Transform to a modern enterprise with hybrid IT
In today’s digital reality, enterprises need strategies that enable traditional IT to work in harmony with analytic-intensive data streams located on-premises, in the cloud and at the edge. Pressure to move information processing close to the data — due to high data volumes, data variety, and the need to minimize analytic latency — is forcing enterprises into public clouds at a remarkable rate. Even enterprise transactional systems are beginning to migrate and transform for agility and flexibility. As the industry undergoes this dramatic transition, hybrid IT operations that span on-premises, data center, cloud and edge become essential.

Hybrid IT embraces integrated teams that have development, deployment and operational experience and blend business, IT and partner expertise. These teams focus on business outcomes for accelerated performance while driving learning at scale. In a nutshell, hybrid IT takes modern approaches, including DevOps, automation, community sourcing, machine learning and artificial intelligence (AI), and pulls the legacy environment forward to provide more business value.
By 2020, over 90% of enterprises will use multiple cloud services and platforms — a transition supported by investments to manage resources across platforms — with more than one-third of these organizations having established mechanisms to operate their multicloud environments.


As enterprise information shifts into the cloud and out to smart devices and “things,” organizations need new strategies that enable IT to work in harmony with resources on-premises, in the cloud and at the edge.

The challenge is how to accelerate the pace of change by stitching together legacy environments — which aren’t going away anytime soon for a variety of business, security, compliance or technical reasons — with emerging capabilities, creating a seamless hybrid IT environment.

Hybrid IT extends beyond hybrid cloud and integrates traditional infrastructure, public and private cloud technologies and platform services to enable an agile application portfolio that meets the dynamic needs of the digital enterprise. Hybrid IT supports processing that is closer to the data, and emerging longitudinal data platforms that are latency-aware.

Hybrid IT automates and modernizes the applications estate, places workloads in their optimal location, embeds security, enables an IT brokerage model and creates a simple, agile, on-demand environment. Hybrid IT also lays the foundation for embracing new technologies such as serverless, platform as a service (PaaS), IoT and edge computing — all with an eye toward improving business outcomes.

This paper explores the benefits, challenges and opportunities of hybrid IT, and the need for a new operating model because of scale, complexity and distribution of data and processes.

The benefits of hybrid IT

The core promise of hybrid IT is it will improve efficiencies and do so at a pace and scale the business requires. Based on DXC Technology’s experience with customers, hybrid IT can significantly speed an organization’s growth while simultaneously reducing IT capital costs, reduce the number of business applications in use, and ultimately provide a dramatic drop in overall operational costs as well.

For example, a multinational financial institution we worked with was burdened with legacy applications that took months to modify and cost a bundle. By moving to hybrid IT, the company was able to bridge its traditional environment to cloud-based resources and accelerate change.
The company first built a pilot virtual private cloud (VPC) environment on Amazon Web Services and migrated some applications to AWS VPC. It then built a digital pipeline that made it possible to support continuous integration, continuous delivery and continuous testing of applications.

Once it was comfortable with the new facilities, the company began migrating apps to AWS VPC, refactored selected strategic applications to cloud application architectures, and began building new applications with cloud architectures.

Today, the company has moved more than 150 applications to AWS. It is creating new environments on demand in less than an hour. And it has put in place a new framework for establishing total cost of ownership per application.

Or consider a financial services company that uses cloud-based market and trade analytics functions as well as traditional hosted applications for initiating and confirming market trades. Consumers use mobile apps to monitor the market, research investment ideas and trade financial products. These cloud-based, traditional and mobile applications work in an integrated fashion to deliver a complex financial trading experience.

Ultimately, a hybrid IT environment enables a whole new style of execution characterized by collaborative development environments, consumer-controlled personalized experiences, a cloud-first strategy, and data-driven decisions arrived at with the help of machine learning and AI.

For example, in a manufacturing scenario, data from IoT sensors monitoring the performance of machines on the factory floor can be ingested using an edge computing infrastructure. Data analytics is first performed locally; then the data is transferred to a data lake in a cloud environment where advanced analytics, AI and machine learning are applied to larger data sets to gain critical insights. These insights can be used to automatically initiate actions in production and supply chain systems that execute in a traditional infrastructure environment. The hybrid IT components are managed in an integrated fashion to deliver the end-to-end business processes.

As these examples demonstrate, the potential benefits of hybrid IT are compelling, yet there are notable challenges facing CIOs as they work to embrace or accelerate hybrid IT.

By 2022, more than 40% of organizations’ cloud deployments will include edge computing to address bandwidth bottlenecks, reduce latency, and process data for decision support in real time.

Why AI needs the cloud

Although the power of machine learning grows as more data becomes available, and we are generating new data at an astounding rate, we are far from putting this data to good use. By some analyst estimates, we may be capturing only 20 to 30 percent of the value of our manufacturing data, 10 to 20 percent of the value of public sector data (European Union), and 10 to 20 percent of the value of our healthcare data (United States).¹

In every industry, the barrier to capturing the full value of data is nearly the same. Data is locked away in silos. Getting a machine to spot meaningful insights typically takes a lot of processing power and data storage capacity. And the enterprise has yet to be shown a convincing demonstration of the data’s potential.

These are all challenges that can be met with the proper deployment of cloud technology. The cloud is the fastest and least expensive way to integrate data. The cloud brings sophisticated algorithms, fast computing platforms and massive storage capacity within reach. It lowers the barrier to adoption and makes it easier for enterprises to get their feet wet with inexpensive experiments. Cloud services make it easier to build compelling applications quickly by delivering in small, meaningful chunks.

The cloud is also what will enable artificial intelligence (AI) to become a ubiquitous and essential part of business operations. By bringing data together in the cloud, which is emerging as the future platform for the intelligent enterprise, algorithms trained by faster, smarter data will play a key role in enterprise transformation.

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¹ Source: [This article](https://www.sciencedirect.com/science/article/pii/S0033586619301744)
Challenges and opportunities

Managing hybrid IT well is the fastest route to becoming digital, because it lets you leverage what you have while harnessing new capabilities, and the pressure to be digital has never been greater. According to a survey by Harvard Business Review Analytic Services, 79 percent of business leaders surveyed said their organization must go through extensive or substantial change over the next 5 years in order to become more digital.²

Becoming more digital inevitably means using the cloud (public or private) more effectively, and that responsibility falls on IT. According to RightScale’s 2018 State of the Cloud Report, nearly 70 percent of respondents said enterprise IT was responsible for advising which apps to move to the cloud.³

Unfortunately, confidence in IT’s ability to execute the company’s digital agenda is lacking. In the HBR Analytic Services survey, only 17 percent of respondents said their IT organization was extremely capable, and only 45 percent saw IT as being moderately capable. Even worse, 36 percent said their IT group was not capable at all.⁴

The internet of things (IoT) could be the biggest thing to hit IT since the cloud, and it won’t leave IT looking quite the same. Business operational technology (OT) — such as machine sensors and telemetry data that was previously consumed by supervisory control and data acquisition (SCADA) systems — is increasingly being instrumented and enabled through IoT software, which very much sits within the IT realm.

IT is becoming business technology and with that comes more scope, more work, and some different thinking and approaches. Now IT is even more critical to the organization’s success.

The next paradigm shift involves IoT’s close relationship with machine intelligence (MI). One without the other makes little sense. Although MI brings its own sets of challenges — namely, in skill acquisition — it brings a significant advantage in insight that allows a business to act based on richer pools of data. The impact to business technology, not insignificant, will be what we’ve seen before: requirements for new skills, new tools and new partnerships.

At the same time, we see a race to the edge. Using centralized cloud-based models to collect, store, process and develop insight from vast quantities of IoT-generated data isn’t cost efficient, and in most cases is cost prohibitive. An edge-based architectural paradigm needs to be embraced, with a layer of MI, analysis, preprocessing, and data-wrangling done as close to the source as possible and prior to transmission to the cloud.

Once this cost efficiency is realized, you will get the added benefit of speeding data processing and be in a better position to deal with regulatory issues by storing data in the location it was generated in, rather than transferring it across borders. Data also has a value, which can rapidly decay over time. If your data is subject to fast levels of decay, then you need to analyze and respond to it quickly, making the edge the best place to do this.

But this isn’t a zero-sum game. The edge will augment the cloud, and a hybrid model is the best way to support it. However, the edge will also offer operational challenges for integrated monitoring and management, as well as for availability and reliability in the face of distributed partial failure realities.

That said, hybrid IT provides the ability to react in real time to data at the edge, while also aggregating data for analytics and integration with specific edge technology devices. Key data is then passed to the cloud for historical analytics, deep learning and training, long-term persistence of important data, and integration back into corporate systems.

Leading Edge Forum (LEF) is DXC Technology’s independent cross-industry think tank.
Clearly, IT faces a challenge, but it also has a tremendous opportunity to take a leadership role in helping the company achieve its digital business goals. That’s why mastering hybrid IT is so important.

**Getting started**

The first step is for CIOs to connect with the business to establish clear lines of communication and to set common goals. Within the IT organization, CIOs must set policies that identify the need to prepare for hybrid IT as a top priority.

Then we recommend assessing the company’s applications and IT estate and creating a roadmap to guide the journey to optimal hybrid IT. This roadmap should compare current and future run costs to create a business case for change; assess application and workload placement and data locality options; recommend application transformation requirements; consider IT policy and operating model factors; and ultimately produce clear, data-based recommendations with a proposed execution plan to enable hybrid IT transformation to happen.

Getting there will require transforming and migrating applications, integrating and orchestrating environments, automating and monitoring business services, enabling digital processes, and integrating data and security. See Figure 1.

**Tactics and techniques**

As companies embrace hybrid IT, they must address both technology and the human side of change. There are several key actions to take:

- **Staff and train differently.** As applications move from traditional platforms to the cloud, current IT staff must be trained and re-skilled. Companies should recruit developers adept in Agile methodologies, and support a culture of learning at scale. Siloes should be broken down, and the workforce should become more integrated, multifunctional, flexible and agile.

![Figure 1. Hybrid IT: Transform, integrate, orchestrate and automate platforms and outcomes.](image)
Enterprises that demonstrate high digital maturity are experiencing, on average, a ~35% higher revenue growth than competitors.

Source: HfS Research: Make Digital Your Core Strength, May 2018

- **Overhaul change management.** The existing governance processes, gates and approval procedures designed for traditional legacy IT environments are no longer appropriate in a cloud environment. Companies should revamp their change management systems to allow changes to happen quickly and, using automated workflows, to reduce manual intervention.

- **Integrate cloud operations.** As organizations move workloads to the cloud, the IT operations function should adapt to manage both on-premises and cloud-based applications. This new model, called CloudOps, can provide continuous integrated operations in a multi-cloud environment to enable rapid response to events, incidents and requests. Adding DevOps to the mix then utilizes automation, integration and organizational change to enable more frequent enhancements that result in higher quality software.

- **Automate support.** To the extent possible, automate IT support functions. For example, the traditional trouble ticket system can be manually intensive and inefficient. Automation can improve service and free up IT personnel for higher-level activities. Longer term, companies will be able to deploy machine learning and AI to take log data from cloud-based systems and automatically take actions to resolve or even prevent incidents. The idea is to learn once, fix with code and share learnings to improve code over time and scale knowledge.

- **Manage “shadow IT.”** Business units are often acquiring the cloud services they need because IT moves too slowly. At some point, those services must be integrated back into the traditional IT environment for operational and security reasons through a services governance model that encompasses hybrid IT elements. In addition, it’s important for CIOs to have a handle on what the enterprise is spending on IT services. The only way to accomplish this is to adopt hybrid IT and demonstrate to business units that IT can support the pace and scale that the business requires.

**Serverless, PaaS, IoT and edge**

A key benefit of embracing a hybrid IT model is it makes it far easier to more quickly embrace emerging technologies.

Applications development and container platforms, such as Red Hat OpenShift, enable the enterprise to build, deploy and scale applications across multiple infrastructure environments using Agile and DevOps processes. This frees up developers to focus on delivering business value rather than managing technology.

Serverless platforms such as AWS Lambda allow developers to focus on delivering innovation in a scalable, high-availability environment without worrying about the underlying infrastructure. Similarly, platform-as-a-service (PaaS) capabilities in the public cloud allow companies to develop and manage services to deliver business value, while the cloud or other third-party provider manages the platform and the licensing.

For example, a multinational consumer goods company worked with DXC on a hybrid IT approach to migrating applications to the cloud. The planning process included determining the best placement for each application, a one-time exercise of optimizing and right-sizing each app for the target platform, and continuous optimization of the app infrastructure.

The outcome was a 63 percent reduction in server count and server utilization exceeding 80 percent. This was achieved in four steps: Traditional apps were
How hybrid IT supports Agile and DevOps

To build adaptive applications that keep pace with change today, businesses require an integrated hybrid IT environment that supports Agile and DevOps processes.

With Agile, there’s an ongoing process of feedback, constant creation of new iterations and continuous delivery. With DevOps, the development and operations teams work together in the development process so that quality assurance, bug testing and security requirements are taken care of as the application is developed, instead of being considered after deployment.

In a hybrid IT environment, not only are Agile and DevOps used to create new applications, but those apps are linked via APIs to back-end legacy applications to create seamless business processes. Continuous delivery processes enable deployment of application components and services to the most appropriate hybrid IT landing zone (public cloud, private cloud or traditional infrastructure) to meet technical and compliance requirements.

A large U.S. airline wanted to streamline its operational processes and accelerate its applications delivery services for airport irregular operations (IROPs). It also wanted to containerized using Docker to increase server utilization; 19 percent of the database server estate was migrated to a new cloud database; some applications were migrated to advanced PaaS for autoscaling and traffic management; and 5 percent of the server estate was replaced with serverless computing.

The ability to extend the enterprise to the edge to gain business insights from sensors (i.e., IoT) is another important aspect of hybrid IT. In addition to deploying IoT devices, companies need to create a multi-tier edge computing architecture, where some processing of raw IoT data occurs at the edge for quick analysis, while deeper analysis takes place at the core. Platforms such as General Electric’s Predix and Hitachi’s Lumada allow you to gain actionable insights from IoT data both at or near the edge and from central resources in the cloud.

The horizon view

The goal of hybrid IT is a well-managed, well-integrated environment that consists of rock-solid traditional IT environments for legacy applications, as well as private and public clouds for deploying new features and functionality at a dramatically improved pace and scale. CIOs who partner with the business and guide their teams to integrate and optimize workloads across multiple platforms will accelerate the organization’s digital transformation.
How DXC and its partners can help

DXC Technology can enable your enterprise journey to hybrid IT, regardless of your starting point.

Our advisory services can help you draft a hybrid IT roadmap with a clearly defined business case and prioritized recommendations by workload, or accelerate efforts already underway. Our recommendations reflect deep industry knowledge and contextual knowledge about your business.

You can access our digital skills and resource teams to adopt change quickly — from application migration, transformation and integration to cloud-native apps development, containerization, platform services and microservices — to enable your enterprise to thrive in public and virtual private environments.

Then we can help you pull it all together through integration solutions that enable smarter sourcing decisions and multisupplier integration and governance.

Finally, we help you run it all at a lower cost using CloudOps delivery enabled with DevSecOps capabilities and extreme automation from our DXC Bionix™ digital generation services delivery model, which is underpinned by Platform DXC, our digital-generation delivery platform. Platform DXC allows DXC to quickly build and deliver partner-engineered, at-scale, repeatable offerings and solutions that help drive digital transformation. DXC’s vast Partner Network plays an integral role, providing best-of-breed technologies to automate tasks, processes and workflows — increasing speed, quality and innovation.

We have established more than 250 industry-leading global Partner Network relationships, including partnerships with Amazon Web Services (AWS), Microsoft Azure, VMware, SAP, Virtual Clarity, Red Hat and Pivotal.

We have 6,500 accredited and certified cloud services staff, and more than 800 managed cloud customers in more than 70 countries. In total, we have more than 558,000 virtual machines under management, and we have more than 570 solutions running managed services for VMware and virtual private clouds.

We go beyond creating a strategy: DXC helps you plan it, do it, run it and self-fund it.

Now is the time to act. Don’t be disrupted — be the disruptor. Let us help you innovate and transform to differentiate with speed and quality. That’s DXC. That’s Digital Delivered.

Learn more at dxc.technology/cloud
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3. “RightScale 2018 State of the Cloud Report: Data to Navigate Your Multi-Cloud Strategy,” [https://www.rightscale.com/insights/2018-state-of-the-cloud-report](https://www.rightscale.com/insights/2018-state-of-the-cloud-report) © 2018 RightScale, Inc. All rights reserved. This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

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