DATA CENTER DEPLOYMENTS
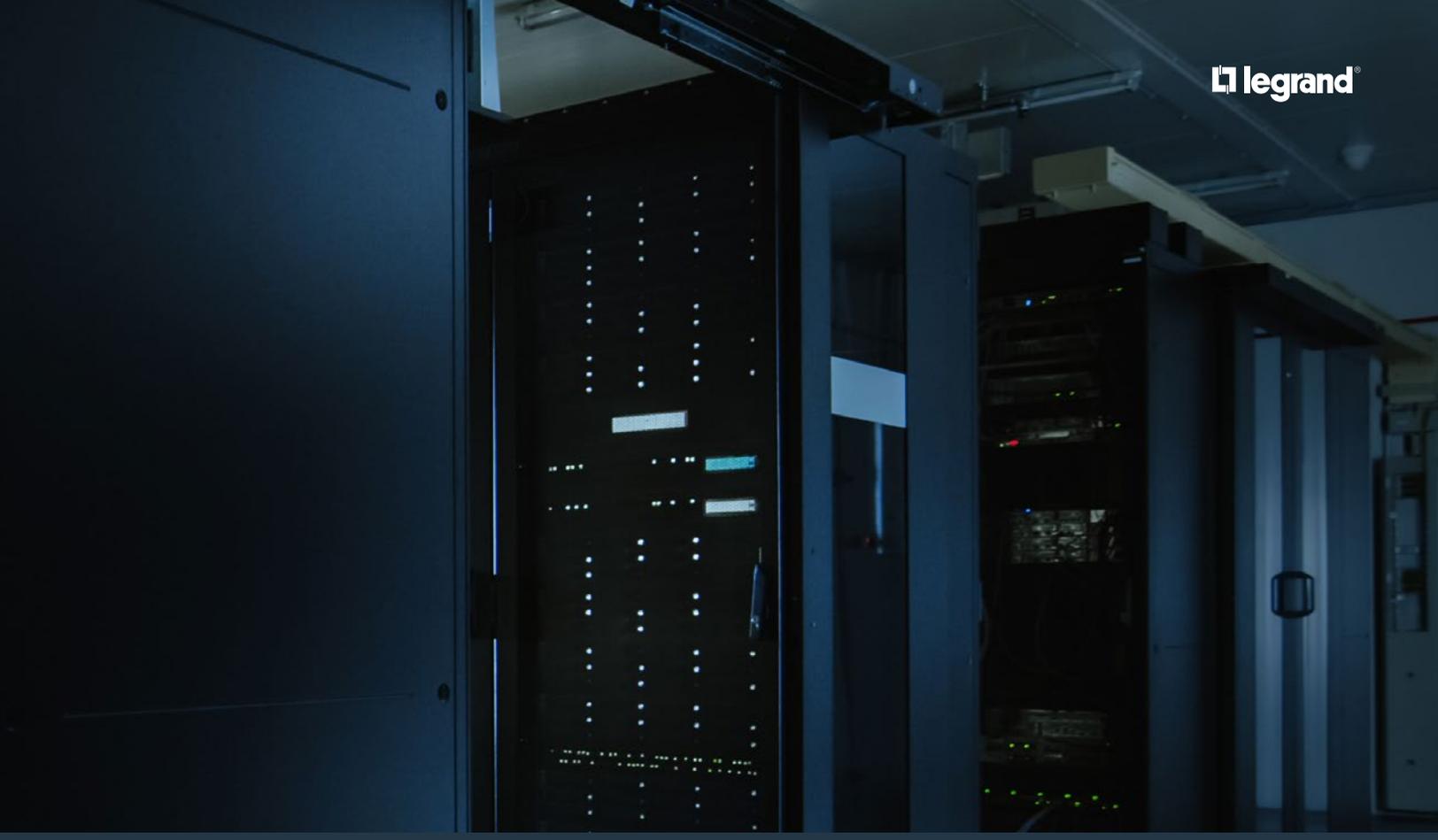
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EXECUTIVE SUMMARY

In a 2016 report, the Lawrence Berkeley National Laboratory estimated that if 80% of servers in small US data centers were moved over to hyperscale facilities, this would result in a [25% drop in energy use](#).

That move is underway. Today, the world has between [600 and 700 hyperscale data centers](#), many of them mopping up services for small corporations or universities that would have previously had their own servers.

But it's not just smaller data centers and legacy facilities that are going away. We also see fundamental shifts away from some public cloud services. The latest AFCOM State of the Data Center Report indicates that 58% of respondents indicate efforts around cloud repatriation and a shift away from public cloud options. It's not the first time this report has revealed this trend. It's important to note that no, the data center isn't about replacing the cloud. However, there is a new balance between cloud workloads and data center deployments. It's this balance that's helping leaders in the technology space better utilize their digital infrastructure and how (and where) they deploy critical workloads.

This paper will explore why this is happening and how leaders should plan around cloud, data center solutions, and their future.

INTRODUCTION

We are a connected world constantly consuming more data, new applications, and more resources. Because of these emerging digital trends, there has been substantial growth in the data center sector. A new report from Fortune Business Insights indicates that the global demand for more efficient IT technologies combined with the economic advantages of modern, consolidated connectivity applications has contributed to the exponential rise in data centers' scale and power. As the report points out, the global data center infrastructure market size is projected to reach $142.31 billion by 2027, compared to 2019, when the global market value stood at $94.56 billion.

All of this growth translates to more providers driving new supply. A recent CBRE study indicates that the US wholesale data center primary markets—Atlanta, Chicago, Dallas/Ft. Worth, New York Tri-State, Northern Virginia, Phoenix, and Silicon Valley—accounted for more than 56% of the record annual absorption in 2018. New deliveries increased these primary markets' total data center inventory by 17.3% in 2019, increasing the competition among specific markets in 2020.

"The ever-increasing need for data exchange, storage, and security is broadening demand for data centers in the US, but one solution does not fit all," remarked Pat Lynch, managing director of Data Center Solutions at CBRE, in a statement. "Capital and operating costs vary considerably by market, and non-monetary factors such as proximity to a headquarters location, fiber density, and environmental and other risk factors can also drive enterprise site selection decisions."

Expanding utilization of data centers by companies amid the Covid-19 pandemic further fueled this market's growth and the importance of agile businesses in the online space. Furthermore, the rapidly evolving competitiveness in the global market and advanced technologies, such as cloud computing and big data, has made it **simpler and cheaper for enterprises to shift their workload to colocation, self-contained, or hyperscale data centers.**

It's this specific trend that we'll explore in this paper. Specifically, how cloud and workload repatriation is impacting data center design and planning and what leaders should do to broaden their perspectives on cloud computing and data center operations.

To gain a better understanding of how cloud and data center leaders are evolving their operational models, we'll examine the following:

- Critical trends around today's cloud and data center market
- Data centers, before cloud and after cloud
- Understanding the hyperscale shift (and why it's a really good thing!)
- The partners that are shaping the cloud and data center balance

MODERN CLOUD MODELS AND USE-CASES

In 2012, the amount of digital data in the world first exceeded a zettabyte; that's a trillion Gigabytes of information. Today, with even more data being created, new applications being deployed, connected devices being added, and even further reliance on our data center ecosystems, leaders in the technology space are always looking for ways to differentiate themselves in a digital market. In comes cloud computing, hoping to solve all of the major challenges organizations from all verticals and industries were experiencing.

But the cloud didn't help everyone.

Many organizations pulled back from the cloud during a big push around infrastructure and digital repatriation.

Before we get into this topic, it's essential to look at cloud computing and the various models.

DEFINING CLOUD MODELS
Back in the day of traditional compute, it was pretty simple: one server carried one workload.

However, with increasing server resource capacity and virtualization, multiple workloads per physical server are typical in the cloud and virtualized architectures. Cloud economics, including server cost, resiliency, scalability, and product lifespan, along with enhancements in cloud security, are promoting migration of workloads across servers, both inside the data center and across data centers (even data centers in different geographic areas).

All of this has created a big market desire for different types of cloud and data center services.

To better understand the various compute and hosting models that are out there, let's examine some of the more popular offerings in the market today:

- *Private clouds.* Think of this as your very own data center environment. You don't have anything hosted at a traditional cloud facility, and you pretty much own all of your assets. For those organizations that want to keep their hardware locally managed, private cloud architecture is a great option. For example, an application that can only run on-premise. Or data sovereignty requirements. However, even in private cloud design, users can still have access to these applications and services. This access is often delivered via a secure portal and can be accessed from any device, anytime and anywhere. Access is securely provided both internally and externally. To have a private cloud, you don't necessarily need to own a data center. You can still use colocation or outsource to a data center managed services partner.

- ***NEW: Privatized hybrid clouds.*** This is a new cloud concept that's impacting many data center ecosystems in the market today. Think Oracle Exadata, AzureStack, AWS Outposts, and Google Anthos as good examples. The trend to create this type of cloud architecture results from organizations pulling away from public cloud services for various reasons. This could be latency issues, cost, deployment challenges, and even scale. So, to combat the loss of some

of these customers, large public cloud providers are happy to place a piece of their physical infrastructure right into your data center. AWS Outposts comes as a managed service that effectively extends the AWS infrastructure. This includes AWS services, APIs, and tools to any data center, colocation space, or on-premises facility for a consistent hybrid experience.
In this scenario, you can run Amazon EC2, Amazon EBS, container-based services such as Amazon EKS, database services such as Amazon RDS on AWS Outposts, and analytics services such as Amazon EMR on-premises. Unlike hybrid clouds, you control the physical infrastructure and keep these 'cloud services' on-premise. So, with AWS Outposts, for example, you can have several actual AWS services running wherever you want.

- *Public clouds.* At this point in the cloud maturity lifecycle, almost everyone knows about public cloud service. Basically, public clouds are perfect for organizations looking to expand their development environment, migrate legacy resources, extend their business, or simply deploy new workloads away from their on-premise data center. Today, some companies simply don't want to pay for gear that may well be underutilized and expensive. Public clouds offer a "pay-as-you-go" model that works out well for these types of organizations. There are a lot of great controls that will allow you to manage cloud-ready resources and deploy them on demand. This can be for disaster recovery purposes, DevOps, or even data-driven use-cases. Either way, to prevent runaway costs in a public cloud, monitoring the environment and managing resources will be significant.

- *Hybrid clouds.* Hybrid cloud ecosystems are now widely adopted by organizations of all sizes. Many adopted a hybrid approach to gain the best of both worlds: on-premise data and latency control, coupled with the power of an elastic cloud solution. This type of architecture allows you to get the benefits of both private and public cloud ecosystems. When architecting a hybrid cloud model, companies can still leverage 3rd party cloud providers in either a full or partial manner.
Another great benefit is on-demand scalability for various types of workloads. Augmenting a private cloud data center with the scale of a public cloud can be employed for a variety of use-cases. This includes surges in traffic and usage as well as application testing and development. Furthermore, IT admins can leverage automation to manage things like peak usage and usage spikes. When needed, they can extend resources into the public cloud, where resources are provisioned on demand. Then, once the peak usage goes down, they can, using automation, de-provision those cloud resources.
The valuable part here is that resources are only being used as needed. These benefits make hybrid cloud a great and often leading option for many different kinds of companies.

- *Multi-cloud.* A more modern cloud concept, multi-cloud allows you to deploy services, applications, and resources across multiple cloud providers. The power of multi-cloud goes beyond your ability to diversify your vendors as well as prevent lock-in. Those working with multi-cloud will want to leverage the best of the given cloud provider. Before diving into multi-cloud, know the ins and outs of your applications or services, how they were

developed, and how they will be delivered to the end-user. From there, you must do your research on each cloud provider you're selecting!

For example, if you're a Microsoft shop leveraging data-driven solutions for data visualization, maybe leveraging Power BI and the Azure framework is best. However, if you're using a lot of RESTful APIs and need a great way to manage those resources better, a platform like GCP and Apigee might be the way to go. The best possible design will come from understanding your apps and services and which cloud provider can handle those requirements. From there, you can create powerful connections between cloud providers to get the best of all worlds. You can have your APIs managed via Google APIGEE while still delivering core compute workloads via AWS S3 and EC2 instances in the same example as above.

- *Edge computing.* If you haven't heard about edge just yet, you'll undoubtedly be hearing about it very soon. Creating customer intimacy or processing data and services as close to the source as possible is one of the primary goals of edge computing. And, there are excellent reasons as to why this technology is booming. According to Gartner, around 10% of enterprise-generated data is created and processed outside a traditional centralized data center or cloud. By 2025, Gartner predicts this figure will reach 50%.

  This means that services around the edge will continue to evolve and grow. Remember, from the customer's perspective; edge computing can be any service or architecture which helps you simplify and localize the delivery of applications, data sets, and services. It creates a closeness between data, user, and the services being utilized.

To generate this closeness, proximity will be critical to manage the volume of information and create a "timely" result. Enabling technologies like 5G and edge computing are making this movement accelerate.

"Organizations that have embarked on a digital business journey have realized that a more decentralized approach is required to address digital business infrastructure requirements," says Santhosh Rao, principal research analyst at Gartner. *"As the volume and velocity of data increases, so too does the inefficiency of streaming all this information to a cloud or data center for processing."*

Your edge use-cases are entirely dependent on your business and your long-term requirements. For example, they can be mobile devices used in healthcare or static, like connected, intelligent systems for managing an entire building.

"A wearable health monitor is an example of a basic edge solution. It can locally analyze data like heart rate or sleep patterns and provide recommendations without a frequent need to connect to the cloud," says Rao.

Catch all of that? Our focus in this paper is the examination of how business leaders are leveraging non-cloud data centers to support emerging workload repatriation trends. It's an entirely new balance that looks at cost, efficiency, business value, complexity, resiliency, and so much more.

Now, let's take a look at the latest perspectives around the cloud and data center balance.

REBALANCING DATA CENTER AND CLOUD SOLUTIONS

There is now a maturity around cloud solutions where organizations understand what needs to be in a public cloud and what should live on-premise at a data center.

This is a balancing of applications around Cloud, Colo, and On-Prem where premise-based solutions are Edge-like, smaller than traditional on-prem solutions, right-sized for the environment, and deployed for optimized data efficiency and security.

So, what does this new balance resemble?

1. Organizations realize the actual cost of cloud and are asking better questions around the longevity of their cloud solutions.

2. Many that are deploying new workloads are now asking: "How much does it cost me to deliver this widget in the cloud today? What about ten years from now?" Just because something was deployed in the cloud initially doesn't mean it should stay there forever.

3. Edge, colocation, and hyperscale solutions are helping organizations balance critical workloads, resiliency, and economics better than going cloud-only.

4. Many are now deploying cloud solutions with repatriation in mind. They see the direct value in the data center ecosystem to support the future of their organization.

5. Finally, the cloud and data center balance is taking on an executive perspective. It's no longer cloud-first. Instead, industry experts are shaping their workloads to ensure that they can support hybrid ecosystems.

Now that we have a better idea of cloud models and use-cases, it's essential to look at how the data center has evolved.
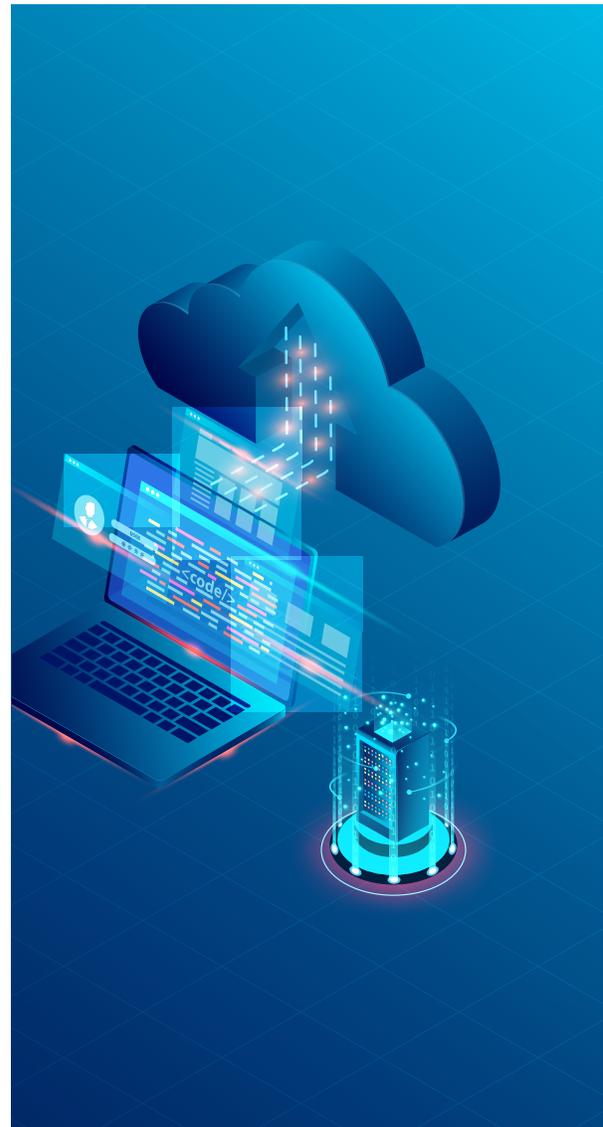
DATA CENTER VALUE EQUATION

Today, even more data is being generated, new digital services being deployed, connected devices coming online, and even further reliance on our data center ecosystems. Leaders in the technology space are looking to differentiate themselves in a digital market.

However, it wasn't always like this. Data centers, although necessary, never really played the type of role that they play today. Dating back to the 1940s, where some data centers have their roots, the traditional ecosystem was typified by ENIAC. These were very big machines housed in giant rooms. Many of these early-developed computer systems were exceedingly complex to operate and maintain. With the broader release of Unix systems in the 1970s, we saw a wider adoption of available Linux-compatible PC operating systems throughout the 1990s. From there, we saw the rise of the server and the client-server model that allowed us to facilitate the sharing of unique resources between multiple services, applications, and users.

Finally, the most extensive boom came from 1997-2000. Organizations required fast Internet connectivity, low latency, lots of computing power, and non-stop operation to deploy systems during that time. Remember, these solutions were critical as they were deployed to establish a presence on the Internet.

Remarkably, the pace of innovation within the data center is staggering. Since the dot-com bubble, data centers have only continued to grow in size and importance. Sure — data centers have always been valuable. But how has that value equation changed over the years?

VALUE DRIVERS (PRE-2000)

Before 2000 and before the more extensive deployment of Internet companies, the data center was seen as a simple business function. Meaning it was seen as a tool and cost-center for many businesses. For many, the data center cost equation could be summarized like this:

> *Data Center Value = (Business Efficiency + Workforce Effectiveness + Market Outcome)*

Of course, there are other variables in this. However, it was seen as a linear approach to managing, deploying, and operating data centers. It was a mechanical approach where these systems were seen as necessary, but not necessarily, absolutely critical solutions. For some influential organizations, outages were still problematic. However, they're nowhere near as frightening as they are today. This means that some compa nies, to an extent, could continue to function, even if their data center was down or partially incapacitated.

So — what's changed over these past 10-15 years?

STATE OF THE DATA CENTER TODAY

A recent report indicated that digital transformation spending would grow to more than 53% of all information and communications technology (ICT) investments by 2023, up from 36% today. Funds continue to pour into digital transformation efforts as business leaders see the category as a long-term investment. As we look ahead, digital transformation spending will approach the $2 trillion mark in 2022. But where do data centers and our digital infrastructure fit in with all of this?

Findings from some of the latest reports shed light on just how much has changed over these past few years. First, there was no slowdown in the amount of digital infrastructure being built and designed. The latest AFCOM State of the Data Center report examined data center growth as compared to previous reports. The report indicated that the total number of data centers within the next 12 months jumped 5% points. The most significant jump came from organizations looking to build 5-9 new locations. The total number of data centers to be renovated or expanded jumped by about four percentage points.

Furthermore, the latest InformationWeek State of Infrastructure report shows us that 40% of respondents will be spending their IT budgets on new technologies and innovation over the next 12 months. These organizations will actively look to modernize their infrastructure to support digital initiatives and a connected consumer.

To feed into new business requirements, modernization efforts, and growing connectivity needs, leaders in the IT space are finding that they need to spend more on infrastructure modernization projects.   Forty-one percent of respondents indicated that in 2020 at least 30% of their IT budget would be spent on the data center. One in five suggested that spending on the data center would surpass 40% of the overall IT budget.

It's not a significant surprise that 2020 saw a massively renewed focus on the data center. The AFCOM report showed us that 2020 was a trial year for many organizations regarding connectivity. According to the report, most respondents (70%) report increased network traffic within their infrastructures since the pandemic hit. Over a third (36%) report an increase of more than 40%. There were also significant efforts to modernization

operation. Three in four respondents (70%) report using data center automation and control, most commonly for smaller tasks (37%), to help them improve and modernize operations. Nearly one in five (18%) uses these technologies for multi-tenancy and user load-balancing purposes.

These data points and trends also point to an important fact: the modern data center's value equation has changed.

FUTURE DATA CENTER VALUE DRIVERS

Both data centers and business leaders will agree that their infrastructure is far more critical than it was just a few years ago. Furthermore, the level of persistent connectivity from remote users and remote business operations that we saw over the past year alone was unprecedented.

This is a big reason why the new value equation of digital infrastructure is here to stay:

Data Center Value = (Business Efficiency + Workforce Productivity) + Digital Innovation

The new variable here is 'Digital Innovation.' Beyond the marketing terminology, innovation in the digital infrastructure and data center space translates to surviving market and industry fluctuation, much like we saw in 2020. Those organizations that adopted this new value equation and were prepared with innovation strategies could support remote users and remote business operations far more effectively. Quite literally, they survived, while some others couldn't.

Here's another critical point about digital innovation. Leaders recognize that a big part of innovation is working with systems and solutions to support business growth while still controlling costs. And this is where the hyperscale shift is directly impacting that digital innovation part of the equation.

UNDERSTANDING CLOUD WORKLOADS AND WHERE RESOURCES SHOULD RESIDE

Over the past few years, emerging trends, statistics, and non-anecdotal research indicate a certain level of maturity in the cloud and data center market. For two years in a row, most respondents to the AFCOM State of the Data Center Report have indicated that they are seeing cloud repatriation happening.

9,000 terawatt hours (TWh)

ENERGY FORECAST
Widely cited forecasts suggest that the total electricity demand of information and communications technology (ICT) will accelerate in the 2020s, and that data centres will take a larger slice.

20.9% of projected electricity demand

- Networks (wireless and wired)
- Production of ICT
- Consumer devices (televisions, computers, mobile phones)
- Data centres

2010 2012 2014 2016 2018 2020 2022 2024 2026 2028 2030

The chart above is an 'expected case' projection from Anders Andrae, a specialist in sustainable ICT. In his 'best case' scenario, ICT grows to only 8% of total electricity demand by 2030, rather than to 21%.

Global electricity demand

2015
Best case 2030
Expected 2030

Other demand

0   40,000 TWh

INTERNET EXPLOSION
Internet traffic* is growing exponentially, and reached more than a zettabyte (ZB, 1 × 10²¹ bytes) in 2017.

1987 1997   2007   2017
2 TB† 60 PB 50 EB 1.1 ZB

*Traffic to and from data centres.
†TB, terabyte (10¹² bytes); PB, petabyte (10¹⁵ bytes); EB, exabyte (10¹⁸ bytes).

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Why are we seeing this happening more today than ever before? The tremendous savings seen from the switch to up-front CapEx investments in information technology to subscription mode soon gets soured as the rising monthly bills come in for services nobody knows where and when used. And so, new technology and operational disciplines were born: FinOps. In this profession, people leverage tools and new methodologies to monitor, measure, and mitigate the costs and value delivered from the cloud. FinOps practitioners' perspectives (yes, they are out there) provide a good understanding of what lies ahead in the cloud:

> *"The dirty little secret of cloud spend is that the bill never really goes down,"* says J.R. Storment, executive director of the *FinOps Foundation.*

Today, **the world has around 600** hyperscale data centers, many of them mopping up services for small corporations or universities that would have previously had their servers. And, there **are approximately 6,600+ colocation and wholesale data center** facilities across North America, EMEA, Asia-Pacific, and Latin America.

This is a new era for cloud leaders in how they work with local markets, support emerging solutions, and partner with data center pros.

Here's a key consideration for the cloud and data center balance:
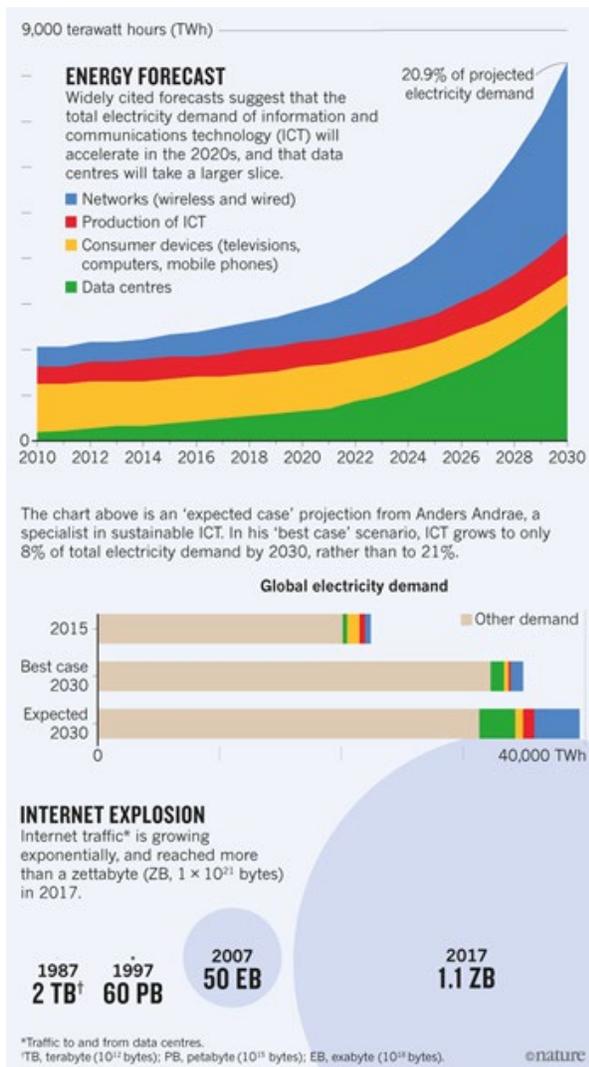
Cloud computing is seeing a pivot away from massive centralized cloud ecosystems to more distributed platforms designed to support new compute and connectivity requirements.

Today, centralized cloud solutions need to complement regional strategies to provide services like IaaS and PaaS. This is the new type of balance that cloud enthusiasts need to approach when working with data center designs.

Our understanding of cloud workloads, where specific resources should live, and how we can plan for the future are all considerations when we think about what needs to be deployed where. The fun part is that we see a better balance between the cloud and the data center.

Another critical point is what's happening to smaller, traditional, and even enterprise data centers. They're going away, quickly. Gartner predicts that by 2025, 80% of enterprises will shut down their traditional data centers.

We're removing infrastructure that was there to fulfill a computing purpose and not much else. They're often not efficient and prone to issues like outages and downtime. A recent article from the American Association for the Advancement of Science states the following:
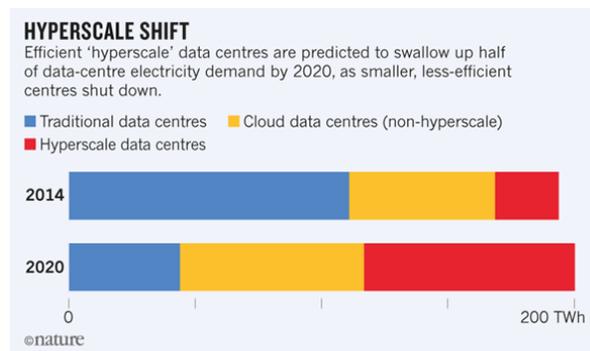
The new integrated data illuminate some critical technological and structural trends that help explain these considerable energy intensity improvements. The combination of increased server efficiencies and greater server virtualization (which reduces the amount of server power required for each compute instance) has enabled a sixfold increase in compute instances with only a 25% increase in global server energy use. In contrast, the combination of increased storage-

drive efficiencies and densities has enabled a 25-fold increase in storage capacity with only a threefold increase in global storage energy use.

Shifts to faster and more energy-efficient port technologies have enabled a 10-fold increase in data center IP traffic with only modest increases in network device energy use.

It's inspiring that engineers and executives see this new balance and are embracing it. They see the direct benefits of moving from less efficient infrastructure to highly resilient and efficient hyperscale and colocation solutions. This is where cloud leaders can make an impact with the right type of partner.

Emerging cloud solutions need to be complemented with edge data centers, modular solutions, faster deployments, and more intelligent infrastructure.

HYPERSCALE SHIFT
Efficient 'hyperscale' data centres are predicted to swallow up half of data-centre electricity demand by 2020, as smaller, less-efficient centres shut down.

■ Traditional data centres　■ Cloud data centres (non-hyperscale)
■ Hyperscale data centres

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We now see that there is a shift happening, but it's on two fronts. One revolves around a better understanding of cost, and the other is to remove legacy and inefficient infrastructure.

But, this also brings up a couple of essential questions: How will future data center operators interact and work with modern cloud and hyperscale models? How will the 'digital innovation' piece of the data center equation impact future digital infrastructure?

THE **TRUE** COST OF DEPLOYING INTO CLOUD

Speaking in terms of dollars, a recent post from a16z gives us a real-world example around cloud cost and repatriation. They talk about a large-scale repatriation project by a pretty sizable organization. You may have heard of them: Dropbox. According to the post, when the company embarked on its infrastructure optimization initiative in 2016, **it saved nearly $75M over two years by shifting the majority of its workloads from public cloud to "lower cost, custom-built infrastructure in colocation facilities"** directly leased and operated by Dropbox.

Dropbox Infrastructure Optimization Initiative Impact

Dropbox Historical Financials

	2015	2016	2017
Revenue	$604	$845	$1,107
Annual Growth Rate		40%	31%
Infrastructure Optimization Cumulative Net Savings	N/A	40	75
Cost of Revenue	407	391	369
Gross Profit	**$196**	**$454**	**$738**
Gross Margin	33%	54%	67%
Free Cash Flow	($64)	$137	$305
Incremental Margin vs. 2015 (% Pt)		+21%	+34%

Source: Dropbox S-1, a16z analysis

The results: **Dropbox's gross margins increased from 33% to 67% from 2015 to 2017.**

You don't have to be the size of Dropbox to experience these types of savings. Another example from the post includes Datadog. Consider this, the company traded at close to 40X 2021 estimated gross profit around June 2021 and disclosed an aggregate $225M 3-year commitment to AWS in their S-1. If we annualize committed spend to $75M of annual AWS costs — and assume 50% or $37.5M of this may be recovered via cloud repatriation — this translates to roughly $1.5B of market capitalization for the company on committed spend reductions alone!

Many leaders realize that market capitalizations of scale public software companies are weighed down by cloud costs and **hundreds of billions of dollars.**

All of this information points to a new understanding of how cloud and data centers operate. It also illustrates the true costs of deploying into the cloud but not thinking about repatriation. Let's dive into the final point for this section: how data centers and cloud solutions are being deployed in today's digital world.

KNOWING WHEN TO USE CLOUD AND WHEN TO LEVERAGE COLOCATION SERVICES

With a greater understanding of cloud computing, there will also be better integration around data center solutions. Specifically, it's important to know when to use cloud-based services and when to leverage a data center colocation partner.

That said, it's important to examine where cloud and modern data centers join forces to make a difference:

- Cloud computing and data centers (specifically hyperscale and efficient colocations) will leverage multiple geographical disbursements of IT services and resources. This means in a hybrid model, you can leverage on-premise resources and the cloud to distribute your critical services. However, it doesn't necessarily have to be the cloud either. You can specifically focus on delivering cloud-like services all from a controlled colocation or data center resource.

- There are a few driving forces when it comes to the adoption of a hybrid approach. One of those is the need to create cost-effectiveness of cloud components such as software-as-a-service and storage-as-a-service. Working with a combination of both cloud and data center, you'll

be able to reduce costs while still increasing the flexibility and agility of your organization.

- Another critical driver around a more hybrid approach is the need to maintain control of data. Data localization within a colocation partner aims explicitly at giving you the most amount of control over where data is being stored. In a hybrid scenario, you can leverage cloud or cloud-like delivery models to accomplish data security. So, think of a colocation service that has cloud data services running within. You're still leveraging a private cloud but have access to a few cloud data resources you can use. This allows you to keep all of your data internally while using cloud-like services for data optimization.

- A robust hybrid deployment alongside the cloud will simply allow you to respond more quickly to the ever-quickening pace of a digital economy. This means giving your IT department the ability to respond to rapidly changing business needs as soon as possible.

- Finally, alongside cloud, hyperscale and colocation partners introduce new cost structures into the enterprise that offer budgetary advantages and allow for greater control of costs.

Here's another critical point to help you understand where colocation and cloud work together. In a hybrid environment, enterprises can continue to get value out of their existing infrastructure (sometimes legacy) until a technology or business event makes it worthwhile or necessary to replace it with an appropriate alternative. This can include significant hardware or software upgrades, the need to decommission or consolidate a part of a data center, a fundamental change in business processes, or even a merger and acquisition.

When looking at your cloud and data center strategy, consider these points as you evaluate how you're using cloud computing today:

- **Cloud spend as a KPI.** Making infrastructure a first-class metric is making sure it is a key performance indicator for the business.

- **Incentivize the right behaviors.** Empowering engineers with data from first-class KPIs for infrastructure takes care of awareness but doesn't take care of incentives to change the way things are done.

- **Optimization, optimization, optimization.** When evaluating the value of any business, one of the most important factors is the cost of goods sold or COGS — and for every dollar that a company makes, how many dollars does it cost to deliver? That is, what does it cost to deliver this 'widget' in the cloud versus a colocation or hyperscale partner?

- **Think about repatriation upfront.** Just because the cloud paradox exists — where cloud is cheaper and better early on and more costly later in a company's evolution — doesn't mean a company has to accept it without planning for it passively.

- **Incrementally repatriate.** There's also no reason that repatriation (if that's indeed the right move for your business) can't be done incrementally and in a hybrid fashion.

If this is a lot to take in, don't worry. You're not alone. Asking reflective questions around your cloud and data center journey is essential and can be a bit overwhelming. This is why when designing a cloud and data center balance, it's vital to work with good partners that understand a modern hybrid approach.

FLEXIBILITY AND MODULARITY IN THE DATA CENTER: HOW TO ADAPT TO CHANGING MARKET DYNAMICS

Understanding the cloud and data center balance doesn't have to be overly challenging. However, it's important to remember that data centers are constantly changing, as is the cloud landscape. Significantly more dynamic activities are taking place in the data center environment. Furthermore, the role of data centers is rapidly changing, in part driven by the cloud, data growth and IT cost reduction.

This presents new challenges when it comes to designing and future-proofing data center infrastructure. Building a data center demands a high degree of flexibility and a modular approach to adapt to the ever-changing needs of the market. Projects are also becoming more and more complex due to increasing globalization. Support and assistance from a well-informed, trustworthy partner are essential.

CREATING RELIABLE, EFFICIENT, AND SCALABLE DATA CENTER INFRASTRUCTURES

With award-winning solutions from Legrand, Minkels, and Raritan, you benefit from optimal uptime of mission-critical operations. In working with distributed resources, you'll have access to a team of local specialists with capabilities to design and build innovative solutions, including enclosures, cooling, power, structured cabling, and access management to meet your unique requirements.

Within a context of increasing globalization, in which projects are more and more complex, the support of a knowledgeable, reliable partner is essential: it is the real key to a successful balance between cloud and data center operations. Working with Legrand Data Center Solutions assures you of global expertise. This includes:

- A worldwide network of specialist partners.
- Innovative applications and a comprehensive range of products enabling you to build solutions and configure systems that incorporate the latest technological advances.
- Specialized teams will help you set up your project, from its design through to final implementation. With the modular and integrated products available from Legrand Data Center Solutions, you are assured of future-proofing your data center investments.

Beyond global expertise, working with a partner that delivers thought leadership is critical. The current data center market is becoming more mature, focusing on availability, efficiency, and cost control. Legrand's approach is to understand its client's requirements and business drivers fully. It will constructively challenge and align it. In-depth market and product knowledge and a strong link with standard committees and the consultant

world further help get the best results for modern data centers.

Another critical point is to create a balance that delivers efficiency and sustainability. Legrand Data Center Solutions offers advanced sustainable data center solutions with intelligence built-in. The essential concepts of modularity, flexibility and energy efficiency have been implemented throughout the extensive product portfolio. This ensures that customers always benefit from the latest data center technologies: modular solutions that are fully adapted to the individual and ever-changing needs of the data center infrastructure.

These types of partners are helping leaders in the digital space better understand the data center and cloud balance. However, the best way to understand this is by seeing an actual use case.

DATA CENTER BALANCE— THE DATACENTER.COM USE-CASE

"We're the most difficult customer in the world."
—Jochem Steman, CEO Datacenter.com

Designing a data center isn't always easy. It becomes more complicated when you have custom-design requirements.

"We realized that existing data center services were failing to meet customers' wants and needs. Companies need flexibility; they want to scale data capacity up or down depending on their circumstances. We decided to address that need." —Jochem Steman

The Challenge
He didn't expect it to be easy, and it wasn't. Besides being flexible, Datacenter.com's services also need to be completely reliable and secure, of course, and preferably affordable too. Moreover,

Datacenter.com saw the demand for data capacity rising dramatically as the sudden growth in online schooling, remote work, and content consumption increased during the pandemic. People are also increasingly communicating by video, and an incredible amount of content is being transmitted back and forth. On top of that, users have come to expect high speed and ever-better data quality.

Datacenter.com needed a better way to scale, be more efficient, and deliver a sustainable solution that could support its business model today and in the future.

The Solution

"End users are very critical, and our customers are very critical, so we are too. From a supplier's perspective, we're the most difficult customer in the world. We want nothing but the best quality, without compromise, simply because we can't afford to take any risks. We're the first company anywhere in the world to work with Legrand's new Nexpand cabinet platform. The racks have been custom-made for us." —Jochem Steman

The Nexpand cabinet platform is located at the data center in Amsterdam, where Datacenter.com is substantially expanding its capacity. The data center itself is a vast 10,500 m2 warehouse, of which 5,000 m2 is in use at 100% capacity. It currently has enough room for 1,800 cabinets. This solution has allowed Datacenter.com to complete its first growth phase and soon be heading into the second. "We're currently running an IT load of 3 megawatts fully continuously, and we're steadily growing towards 12 to 15 MW. Our data center is very energy-efficient; our power usage effectiveness (PUE) is 1.08. We make a point

of cooling the heat generated by the servers as efficiently as possible."

Why Nexpand?

Datacenter.com was attracted to the Nexpand platform because of its specific needs. They wanted to maximize the amount of IT equipment per cabinet; because it is more efficient and better for the customer. In Amsterdam, Datacenter.com works with 52U, the biggest size of the cabinet. In previous designs, Datacenter.com had some issues with hot air leaking out of existing cabinets. Our contact person at Server Technologies, which supplies us with power distribution units, alerted us to its parent company Legrand to the new platform.

Legrand listened carefully to Datacenter. com's wants and needs to develop the solution and custom-built the racks according to their requirements. As the first customer for this solution, Datacenter.com also serves as a pilot project to some extent. As of today, the implementation went fine, and the platform is now fully up and running. Further, the Datacenter.com team now leverages next-level cabinet solutions that are sustainable and make managing the data center far easier.

What's Next?

"As for the reactions from our customers, we've had nothing but positive feedback so far. It's a bit of an adjustment for some of them, such as those with a combination of old and new data storage. But all the space that we bought has already been sold, so we'll be expanding again soon. The next upgrade is scheduled for after the summer — and I'm pretty sure that means we'll be installing more Nexpand cabinets."

FINAL THOUGHTS AND GETTING STARTED

Finding your cloud and data center balance is a genuinely reflective journey. This means that you'll need to align your business practices alongside technology requirements. It also means asking some critical questions:

- Have you looked at better solutions to support next-level data center architecture?
- Have you done an efficiency study to ensure your data center components are operating optimally?
- Are your current partners doing a good job supporting your growth and business initiatives?
- What is the actual cost of your cloud solution?
- Have you evaluated the cost of migrating critical workloads and working with data center partners?

Also important is your approach to the new data center value equation:

Data Center Value = (Business Efficiency + Workforce Productivity) + Digital Innovation

How are you working with the digital innovation aspect of this equation? Remember, partners like Legrand delivers comprehensive network infrastructure to meet the expanding requirements of today's data centers, with a range of connectivity, physical infrastructure, cable management, power, and cooling solutions. These systems support next-generation technologies with flexibility for future growth and energy and installation efficiencies, united by superior design.

To get started, be sure to work with partners that can help you understand a modern hybrid approach to cloud and data center operations. From there, be sure to take a reflective approach to cloud design and understand the actual cost of cloud computing. Finally, be sure to design a digital infrastructure that supports your use-cases in a sustainable and scalable manner.

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