



DELIVERING DIGITAL TRANSFORMATION EFFICIENTLY AND SUSTAINABLY

Part 1: Defining ITaaS

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INTRODUCTION—WHY DISCUSS IT AS A SERVICE (ITAAS)?

According to a survey conducted by 451 research, 57% of enterprises are adopting a hybrid multicloud IT delivery strategy.¹ Executing on such a strategy raises multiple challenges, such as application redesign, deciding on data location and portability, and rethinking information security—for example, leveraging the zero-trust model, implementing new approaches to cost monitoring, internal chargeback and budget enforcement. These challenges have implications on technology, people, and processes that require collaboration across the organization.

In parallel, closely linked to hybrid cloud implementations and digital transformation requirements, virtualization and containerization technologies at the application layer are experiencing tremendous growth. These technologies allow applications to be almost entirely de-coupled from the hardware layer they run on.

In this context, adopting ITaaS such as HPE GreenLake is usually the first simple step IT departments can take, to start the journey of a hybrid multicloud strategy.

While the aforementioned IT transformation wave is under way, a new source of enterprises' capital focusing on ESG achievements is gaining traction. Green bonds, or sustainability performance-linked financial products, give organizations a new incentive to assess material ESG factors, set measurable goals, and report progress.

IT presents both an opportunity and a challenge. By reinventing business processes, fueling innovation through digital transformation, or offering the opportunity to gain new insights from data, IT can drive an organization's efficiency gains and support progress on material ESG topics. However, IT equipment contributes to materials extraction and electricity consumption, therefore, posing environmental challenges. As global demand for connectivity and computing power grows exponentially, information and communications technology (ICT) infrastructure is consuming energy and materials at unprecedented rates.

ITaaS is a simple step organization can take to deliver digital transformation efficiently, optimizing the use of resources and electricity, and minimizing waste.

IT consumption or ITaaS mean different things to different people. The first part of this paper will focus on defining ITaaS and will highlight its unique attributes that support a more efficient and, therefore, sustainable approach to IT service delivery. The [second part](#) will review, in more detail, the efficiency and sustainability benefits of ITaaS.

OVERVIEW

ITaaS, as the name implies, is a service agreement between a provider and a client, where the primary key performance indicator (KPI) against which the client is charged, is the metered utilization level of the deployed IT infrastructure or workload. The usage metering can be at the infrastructure level (server, GB, CPU cores), at the virtual machine (VM) or container level, or go into application-specific utilization metrics—thereby, delivering a dedicated software as an experience. Specific application-level KPIs, such as backup, database, or disaster recovery (DR), can be achieved based on pre-existing or customizable catalogs of services.

ITaaS agreements are modular, allowing different resources to grow, following various tiers for different units of measure. It encourages users to start small and grow with workload demand. For example, a client could deploy a compute bare-metal service and a back-up service. The compute service would be charged per server and grow in increments of one server with a new pricing tier every **X** servers, while the backup service would be charged per GB of data being backed up, and reach a new tier every **Y** TB. X and Y would be determined based on the client's specific requirements.

An ITaaS consumption model does not require a physical shift of IT infrastructure to a different location, whether on-premises or colocation. Additionally, it does not require users to fundamentally rethink the data or application strategy, as ITaaS does not change the boundaries of the IT department's operating environment. ITaaS is simply a different delivery model for the given infrastructure, platform, or software layer that allows the users to shift their focus from asset ownership to actual resources utilization and operational KPIs.

These attributes make ITaaS straightforward to implement and well suited to address specific bottom-up requirements. Troublesome workloads, or workloads that are difficult to forecast, have strong growth and require accurate cross charging. These workloads are usually a good place to start an ITaaS project, as the benefits are tangible: de-risking of the forecast and supply chain integration process, documented and transparent unit of usage definition, and costs and utilization reporting.

¹ [Having your cake and eating it too. 451 Research, 2019](#)



While they can address standalone projects, ITaaS initiatives are also suitable as the foundation layer supporting top-down comprehensive digital transformation projects. Enterprises should assess whether their ITaaS partner brings proven business processes and business models, as well as monitoring and operations tools that will effectively support their digital transformation, along with the operationalization of their hybrid multicloud strategy. Considerations such as availability of a single, integrated view into cost, governance, performance, operations, and security; or ability of the partner to complement in-house skill gaps, should be part of the ITaaS partner evaluation.

Lastly, an ITaaS approach intrinsically allows organizations to share the supply chain and utilization risks with their service provider, shifting the focus of the partnership to workload delivery. Focusing on workload delivery, as opposed to specific hardware configurations, allows organizations to benefit from a larger pool of options to choose from, when faced with unexpected circumstances. This flexibility can prove particularly effective when having to deal with crisis situations such as large-scale pandemics. It also allows the business to preserve cash while still moving forward and sustaining business continuity.

IT OPERATIONS BENEFITS: ADDRESSING OVERPROVISIONING AND ACCELERATING TIME TO MARKET

The root cause of data center IT overprovisioning

Overprovisioning results in wasted IT capital, energy, and resources. Research indicates that data center space, compute, and storage are, on average, over 50% overprovisioned. Existing deployments of infrastructure-as-a-service (IaaS) models have also yielded indicative insights in overprovisioning behaviors, such as instances where:

- It takes enterprises 12 to 18 months to reach the capacity they initially wanted.
- Enterprises are able to replace the deployed storage capacity with half as much—taking advantage of more recent deduplication and compression technology, as well as bringing in optimal utilization of deployed resources.
- Enterprises can shrink a workload's data center space by a factor of 15 through eliminating overprovisioning and modernizing their infrastructure.²

Multiple congruent factors have led to this pervasive overprovisioning and underutilization of data center IT infrastructure:

- In general, IT departments are measured on application performance. One way to de-risk application performance is to ensure availability of extra hardware resources.
- Using traditional approaches, IT infrastructure has been deployed based on a forecasted need derived from business projections. There are often discrepancies between workload ramp-up forecasts and reality.
- When dimensioning the infrastructure, application performance benchmarks are not always available, and multiple assumptions have to be made. Application performance in a live environment is often different from projections.
- 451 Research indicates that 92% of enterprises have to wait a month or longer for new capacity to be installed.³ This delay is related to the strong governance associated with IT assets purchases, as well as the time it takes to activate the end-to-end supply chain, including internal processes. Overprovisioning is often a way to hedge uncertainty around procurement cycles, supply chain delays, and incompressible operational activation tasks.

Eliminating overprovisioning and accelerating time to market

ITaaS is anchored in processes—business and operational—and reporting tools that support forecasting, ordering, and deploying infrastructure based on actual, measured, historical, and current utilization levels. This combination addresses the root causes of overprovisioning and accelerates time to market:

- Capacity is available ahead of demand through the deployment of a buffer capacity on-site that can be activated instantly
- Reporting tools with granular view of consumption help inform capacity expansion decisions with data
- The contractual framework makes it easy for organizations to start small and grow incrementally through change orders, as opposed to going through a new procurement cycle. This can minimize the impact of incorrect forecast or dimensioning assumptions

Given that utilization level is the primary KPI that gets charged, ITaaS brings transparency to the actual utilization levels of the deployed IT systems and workloads, building upon transparent reporting and charging mechanisms.

² Sourced from HPE customer data over the past two years

³ [Having your cake and eating it too, 451 Research, 2019](#)



Operations and administration services

As an option, ITaaS can also include operational services, to monitor, administer, or manage the infrastructure, complementing and augmenting in-house skills.

IT resources are always under pressure to improve productivity, measured by the number of elements managed by an administrator. Software tools, such as HPE OneView, that leverage templates to automate the provisioning and configuration of resources are a great way to accelerate staff productivity and efficiency. Further effectiveness can be gained by the adoption of anticipatory and self-correction technologies available in tools such as HPE InfoSight. Some organizations also opt to consume operations tools on-premises and as a service.

Adopting modular management services within an ITaaS deployment can ease the pressure on internal IT staff, freeing up in-house resources and allowing employees to contribute their expertise to business process transformation in support of larger digital and hybrid cloud transformation efforts.

CONTRACTUAL AND FINANCIAL IMPLICATIONS

Charging mechanisms of ITaaS consumption models rely on a simple formula:

Unit price x quantity used = Amount charged

The unit price will usually decrease as the users gain access to higher tiers of usage.

The ability to pay per use offers obvious cash flow benefits, aligning costs with revenues, and, if required, enabling internal cross charging with improved accuracy in the definition of the unit price and in the usage reporting.

This model also allows extra cash and budget management flexibility, beyond the immediate cash-flow benefits, with some organizations choosing to pre-pay some of the future committed capacity, while others prefer to layer a financial ramp on top of the infrastructure ramp at the program onset.

ITaaS consumption, however, requires procurement and finance departments to rethink the legacy approach of IT asset procurement. This can create challenges to some of the fundamental processes that have been deployed around IT asset acquisition. The adoption of an ITaaS consumption model:

- May require organizations to revisit their asset depreciation policies. Decisions on IT asset depreciation may not have kept up with the pace of IT innovation. The depreciation period may have been influenced more by the industry the organization belongs to, than by the actual useful life of the asset.
- Challenges traditional CAPEX and OPEX approaches. Organizations may sometimes struggle to implement and take advantage of the additional accounting treatment flexibility granted by asset-inclusive services agreements.
- May depend upon process updates to benefit from the extra flexibility in budget forecasting and allocation granted by ITaaS agreements, while keeping costs in check.

ITaaS may also require procurement officers to rethink their approach as they evolve from buying hardware and software that meet certain specifications at a defined point in time, to buying services meeting a certain service-level agreement (SLA) over the term of the contract. Having the right governance supported by digital processes to ensure the SLAs are met, requires different stakeholders across the organization. For example, procurement, supplier management, finance, and account payables departments that can stay engaged in the delivery phase of the contract and may benefit from the development of new skillsets, or the adoption of new tools.

Therefore, in some organizations, the adoption of consumption models has both an operational and a personnel skillset impact to the IT, finance, and procurement functions. This transformation should be approached following the same principles and processes as other digital transformation initiatives.⁴

TECHNOLOGY CONSIDERATIONS

While enterprises can adopt an aaS delivery model for all elements in the technology stack, this section aims to assess whether extra benefits, in effectiveness or economics, can be derived from applying aaS models to specific technologies.

⁴ hpe.com/us/en/services/pointnext.html



Effectiveness and efficiency gains support a more sustainable use of technology, by reducing the quantity of equipment that needs to be deployed to run a given workload or set of workloads.

• **Composability—effectiveness intensified**

Composable infrastructure allows fluid pools of compute, network, or storage resources to grow independently from each other to adapt to the requirements of various workloads dynamically. Composability relies on software tools to manage the hardware resources and deploy applications effectively. These tools allow IT organizations to redeploy to other workloads the modular storage, network, and compute resources that might have been over-provisioned for a specific workload because insufficient data was available at the time of requirements forecasting.

This fail-fast-and-repurpose ability granted by composable infrastructure to effectively redeploy resources if scenarios do not materialize as planned, augments the flexibility of an ITaaS consumption model. By having a constant line of sight to actual infrastructure utilization, ITaaS can maximize effective resources arbitration between workloads. Through optional management services from the ITaaS service provider, IT organizations can also ensure that the extra flexibility granted by composable features is fully operationalized. This approach allows organizations to take advantage of, for example, templates closely aligned with consumption tiers and dynamic reallocation of capacity, maximizing the operational leverage from the large software integration framework of composable infrastructure.⁵ This enables organizations to push deployed resources' utilization to an optimal level.

Therefore, an ITaaS approach is a way to take advantage of and operationalize the composability of the hardware stack, thereby, making a more efficient use of resources deployed and materially de-risking digital transformation projects through fail-fast-and-repurpose options.

• **Storage—effectiveness benefits**

Modern storage technologies that do not require downtime when going through updates and upgrades are also particularly well-suited to ITaaS consumption models, which enable scaling of the capacity in small increments. In such cases, capacity additions will not be disruptive for the applications and can be scheduled as needed, staying close to the demand curve, as opposed to having to plan rigid maintenance windows and downtime.

• **DevOps—effectiveness benefits**

As mentioned in the introduction, although ITaaS is perfectly suitable for bare-metal infrastructure, it also brings the flexibility required to operationalize the flexibility brought by virtualization, containerization, and cloud-native architectures. Through the availability of a capacity buffer, an ITaaS consumption model allows administrators to allocate time-bound resources to the “Ops” part of DevOps without the requirements to stage specific test systems, which may only approximately replicate the actual operational environment.

• **Containers—efficiency benefits**

The adoption of container technology and microservices-driven application architecture is growing, as organizations require increased portability of their workloads. Containers are sometimes considered to deliver a more efficient use of compute resources compared to other virtualization technologies; however, this particular topic is beyond the scope of this paper.

However, IT operations and administration of container environments can be very complex with multiple platforms and multiple versions of a given platform running concurrently, all of which require frequent updates. This demands robust processes from the operations staff to maintain version control and patching, and may require new skills to be acquired.

Applications that leverage container technology can benefit from running on an underlying ITaaS layer through its ability to rapidly scale in increments of any required size. Organizations may also want to include management services to address specific exponential operational challenges caused by the deployment of container-based microservices. Machine learning (ML) applications operations (MLOps) is a good example where adopting a MLOps-as-a-service approach can yield significant efficiency and productivity benefits.⁶

• **Specialty resources—economic benefits**

Specialty resources such as high-performance computing, Big Data analytics or ML/artificial intelligence require a significant investment and by definition cannot start small. These solutions are often deployed as a pool of resources available to various departments within an enterprise, a university, or a government department. The benefits of adopting an ITaaS delivery model for these specialty resources are multiple. ITaaS allows organizations to:

- Spread the costs of the solution over the term of the contract, easing cash flow.
- Periodically refresh the technology to stay ahead of the performance curve, which is particularly critical for specialty resources.
- Apply accurate, reliable, and granular chargeback to internal departments. A charging granularity down to, for example, the processor core level, can bring transparency and accuracy to the cost of resources. In turn, this will reduce the inherent data security and compliance risks of shadow IT.

⁵ hpe.com/us/en/integrated-systems/synergy.html

⁶ hpe.com/us/en/solutions/machine-learning-operations.html, hpe.com/us/en/solutions/container-platform.html



CONCLUSION

As we have seen, an ITaaS consumption model delivers operational, financial, and time to market benefits that can be applied to a large variety of use cases, from bare-metal infrastructure to large-scale digital transformation projects.

ITaaS is particularly effective for composable infrastructure, storage arrays that can be updated without downtime, DevOps environments, and containerized applications. By having the primary KPI focused on utilization of deployed resources, ITaaS offers an efficient framework that eliminates overprovisioning and as a result increases infrastructure utilization.

In its paper, *Beyond PUE, Tackling IT's wasted Terawatts*, the Uptime Institute identifies increasing server utilization as one of the few major energy saving opportunities in IT, alongside optimizing the server refresh lifecycle, right-sizing redundancy requirements and consolidating the infrastructure.⁷ While the paper specifically focuses on servers, as they represent the larger share of data center electricity consumption, broader efficiency can be achieved by applying a consistent approach across all categories of data center equipment, including storage arrays and network equipment.

An ITaaS delivery model addresses the top two areas highlighted by the Uptime Institute as being responsible for inefficient data center IT energy consumption: overprovisioning and lifecycle management. ITaaS thus paves the way for a more sustainable use of IT.

The [second part](#) of this white paper highlights in more details how the adoption of ITaaS not only enables organizations with the insights, flexibility, and control to accelerate their digital transformations, but also enables them to do so sustainably. It provides insights into how ITaaS represent a shift toward supplier responsibility, circular IT, as wasted infrastructure, and processing capacity are eliminated and manufacturers maintain custody over equipment to manage assets at end-of-use.

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hpe.com/us/en/living-progress.html

⁷ uptimeinstitute.com/beyond-pue-tackling-it-s-wasted-terawatts

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