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ANALYZE THE FUTURE

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Business Value Highlights

223%
five-year ROI

35% lower
cost of operations

25% lower
IT infrastructure costs

60% more
efficient IT infrastructure teams

71% less
staff time per server deployment

30% higher
application development team productivity

2.3% higher
user productivity

Generating Business Value Through IT Agility Using HPE Synergy

EXECUTIVE SUMMARY

Digital transformation (DX) is an essential mandate for businesses to thrive in a digital economy. Businesses embark on DX initiatives while keeping the business running on a daily basis. Current-generation applications (CGAs) are essential for existing business operations, whereas next-generation applications (NGAs) and technologies (collectively referred to as IDC's 3rd Platform technologies) form the essential underpinning for DX. A fundamental requirement for IT departments in the short to medium term is to manage an infrastructure that supports current- and next-gen apps, each with vastly diverse infrastructure requirements and service-level objectives. A new class of composable/disaggregated infrastructure (CDI) solutions has been designed to inherently meet this infrastructure requirement of concurrently hosting current- and next-gen apps. By pooling compute, storage, and networking resources, CDI solutions can provide a simple, scalable, and easy-to-manage platform for the entire datacenter. IDC estimates the market for CDI to follow a similar trajectory as hyperconverged systems and cross $4.7 billion in 2023.

HPE Synergy is a full-stack CDI system, powered by Intel Xeon Scalable processors, comprising the disaggregated hardware platform and a suite of management software that allows rapid provisioning and seamless ongoing management of resources. IDC interviewed organizations about their use of HPE Synergy to run and support various business applications. Study participants reported that HPE Synergy has made their IT operations significantly more agile and flexible, even as they improve performance and lower costs. IDC's analysis shows that these organizations will realize value with HPE Synergy that will translate into more than a three-to-one return on their investment (223% five-year ROI) by leveraging increased IT agility and automation to:

» **Provide timely and flexible access to compute, storage, and network resources,** enabling application development teams to be more productive and leading to lower IT costs.

» **Reduce time requirements for monitoring and provisioning activities,** freeing up IT staff time to take on other projects and initiatives.

» **Improve application performance and provide new functionality in less time,** thereby increasing user productivity levels.

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SITUATION OVERVIEW

Digital transformation — a technology-based business strategy — is an essential mandate for businesses to thrive in a digital economy. Businesses embark on DX initiatives to create value and extend their competitive advantage through new products and services, new business relationships, improved customer experience, and increased operational efficiencies. DX initiatives are often net new and highly outcome dependent and are often led by lines of business (LOBs). Next-generation applications and technologies (collectively referred to as IDC's 3rd Platform technologies) form the essential underpinning for DX. In the short to medium term, next-generation applications coexist with traditional or current-generation applications, as the latter support day-to-day revenue-generating business operations. That means in the immediate future, IT departments have to manage an infrastructure "duality" — the ability to deploy and manage two sets of applications, each with vastly diverse infrastructure requirements and service-level objectives. Unlike CGAs, NGAs do not assume infrastructure resiliency and are stateless and horizontally scalable, built with analytics-first design principles, utilize newer compute vehicles like containers, and deployed using newer methodologies like DevOps. Traditional infrastructure is not optimized for NGAs. Cohosting NGAs with CGAs requires businesses to embrace a new infrastructure paradigm. A new class of composable/disaggregated infrastructure solutions is designed to inherently handle the current- and next-gen infrastructure duality. CDI solutions (dis)aggregate compute, storage, and networking fabric resources into shared resource pools that can be available for on-demand allocation (i.e., "composable"). IDC estimates the market for CDI to follow a similar trajectory as hyperconverged systems and cross $4.7 billion in 2023. HPE Synergy is a full-stack CDI system comprising the disaggregated hardware platform and a suite of management software that allows rapid provisioning and seamless ongoing management of resources. Intel Xeon processors, which power HPE Synergy, deliver cloud computing, real-time analytics, processing for mission-critical business, and big data insights. These high-performance x86-based processors also improve data center efficiency and reliability to handle any workload. The three key foundational design elements of HPE Synergy that enable IT organizations to deploy a shared, flexible, and agile infrastructure to host NGAs and CGAs concurrently are:

» **Unified application programming interfaces (APIs)** allow organizations to implement infrastructure as code — a single line of code that abstracts all infrastructure. This enables developers to integrate infrastructure provisioning commands directly into the application development process, which in turn allows a quicker deployment of applications. It is also what allows integration into third-party applications and tools.

» **Software-defined intelligence** enables organizations to take a template-driven approach to workload composition and management. This minimizes hiccups caused by operational activities such as OS patching and firmware upgrades, thereby improving IT efficiency and reducing opex costs.

» **Fluid resource pools** provide the ability to compose pseudo-physical, virtual, and containerized computing units from compute (CPU and memory), accelerated compute (GPUs and FPGAs), network fabric, and data persistence (disk and flash) resource pools. This reduces the wastage and overhead caused by overprovisioning of resources, and thus capex costs.

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HPE SYNERGY, THE COMPOSABLE/DISAGGREGATED INFRASTRUCTURE PLATFORM

In late 2015, HPE announced an evolution from the converged architecture systems with HPE Synergy. It is built to further HPE's vision of a fully composable/disaggregated infrastructure. HPE Synergy, with Intel Xeon Scalable processors inside, is designed to serve as a bridge for businesses that are in the thick of CGAs but are rapidly transitioning to supporting NGA environments. From that side, it serves as the best of both worlds — for applications with infrastructure resiliency requirements and for applications that don't assume infrastructure resiliency. Figure 1 illustrates the main components of HPE Synergy. They are:

» **Composable frame (includes compute, fabric, storage, and management modules):** The frame houses compute, storage, fabric, and switch modules. Compute modules provide CPU, memory, local storage, and fabric resources. A shared storage module can contain up to 40 DAS drives, with up to 600TB of storage potential, that can be zoned in a number of ways and mapped to the compute module. Each frame can support five of these storage modules for a total capacity of 200 drives for a total of 3PB of storage potential. These drives can be shared across the frame with software-defined storage (SDS). The Synergy fabric/switch modules (except for the SAS interconnect module) allow frame expansion and external connectivity. The fabric modules can uplink to the datacenter directly with 10G, 20G, 25G, and 50G Ethernet speeds and 16G Fibre Channel speeds. Internally, the common air-gapped management fabric can link multiple frames/racks for a single management network.

» **Composable software suite:** Two key elements of the HPE OneView composable software stack are HPE Composer and HPE Image Streamer. The HPE Composer is the provisioning engine that allows resources from the frame to be carved into pseudo-physical compute and persistence units. HPE Image Streamer — which is optional — allows the operating environment to be provisioned faster and in a consistent manner onto these pseudo-physical units. HPE Image Streamer allows constituent software deployment at scale for extreme agility and performs additional maintenance easily, thus greatly increasing simplicity.

HPE Synergy also supports remote object, file, or SAN storage to be connected to the frame. In the case where the external storage supports the composable API (such as HPE 3PAR StoreServ or HPE Nimble arrays), the provisioning domain can be extended to include such storage.

While in theory any hardware could be disaggregated, the hardware has to be truly disaggregated. This is where the HPE Synergy design is truly different. It is stateless from a data perspective — so the OS images can be accessed anywhere from the frame (via Image Streamer) and from a configuration state perspective — to ensure that images can be altered on the fly.

FIGURE 1

HPE Synergy: Powering Your Hybrid Cloud Transformation

Composable Frame
Everything needed to run applications, so IT can be quickly setup and consumed
Auto-integrating makes scaling simple and automated at rack/row scale

Composer
Integrated software-defined intelligence to self-discover, auto-integrate, provision and scale from racks to rows

Composable Compute
Provides the performance, scalability, density optimization, storage simplicity, and configuration flexibility

Composable Fabric
Rack scale multi-fabric connectivity eliminates standalone TOR switches

Composable Storage
High-density integrated storage to compose any compute with any storage (SDS, DAS, SAN)

Source: HPE, 2018

THE BUSINESS VALUE OF HPE SYNERGY

Study Demographics

IDC interviewed eight organizations about their use of HPE Synergy. Interviews focused on understanding the qualitative and quantitative impact of this platform in terms of IT costs and performance as related to supporting business operations. The overall profile of study participants was that of a large enterprise in terms of employees (16,226 on average) and revenue ($2.76 billion). Interviewed organizations represented customer experiences involving United States– and EMEA-based organizations, as well as various industry verticals as detailed in Table 1.

TABLE 1

Demographics of Interviewed Organizations

	Average	Median
Number of employees	16,226	5,150
Number of IT staff	245	171
Number of business applications	2,032	413
Revenue per year	$2.76 billion	$1.06 billion
Countries	United States (6), Denmark, and Netherlands	
Industries	Cloud services provider, entertainment, genomics, healthcare, hospitality, natural resources, semiconductor, and telecommunications	

n = 8
Source: IDC, 2018

Choice and Use of HPE Synergy

Interviewed organizations deployed HPE Synergy after concluding that they faced IT and business challenges that required a transformative step to add more agility and flexibility to their IT operations. Most of these organizations moved from HPE BladeSystem servers and viewed HPE Synergy as a path to achieving these goals based on the ability to pool compute, network, and storage resources and use automation to distribute these resources efficiently. Study participants described their considerations in deciding upon a composable infrastructure approach with HPE Synergy in detail:

» **The need to further minimize IT friction:** *"We had begun implementing a DevOps approach ... but still found that there was a huge friction point. We weren't able to fully realize that goal without having end-to-end automation in provisioning. That's why we needed infrastructure that would allow us to do things like software-defined networking .... So that was our goal and what we were after with deploying HPE Synergy."*

» **Increase performance through shared compute and storage:** *"We needed more power for our server enclosures .... Now, with HPE Synergy, we run thousands of different applications on Unix or Linux, and we install the applications on a shared compute and storage environment. With HPE Synergy, we can run applications across the environment and our servers can be identical from an operating system perspective."*

» **Enable development with cost-effective reuse of infrastructure:** *"We were looking for the next generation of hardware on which we could grow our business without being stuck with old aging models .... HPE Synergy is one of the key elements of that transformation because we can reuse infrastructure as our development team deploys new software."*

At the time the interviews were conducted, study participants had been running applications on HPE Synergy for an average of just over one year. They reported running various workloads with HPE Synergy, including, most commonly, infrastructure/database, transactional, and application development. Table 2 shows study participants' extensive use of HPE Synergy, with 204 physical servers supporting business applications used by 7,126 employees on average.

TABLE 2

HPE Synergy Use by Interviewed Organizations

	Average	Median
Number of physical servers	204	86
Number of VMs/containers	662	251
Number of business applications	1,461	45
Number of terabytes (TB) (direct-access storage capacity)	1,418	3
Number of terabytes (TB) (external storage capacity)	3,121	250
Number of users of IT services (applications running on HPE Synergy)	7,126	3,700

n = 8
Source: IDC, 2018

Business Value Results

Interviewed organizations reported leveraging their use of HPE Synergy to instill their IT organizations with the agility and flexibility needed to meet business demand for IT services. They cited automation and having a single pool of IT resources as factors enabling them to serve their businesses more efficiently, thereby saving staff time and enhancing more impactful development activities. Meanwhile, their lines of business benefit from improved application performance, even as their IT organizations lower the costs of running the same workloads. Study participants also cited the broader organizational impact of HPE Synergy, with several noting that the platform's capabilities are changing how lines of business view the role of IT organizations:

» **Use automation to enable IT to keep up with business:** *"The biggest IT challenge we faced was keeping up with the business. We don't want to be the bottleneck .... With HPE Synergy, we can run traditional workloads while in parallel developing automation for the infrastructure."*

» **Provide greater agility and flexibility with regard to compute use:** *"With HPE Synergy, we've reduced the planning times for simulation jobs and have more CPU cores. This is important because our business requirements are core hungry. Also, with HPE Synergy, we can deploy what we need and then shut it down, or maybe deploy it to another task."*
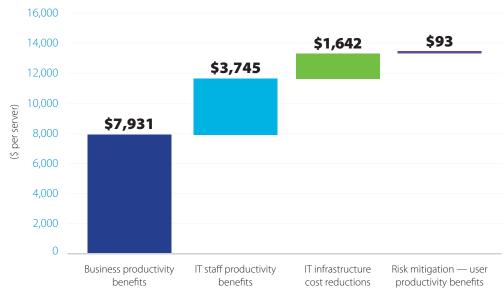
IDC's analysis of these organizations' experiences demonstrates the significant value the organizations are achieving with HPE Synergy. IDC quantifies these benefits, which are depicted in Figure 2, as having an average annual value of $13,410 per physical server ($2.74 million per organization) in terms of:

» **Business productivity benefits:** By providing employees with a better user experience through enhanced application performance and earlier access to new application features and functionality, study participants realized user productivity gains that IDC quantifies as worth an annual average of $7,931 per physical server ($1.62 million per organization).

» **IT staff productivity benefits:** By reducing the burden on IT infrastructure teams and enabling application development teams, study participants have made these IT teams more efficient and effective. IDC puts the value of time savings and productivity gains for IT staff members at an annual value of $3,745 per physical server ($0.76 million per organization).

» **IT infrastructure cost reductions:** By tailoring IT infrastructure to actual demand, study participants lowered the cost of running applications. These efficiencies also helped reduce costs associated with running these environments, including licensing, power, and facilities costs. IDC forecasts that these organizations will reduce costs by an annual average of $1,642 per physical server ($0.33 million per organization).

» **Risk mitigation — user productivity benefits:** By establishing a reliable and high-performing foundation for key applications, study participants minimized the impact of unplanned outages. IDC calculates that they will reduce losses of productive time worth an annual average of $93 per physical server ($0.02 million per organization).

FIGURE 2

Average Annual Benefits per Physical Server

Average annual benefits per physical server: $13,410

$7,931 — Business productivity benefits
$3,745 — IT staff productivity benefits
$1,642 — IT infrastructure cost reductions
$93 — Risk mitigation — user productivity benefits

Source: IDC, 2018

Business Productivity Benefits: Benefiting from Improved IT Platform Performance

Study participants also explained that enhanced agility translates to having an IT platform that better supports their business efforts. They noted the importance of cost-effective distribution and the use of IT resources in bringing services and products to the market that can compete on both price and performance. Further, as described below, having a higher-performing IT platform results in operational efficiencies in the form of higher user productivity levels. IDC quantifies the value of these user productivity gains at an annual average of $7,931 per physical server ($1.62 million per organization) (refer back to Figure 2).

Several organizations linked platform agility and gaining a competitive advantage:

» **Delivering cost-effective access to capacity needed for business:** *"HPE Synergy was 15–20% less expensive than other solutions and its capacity was superior. From a business perspective, we can add the cores we need and this can be the difference in winning or keeping a contract. For example, we have a very demanding customer and if we are late with a design because of insufficient capacity, we could lose business."*

» **Cost-effective multitenancy to support business:** *"HPE Synergy absolutely supports our business strategy. One of our goals is to have the flexibility and multitenancy of public cloud in our private cloud .... Our business requires that we create business units for each project that are essentially segregated, and we do that through multitenancy with HPE Synergy, which saves a lot of costs."*

Further, study participants explained that they have enabled more efficient business operations by providing line-of-business employees with higher-performing business applications and delivering enhancements more frequently. With study participants running impactful applications used on a daily basis by employees, including VDI, database, and other core enterprise applications, optimizing application performance ensures that employees have the tools they need to deliver maximum value to their organizations. Likewise, timely delivery of new features and functionalities play into employees' effectiveness. Interviewed HPE customers reported a substantial impact on key groups of employees, with an average gross productivity gain of 2.3% across most users of applications running on their HPE Synergy platforms (see Table 3).

TABLE 3

Business Productivity Benefits of HPE Synergy

	Per Organization	Per 100 Users
User productivity impact		
Number of users impacted	7,126	100
Average gross productivity gain	2.30%	2.30%
Equivalent productivity gain in FTEs	23.1	0.3
Total recognized value of higher productivity per year (IDC model)	$1.62 million	$22,700

Note: IDC model assumes a 15% operating margin for user productivity.
Source: IDC, 2018

IT Staff Productivity Benefits Through Agility and Ease of Management

HPE customers also reported achieving significant efficiencies for their development and IT infrastructure teams using the HPE Synergy platform. IDC puts the value of these efficiencies and productivity gains at an annual value of $3,745 per physical server ($0.76 million per organization) (refer back to Figure 2).

Study participants commonly cited a core need to increase their IT agility as driving their decision to deploy a composable infrastructure platform — HPE Synergy. In addition to the objective of enabling their development teams to be more efficient, study participants stressed that the costs of having insufficient agility extended beyond just delaying the provisioning of compute and other IT resources. Instead, they described several ways in which having a truly agile IT platform benefit them, including:

» Better responding to business demand

» Ensuring higher performance of key applications

» Allowing IT teams to work more efficiently

» Optimizing costs associated with IT infrastructures

Study participants moved to HPE Synergy with the objective of not only upgrading their existing HPE BladeSystem server infrastructures (in most cases) but also establishing a more agile, fluid, and unified infrastructure foundation from which they would deliver IT services to support business operations through the delivery of new applications and features. Study participants described how automation within a single pool of compute, storage, and networking resources has enabled faster and more timely delivery of IT resources as needed by their businesses:

» *"We can provision IT resources faster with HPE Synergy. The classic example of where this is beneficial is if there's a problem and we need to spin up a test environment to troubleshoot, we can do that a lot quicker. Likewise, if there's a new application requirement from the business side, we can deliver the infrastructure a lot faster."*

» *"We have scientists who come to us and say, 'I want to do more' and expect us to come up with unique ways of supporting their work. HPE Synergy is helping us do this by providing the equivalent of bare metal spot compute and storage capacity."*

For study participants, instilling agility across their IT operations provides a direct benefit by reducing the time required for provisioning IT resources. As shown in Table 4, interviewed HPE Synergy customers can now deliver server (71% faster on average) and VM resources (13% faster on average) in less time to support IT and business operations.

Interviewed organizations tied enhanced delivery of compute, storage, and networking resources to numerous benefits, but most directly to their application development teams. These teams, which are tasked with delivering highly functional software on which their businesses depend, need timely and cost-effective access to IT resources to develop, test, and deploy new applications and releases.

The lack of access can encumber their efforts, and slow delivery times can reduce these teams' ability to drive business operations. With HPE Synergy, study participants reported minimizing the bottlenecks that can inhibit development efforts, allowing them to reap rewards in terms of increased output of new applications (16% on average) and new features (52% on average). This means that their development teams better support their businesses, which is reflected in the average 30% productivity gains that they attributed to HPE Synergy for developers working on the platform.

TABLE 4

Impact of HPE Synergy on IT Agility and Application Development

	Before/Without HPE Synergy	With HPE Synergy	Difference	Benefit (%)
New server deployment				
Time to deploy new server (hours)	1.1	0.5	0.6	51
Staff time per new server deployment (hours)	0.4	0.1	0.3	71
VM deployment				
Time per VM deployment (minutes)	17.3	15	2.3	13
Staff time per VM deployment (minutes)	10.1	8.8	1.3	13
Application development				
Equivalent developer productivity level (FTEs per organization)	13.3	17.3	4	30
Number of new applications developed per year	4.3	5	0.7	16
Number of new features developed per year	161	245	84	52

Source: IDC, 2018

Some of the same benefits that allow HPE Synergy customers to make more efficient use of their IT infrastructure resources — including automation and platform consolidation — help their IT infrastructure teams manage and support their environments much more efficiently (60% on average as shown in Table 5). This not only saves IT staff time but also enables IT team members to work on higher-value projects, increasing both the organizational relevance and the value of IT organizations. One interviewed organization described how HPE Synergy has changed its IT capabilities and focus: *"HPE Synergy unlocks the capability to provide software-defined automated provisioning. It's the missing piece in the puzzle — it provides full automation, speeds time to deliver, and frees up engineering time to allow less commodity work and more valuable work."*

TABLE 5

Impact of HPE Synergy on IT Infrastructure Teams			
	Before/Without HPE Synergy	**With HPE Synergy**	**Difference**	**Efficiency with HPE Synergy (%)**
Equivalent productivity level of IT infrastructure team (FTEs)	2.3	5.8	3.5	60
Hours of staff time per server per year	49	20	29	60
Equivalent value of staff time to manage per organization per year ($)	229,100	575,600	346,600	60

n = 8
Source: IDC, 2018

IT Infrastructure Cost Reductions: Delivering a Cost-Effective IT Platform

Enhanced agility delivered by HPE Synergy helps study participants run business applications and workloads more cost effectively because they can better match IT resources to actual demand. IDC calculates that study participants will run equivalent workloads at 35% lower cost on average over five years with HPE Synergy than their legacy or alternative IT platform (see Figure 3). This lower cost of operations includes cost savings compared with their legacy environments that IDC projects will average $1,642 per physical server per year ($0.33 million per organization).
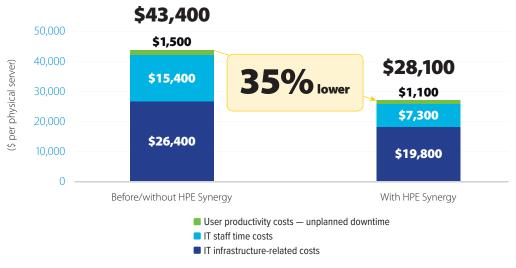
Study participants explained that HPE Synergy is a more cost-effective IT platform because they can easily repurpose and reuse compute, storage, and network capacity. As a result, they can not only more closely tailor their capacity to actual demand but also move resources around to maximize efficiency. Study participants described the benefit of greater agility in the use of IT resources through a single common pool as a key driver in lowering their IT infrastructure-related costs (cost of hardware, warranty, power, and facilities) by an average of 25% with HPE Synergy (see Figure 3):

» *"HPE Synergy gives us significant headroom in terms of compute capacity, which contributes to lower overall cost of delivery of service. With the composable compute architecture, we can 'steal' overhead from underutilized areas of the business and use it in the high-demand areas, as needed, and then put it back when not needed to adjust and share the compute capacity."*

» *"One of the primary goals that we have going forward is to never buy hardware for specific purposes because of HPE Synergy's 'repurposability.' We want to be able to scale up and down through elasticity at any given time and shift workloads from the cloud to on-premise environments depending on the price per unit. HPE Synergy allows us to do that."*

» *"HPE Synergy helps us avoid buying hardware because now we can assemble or compose a number of hosts into a mini-environment on the fly, which means that we don't have to buy extra hardware and take on more overhead. In six months, we've avoided buying 64 servers."*

Overall, IDC projects that organizations interviewed for this study will run their HPE Synergy environments at 35% lower cost on average than their legacy or alternative environments considering cost of IT infrastructure, cost of IT staff time, and cost of lost user productivity due to unplanned outages.

FIGURE 3

Five-Year Cost of Operations

Source: IDC, 2018

Risk Mitigation: User Productivity Benefits Through Reduced Unplanned Downtime

Interviewed organizations also reported that they have experienced little impactful downtime with HPE Synergy, amounting to under 10 minutes per user per year. On average, they have reduced the impact of unplanned downtime by 30%, with a value of avoiding lost productive time for users that IDC quantifies as being worth $93 per physical server per year ($0.02 million per organization) (refer back to Figure 2). In particular, they cited their ability to create automated template scripts within their HPE Synergy environments as limiting the likelihood of human error: *"The composability of HPE Synergy means we can script. This gives us repeatability that removes the human error component in terms of provisioning new hosts or installing software, updates, or patches because every node is templated and has to comply with the template. This means there's no scope for human error on deployment of IT resources."* For study participants, the result is an improved user experience with less business and operational risk related to potential outages of key business applications and services.

ROI Analysis

Table 6 presents IDC's ROI analysis regarding interviewed organizations' use of HPE Synergy. IDC projects that study participants will realize benefits related to higher IT and user productivity and lower IT-related costs worth a discounted average of $47,777 per physical server over five years ($9.75 million per organization). In total, IDC calculates that these organizations will invest a discounted average — including the cost of HPE Synergy, staff deployment time costs, and other costs related to their deployments — of $14,805 per physical server over five years ($3.02 million per organization). This level of benefits and investment costs would result in an average five-year ROI of 223% for interviewed organizations, with breakeven on their investment in HPE Synergy occurring in 15 months on average.

TABLE 6

Five-Year ROI Analysis

	Five-Year Average per Organization	Five-Year Average per Physical Server
Benefit (discounted)	$9.75 million	$47,777
Investment (discounted)	$3.02 million	$14,805
Net present value (NPV)	$6.73 million	$32,972
Return on investment (ROI) (%)	223	223
Payback period	15 months	15 months
Discount rate (%)	12	12

Source: IDC, 2018

FUTURE OUTLOOK

As businesses move through their DX journey, the people-process-technology transformation will result in a shift in the role of IT. IT will become part of the fabric of products and services that are rapidly innovated at every company. IT will play a pivotal role in the quest for the business to remain competitive. CIOs and line-of-business executives will be at the forefront of major initiatives aimed at leveraging the competitive advantages of the new hyperconnected enterprise. In other words, IT will gain the ability to influence new business opportunities by quickly delivering revenue-generating products, services, and experiences. Instead of just providing technology to automate internal business processes, IT can now directly impact business strategy and revenue by creating software-based services that:

» Energize growth

» Strengthen profitability

» Boost productivity

» Enhance innovation

» Increase organizational agility

» Improve the customer experience

» Provide a competitive advantage

Infrastructure as code — which at present is nascent in terms of real-life implementations, especially in the enterprise — will truly be the overarching management paradigm. Composable infrastructure will form the core of any IT in that paradigm.

CHALLENGES/OPPORTUNITIES

Essential Guidance for IT Buyers

From a systems perspective, any composable/disaggregated architecture consists of two parts: the first part is the ability to (dis)aggregate IT resources into compute, storage, and fabric pools and the second part is the ability to compose consumable resources from such disaggregated pools via a unified API. Therefore, intelligent software is needed to manage all the distinct assets and to compose the optimal configuration for a specific application. All the elements inside the installed infrastructure are pooled and require management, including discovery and location of resources. Monitoring and life-cycle management software are necessary to provide full awareness of the hardware assets and application workloads. Further:

» **Self-discovery, provisioning workloads, orchestration, and healing.** It will be essential to have visibility into the utilization of the discrete resources and understand the load on the resource elements.

» **Orchestration layer.** It will be essential to enable a catalog of compute, storage, networking, and memory in an orchestration layer and also define resource requirements for specific applications and compose them in a set that is optimized for the workload.

Composable systems necessitate infrastructure analytics (i.e., data metrics are needed to understand how to optimally configure hardware for the applications). It is essential to have visibility into the utilization of the discrete resources and understand the load on the resource elements; for example, to answer questions like:

» How much is the application consuming?

» Which resources (such as processor and storage) are reaching thresholds or are underutilized?

These data metrics are also valuable feedback to enable orchestration and template provisioning. The dynamic nature of application capacity means manual processes, which consume time and are a source of potential errors, must be reduced as much as possible.

IDC sees these as necessary factors for composable systems to be successful in the enterprise — in accelerating provisioning times, improving IT utilization, and simplifying overall IT operations.
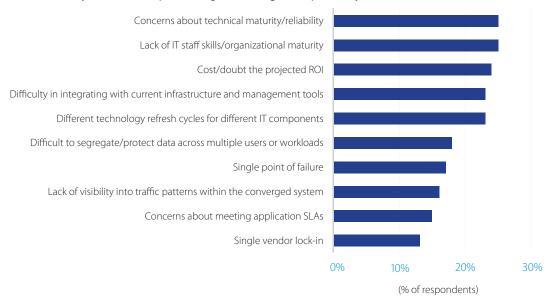
Figure 4 illustrates the top challenges for businesses in embracing composable infrastructure. Concerns about technical maturity and reliability, the ability of staff to manage a new platform, doubts about promised ROI, and difficulty integrating with existing tools are at the top of mind for respondents. For system vendors like HPE to dominate this space, they have to address these concerns. Their credibility and their decades of collective experience in building enterprise infrastructure platforms are what will count.

FIGURE 4

Top Challenges in Adopting Composable Systems

Q. *What do you see as the top 2 challenges in moving to composable systems?*

n = 301
Base = all respondents

Note: Data is weighted by employee size.

Source: IDC's Infrastructure Usage and Overprovisioning Trends Survey, November 2016

CONCLUSION

Concepts of disaggregating IT systems down to discrete resources have been discussed in the industry for some time, even though the enabling technologies have yet to mature. DX and NGAs driven by shifts in business strategy will fuel the demand for composable infrastructure. This emerging category of systems seeks to create greater business agility, lower operational costs, and increased application performance. Businesses should stay open to embracing these systems provided concerns such as ease of management and promised ROI are addressed.

APPENDIX

IDC's Market Definition of Composable/Disaggregated Infrastructure

This white paper assesses the set of technologies and solutions that are collectively classified as "composable/disaggregated infrastructure," or CDI for short, with a specific focus on how it is implemented through HPE Synergy. It also discusses workloads, applications, and customers that are driving demand for these technologies and solutions.

The term "composable/disaggregated" is used to imply the two terms are complementary to each other. The two terms are not interchangeable, even though a "/" may imply otherwise. According to IDC's taxonomy on "composable/disaggregated infrastructure:"

» "Composable" implies the ability to create a set of virtually consumable infrastructure entities from physically disparate resources "disaggregated" at a component level via unified APIs. "Composability" is driven at the software (API) level, and "disaggregation" is primarily driven at the hardware level. To fully implement the design principles of composable infrastructure, the hardware it operates on has to support partial or full disaggregation (in which resources are pooled down to a component level).

» "Composable" and "disaggregated" have different evolutionary trajectories. The enabling technologies for these systems are in different stages of maturity: some such as common APIs offering infrastructure-as-a-code capabilities are becoming available, whereas others such as silicon photonics are still in development. The "composable infrastructure" software is designed to operate on any type of compute and storage hardware that supports a composable API.

» IDC views composable/disaggregated systems as an evolution of converged and hyperconverged infrastructure. While the new technology is a significant leap forward, the gist of this evolution is the hardware side is moving toward disaggregation, whereas the software side is moving toward composability — via a unified API-based provisioning, orchestration, and automation layer.

» The composable stack — which is basically a collection of software tools and stacks — will be tracked under an existing or newly defined "infrastructure software" functional market (to be determined). The "disaggregated" hardware stack (i.e., partially disaggregated or fully disaggregated hardware for now) will be tracked in the existing computing platforms (aka server) markets. If there are external systems like storage arrays and networking equipment that are part of this infrastructure, they will be tracked in their respective space. The hardware itself could be in a category of its own, but it is too early to say so.

» For more details, refer to *Composable/Disaggregated Infrastructure and Rackscale Architectures — Market Background, Trends, and Taxonomy,* 2016 (IDC #US41633516, August 2016).

IDC BV Methodology

IDC's standard ROI methodology was utilized for this white paper. This methodology is based on gathering data from organizations currently running business applications on HPE Synergy as the foundation for the model. Based on interviews with these study participants, IDC has calculated the benefits and costs to these organizations of using HPE Synergy. IDC used the following three-step method for conducting the ROI analysis:

1. **Gathered quantitative benefit information during the interviews using a before-and-after assessment of the impact of using HPE Synergy to run various business applications and workloads.** In this study, the benefits included staff time savings and productivity benefits and IT infrastructure–related cost reductions.

2. **Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using HPE Synergy and can include additional costs related to migrations, planning, consulting, and staff or user training.

3. **Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of HPE Synergy over a five-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

IDC bases the payback period and ROI calculations on a number of assumptions, which are summarized as follows:

» Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and manager productivity savings. For purposes of this analysis, based on the geographic locations of the interviewed organizations, IDC has used assumptions of an average fully loaded $100,000 per year salary for IT staff members and an average fully loaded salary of $70,000 for non-IT staff members. IDC assumes that employees work 1,880 hours per year (47 weeks x 40 hours).

» Downtime values are a product of the number of hours of downtime multiplied by the number of users affected.

» The impact of unplanned downtime is quantified in terms of impaired end-user productivity and lost revenue.

» Lost productivity is a product of downtime multiplied by burdened salary.

» The net present value of the three-year savings is calculated by subtracting the amount that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost. This accounts for both the assumed cost of money and the assumed rate of return.

Because every hour of downtime does not equate to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of our assessment, we asked each interviewed organization what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.

Further, because IT solutions require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis and then subtracts the deployment time from the first-year savings.

Note: All numbers in this document may not be exact due to rounding.

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