How Digital Transformation Is Redefining Enterprise Workloads, Infrastructure, and Operations

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Questions posed by: Cisco
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Q How are digital transformation (DX) initiatives redefining applications and datacenter workloads?

A Businesses undergoing digital transformation focus on objectives that balance tactical and strategic goals such as improving operational efficiencies and customer satisfaction, increasing existing product revenue, improving profit margins, and pursuing new digital revenue streams. Digital businesses recognize that data represents a form of digital capital with increased data intelligence, and they are using this information to fuel new revenue-generating digital products and services. The premise of such digital businesses is built upon using advanced analytics to unlock new business insights from an expanding sphere of data and enable unique digital experiences. This objective requires a highly integrated and distributed IT.

Because of these new digital business objectives, enterprise workloads are shifting to a deployment-agnostic model, which moves from silicon dependent to silicon agnostic and ultimately to silicon independent. This deployment-agnostic model will stretch from edge to core to cloud, and it will be capable of using a variety of vehicles for computing and data persistence. As engagement models diversify and digital insights become more pervasive, changes are also frequently required to traditional systems of record, content, collaboration, and other associated workloads.

Migration and modernization activities have become critical to organizations building and extending digital platforms with the aim of monetizing newly developed digital services. Most enterprises have a mix of commercial and custom applications deployed in their environments, and many of these could be considered next-generation (cloud-native) in the way they are built and maintained. Many organizations are refactoring, repackaging, and replatforming these applications to make them elastic in how they utilize infrastructure and to ensure that functionality is more consumable to digital business uses. This is important because most enterprise workloads have multiple interdependencies that must be considered as part of broader DX initiatives.
Digitally transformed organizations are also developing new applications that are composite in nature (i.e., built using composite workloads) and assume the availability of infrastructure, cloud, and software components necessary for a complete multicloud experience. Developers are increasingly favoring integrated platform-as-a-service (PaaS) frameworks that include containers as a service (CaaS) and serverless architectures that include functions as a service (FaaS). Tighter full-stack integration of these composite applications will be required to meet the compliance, agility, and security requirements of these workloads. It’s worth noting again that these workloads have an increasing number of application and data interdependencies that need to be considered when combining new cloud-native composite workloads with existing on-premises data and applications.

These new composite workloads will have significant impacts on both infrastructure and the IT organization itself. Infrastructure and operations leaders will need to adopt an application-centric approach to cloud-native workloads that focuses on managing application programming interfaces (APIs) and service-level agreements (SLAs) and not on managing physical infrastructures. Key performance indicators measuring operational efficiency, increased profitability, new customers, improved customer satisfaction, and faster product/service innovation will become critical as enterprises increasingly benchmark themselves against digitally native organizations.

**Q** What are the implications for datacenter infrastructure?

**A** The datacenter’s role will continue to rise as digital business and cloud computing become more prevalent. In this digital world, there is a proliferation of application deployment models and locations. The continuum of applications and data powering digital organizations will extend from the core to both the cloud and the edge, resulting in a new type of distributed IT that will also begin to redefine operational technologies as they intersect with the Internet of Things (IoT). IT is increasingly managing applications that are deployed in some combination of on-premises private clouds, remote virtual private clouds, bare-metal clouds, and public cloud environments. The less these look like disparate silos, the more IT can offer agility and a flexible set of deployment scenarios to its constituents. However, fundamental improvements in infrastructure capabilities will be required in order to make all of this easily consumable for IT users.

Enterprises must address their application requirements while reducing the operational infrastructure complexity currently limiting success. Indeed, bringing simplicity to this potential morass of multicloud complexity will be a challenge for vendors and datacenter infrastructure operators alike. Composite workloads are designed with software functions decoupled from the underlying hardware while making use of specific
hardware technologies to deliver rich end-to-end performance. The characteristics of composite workloads include the following:

» Custom workloads relying heavily on open source stacks so that developers can put together complex software stacks, unconstrained by what is available off the shelf

» Highly dynamic and feed off generational shifts in infrastructure, including the rise of abstractions that shield developers from having to worry about the underlying details and intricacies of the infrastructure

» Newer approaches to utilizing infrastructure including hyperconverged infrastructure (HCI)

Organizations are making their largest-ever investments in enterprise infrastructure in response to DX and their new application and data models that stretch from core to edge. In a digitally transformed infrastructure, services are closely aligned with business initiatives. IT should consider deploying and operating infrastructure solutions that combine and automate the computing platform, network fabric, storage resources, virtualization capabilities, and necessary analytics. These modern infrastructures must enable consistency, flexible consumption, rapid deployment, and expansion while supporting the evolutionary nature of IT processes. Modernized IT infrastructures will use new "build and deploy" paradigms coupled with infrastructure-agnostic data service models to extend the value of the information at hand.

Infrastructure and operations professionals are increasingly strategically involved in the modern digital enterprise. Their charter has shifted toward the delivery of new products and services and away from the delivery of engineering and operations. Infrastructure is both rapidly growing and expanding to the edge, which increasingly drives the need for intelligent infrastructure and network automation. Organizations must prepare for the notion of pervasive and abstracted infrastructure while working within constrained budgets and economic pressures. Enterprises need to choose their infrastructure partners carefully to ensure global success, and they need to unlock value from their infrastructure partners’ recent investments while shifting the internal differentiated focus to the richer integration of applications and data.

Q: How is the edge impacted by IT transformation?

A: The edge is part of a distributed computing topology where information processing is located close to the edge, which is where people and IoT devices either produce or consume data. The shift to a policy-driven and highly automated technology portfolio that spans on-premises private clouds, remote virtual private clouds, bare-metal clouds, public cloud environments, and edge IT locations is already underway. Organizations need to maximize the benefits while reducing complexities associated with the transformation to the WAN edge. As businesses seek value from insights generated from distributed, diverse, and dynamic information across their organizations, next-generation composite applications will require location- and infrastructure-agnostic data services and applications.
This requirement will also expose the need for consistent environments that span on-premises and public cloud resources for development, test, and production workloads. As applications become increasingly distributed from core to cloud to edge, the relevance of the network increases significantly.

Infrastructure and operations leaders must be equipped to locate workloads based on business needs while not being limited by physical location. Using multiple IT locations raises issues of security and compliance, but appropriate network strategies can help address these issues. Traditional enterprise WAN is an unfriendly architecture for cloud and edge workloads because of the inherent complexity, expensive bandwidth, and fragmented security. Software-defined WAN (SD-WAN) architectures provide a path that enables a more efficient transition to the cloud and IoT initiatives at the edge while introducing security capabilities that modern enterprises will require. Multicloud IT models require that datacenter software-defined networking (SDN) overlays extend to public clouds to provide simplicity and flexibility through the automated enforcement of consistent network and security policies throughout the distributed application environment. This ensures that the on-premises datacenter is extensible to both the public cloud and the edge.

Q How can infrastructure and operations teams thrive in this new datacenter reality?

A Most IT organizations continue to experience budget and staffing limitations. Infrastructure and operations leaders must work to balance costs, IT projects, and expectations from the lines of business (LOBs) with their own internal staffing justifications. Organizations thus need to connect staffing levels to strategic objectives. Whenever possible, businesses should exploit the simplification potential of commercial offerings including artificial intelligence (AI)–infused intelligent infrastructure and hyperconverged infrastructure. Enterprises should focus on differentiating competitively through the strategic application of new data models and applications, not through bespoke infrastructure and operations. They should choose solutions from their vendors that are both easy to run and secure.

New cloud operations and orchestration tools are also needed for network services to achieve cloud-based management that scales consistently and economically. Network transformation at the enterprise edge is critical. Intent-based networking (IBN) uses advanced automation, visibility, and analytics tools to implement, secure, and dynamically maintain the network operator’s desired state of the network. The architecture has the potential to reshape how enterprise networks enable applications and data that span on-premises private clouds, remote virtual private clouds, bare-metal clouds, public cloud environments, and edge IT locations. As a result, IDC sees the need for AI-infused infrastructure and tooling to scale IT operations staffing capabilities for this explosion in applications and data under management.

Centralized deployment and operational models for deploying "network as a service" across the enterprise, extending to security, are becoming critically important. This centralized approach enables the dynamic introduction of new capabilities faster while improving the ease of management for distributed enterprises that need optimal access to multicloud and distributed applications. IT leaders would be wise to seek out commercial offerings that solve the fundamental infrastructure challenges with an architectural approach.
At the same time, enterprise technologists should avoid investing their own resources to engineer these solutions themselves. Organizations need to avoid the temptation to cover gaps in the environment with multiple layers of overlapping (and potentially conflicting) abstraction, which create more complexity and constrain agility and flexibility.

Q How can enterprises bridge the technology and skills gap?

A Cloud-based operations are becoming more prevalent on-premises, and IT operations are quickly extending out to the intelligent edge. As a result, IT skills and processes need to consider IT governance needs while maintaining close alignment between IT operations and business drivers. Historically, IT staff have been vertically organized and effectively siloed based on the technology stack they were tasked with managing. As businesses embrace a new type of distributed IT that stretches from core to cloud and out to the edge, people in the IT organization will need to work horizontally and collaboratively across traditionally siloed stacks to detect and remedy technology issues impacting the business in near real time. Expanding the skill sets, practices, and procedures to accommodate multicloud operations is becoming critical to success. IT professionals will need to be versatile and adaptable.

IT is increasingly taking on the role of supporting cloud services in terms of aggregation, customization, integration, and governance. A big challenge with cloud services is keeping costs under control, and the business will expect infrastructure and operations professionals to do exactly that. IT will need to become a service broker, which is a shift from its traditional focus on engineering and operations. As organizations rethink the talent and processes necessary to reduce risk and accelerate the development and deployment of new business applications, new roles and skills are emerging that span traditional technology domains such as:

» DevOps architect
» Cloud architect
» Cloud administrator
» Cloud resource manager
» Developer of sandboxes and code exchanges

IT governance will need to be elevated as IT operations are aligned with IT investments in support of business priorities. This change is best accomplished by adopting a framework that focuses resources across an organization to meet business goals while increasing efficiency and reducing risk and complexity. New processes emerge such as:

» Operational intelligence via real-time business analytics
» Operational orchestration that automates routine IT tasks such as maintenance and incident resolution

In the end, the best advice is to seek technology partners that optimize their solutions for automation and offer support for these new IT roles, skills, and processes.
As digital business and cloud computing become increasingly prevalent, enterprises must shift to solutions that enable agile deployments, continually changing infrastructure, and monitoring. Cisco removes the complexity of on-premises, decentralized, and multicloud workloads associated with digital transformation.

The Cisco Data Center empowers customers with the flexibility to run and operate traditional or cloud-native applications across any environment including on-premises, cloud exchange, and multicloud. Customers can apply a consistent policy for any workload within any location, on-premises or cloud ensuring operational efficiency and consistency. The architecture delivers the required results by tying analytics, automation, and policy-driven security to provide customers with the best aspects of data centers and cloud. This reduces the operational expense and addresses the skills gap to support digital transformation initiatives.

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Matt Eastwood manages IDC’s market analysis, tracking, forecasting, and consulting for enterprise computing, storage, networking, systems infrastructure software, infrastructure services, cloud services, edge, datacenter, and developers. He leads a team of analysts responsible for identifying and analyzing people, process, and technology trends affecting the deployment and management of edge infrastructure, enterprise datacenters, and clouds worldwide.