

Software-defined infrastructure solutions give IT departments a new avenue to rethink their compute, storage, and networking capabilities. This creates a unique opportunity to modernize operations and align with the requirements of today's digital businesses while reducing cost and complexity.

Organizations May Not Achieve Digital Transformation Initiatives Without Software-Defined Infrastructure Capabilities

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Digital Transformation Drives IT Infrastructure Evolution and Modernization

IDC defines digital transformation (DX) as the continuous process by which enterprises adapt to or drive disruptive changes in their operations, customers, and markets. DX isn't defined by a single initiative on a fixed time frame. For many organizations, DX is thematic in nature and serves as an umbrella for technology and operational change across business units. Because of the multifaceted nature of DX, many businesses struggle to implement a cohesive DX strategy, and some may fail entirely. In part, this is due to technology shifts that change how organizations transact business, address customer expectations, operate and secure products and services, and compete in the marketplace.

IDC estimates that worldwide spending on technologies and services that enable digital transformation will reach \$1.97 trillion in 2022. From a technology perspective, hardware and services spending will account for more than 75% of all DX spending in 2019. Furthermore, IDC expects that by 2020, 30% of G2000 companies will have allocated capital budget equal to at least 10% of revenue to fuel their DX strategy.

Budget allocation to DX initiatives is a significant first step for many organizations, but the success of these initiatives will depend in large part on the adoption of modern IT infrastructure capabilities. The technological requirements inherent to DX initiatives (more and faster gathering, processing, and analysis of data) demand new infrastructure solutions that can lower costs while providing higher levels of operational efficiency. Specifically, organizations need to implement automated, agile, and scalable infrastructure capabilities to accommodate the architectural and functional requirements of next-generation applications (e.g., virtualized, containerized, cloud based, NoSQL, Big Data). Software-defined infrastructure (SDI) — which, in the broadest terms, comprises software-defined compute, networking, and storage — is an essential capability needed to support modern, digital enterprises. This IDC Technology Spotlight further explores the link between DX and SDI and why this emerging infrastructure paradigm is so important to modern businesses. In addition, the document examines the role that vendors such as Veritas play in making this evolution a reality.

AT A GLANCE

KEY TAKEAWAYS

- » Digital transformation initiatives impact a range of technology and business operations.
- » Spending on DX initiatives is forecast to reach into the trillions of dollars by 2022.
- » Allocation of spend to modern IT infrastructure solutions is a critical element for the success of DX initiatives.
- » Software-defined infrastructure solutions provide the flexibility and scale needed to meet the demands of wide-ranging DX initiatives that require the collection and management of more (and diverse) sets of data than ever before.

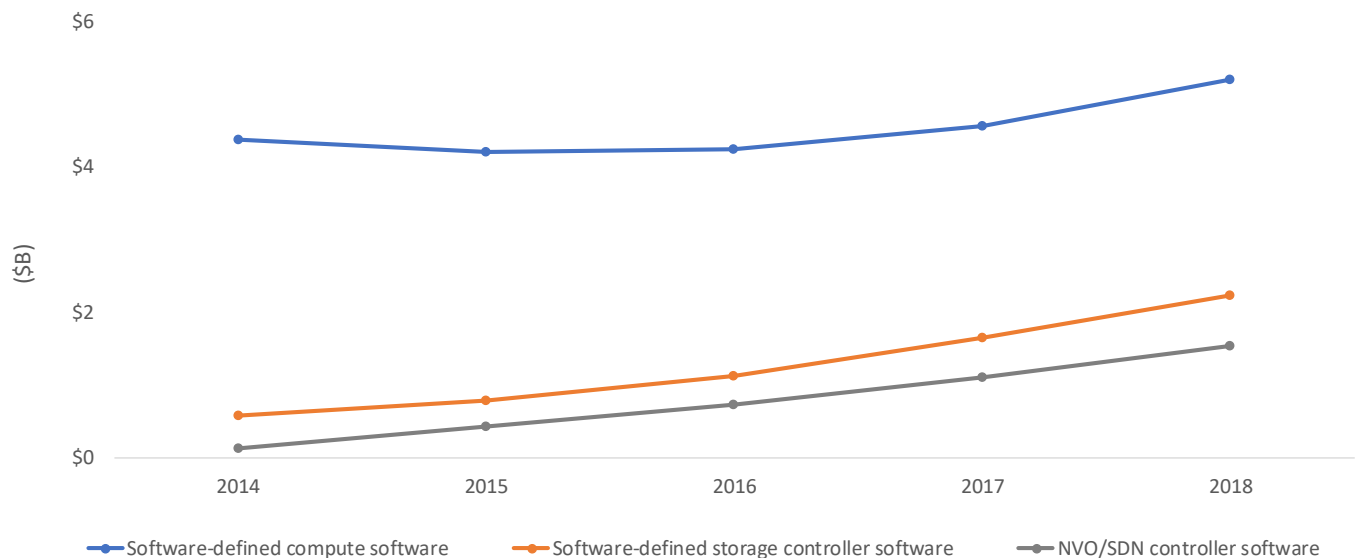
Definition

Software-defined infrastructure (SDI): SDI refers to logically pooled resources of compute, memory, storage, and networking that are managed by software with minimal human intervention. SDI systems are independent of the underlying hardware. SDI enables policy-based automation of IT operations such as monitoring, provisioning, and configuration. Typically, SDI is addressable/accessible via open APIs. SDI encompasses modern infrastructure that can deliver the performance and agility demanded for both existing virtualized workloads and next-generation applications. SDI solutions can be deployed within appliances, as software only, or as part of a cloud service.

Software-Defined Infrastructure Capabilities Allow Organizations to Achieve Higher Levels of Optimization and Application Availability

SDI technology provides enterprise IT departments with a way to rethink how they deploy, manage, consume, and refresh infrastructure resources with an eye toward reducing costs and increasing operational efficiency. IDC research shows that the three main segments of SDI — software-defined compute, storage, and networking — have been growing steadily over the years, indicative of the increasing demand for these solutions (see Figure 1).

FIGURE 1: **Worldwide Software-Defined Infrastructure Market Segment Growth**



Source: IDC, 2019

The continued growth of SDI market segments is driven in part by the wide range of benefits that organizations derive from the proper implementation and management of SDI. Benefits include the following:

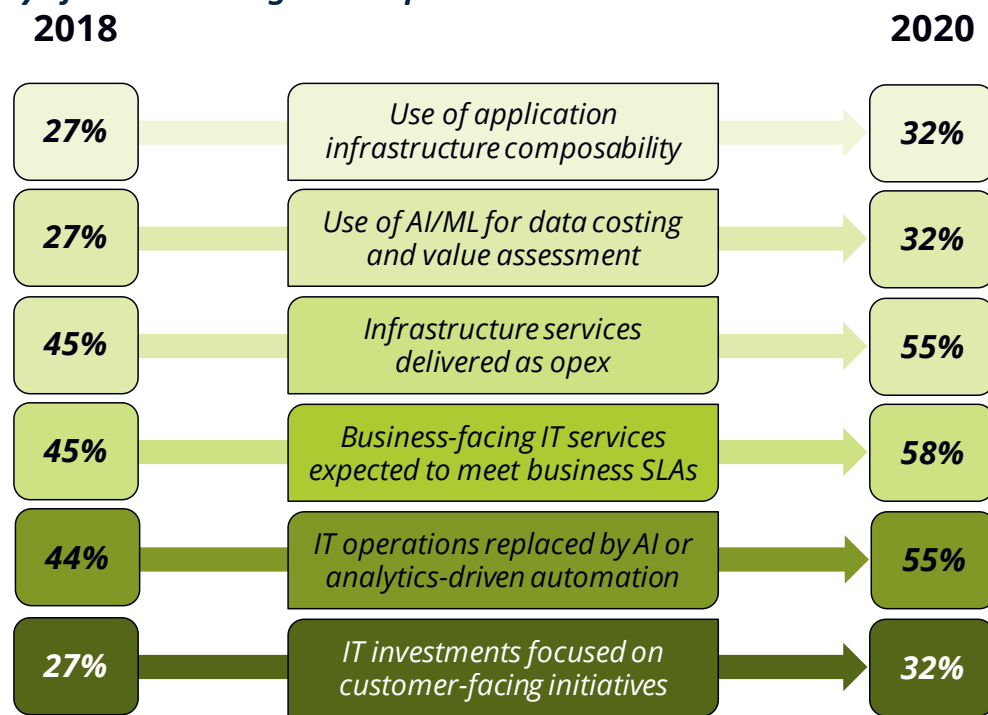
- » Increased visibility into and control over datacenter infrastructure and ability to configure systems optimally and seek to utilize them fully, thus reducing the cost of delivering services
- » Ability to leverage industry-standard general-purpose servers that have raw compute, storage, and networking capabilities that work best when they are pooled together

- » Ability to orchestrate across cloud and on-premise infrastructure with the help of software-defined compute, storage, and networking resources that can be pooled and managed centrally via software (This enables not only visibility and performance optimization but also ease of migration depending on where an application runs most efficiently or securely.)
- » Better response to dynamically changing and/or unanticipated workload and application requirements, better planning for growth, and improved service quality
- » Ability to automate, streamline, and simplify a wide range of IT tasks and processes achieving operational efficiencies, enhanced performance and availability, and task savings
- » Improved service-level agreements (SLAs) and increased agility by delivering faster time to value and fewer service interruptions (whether downtime is planned such as when migrating a business-critical application to a new infrastructure or ensuring higher levels of availability of existing applications to minimize or even eliminate unplanned downtime)

Modern Business Trends Driving Software-Defined Infrastructure Adoption

SDI solutions need not be an all-or-nothing deployment strategy that results in complete replacement of traditional solutions. IDC expects SDI solutions to be blended into an overarching infrastructure strategy that identifies key scenarios in which software-defined deployments have clear business and technological benefits. Figure 2 illustrates some of the key business initiatives driving adoption of SDI solutions in today's enterprises.

FIGURE 2: *Summary of Trends Driving SDI Adoption*



Source: IDC, 2019

- » **Growing infrastructure composability.** In 2018, 27% of infrastructure provisioning employed application infrastructure composability. By 2020, 32% of infrastructure provisioning will employ application infrastructure composability. The use of multiple types of technologies for multiple DX options demands integrated, coordinated oversight, requiring a process of assembling provisioned resources and their attachment from common pools of hosts, virtual machines (VMs), containers, networks, and file systems/storage volumes.
- » **Increasing use of and demand for data costing and data location optimization.** Organizations worldwide are looking to do more with less and are also exploring how to optimize data location for cost, availability, and reliability. Various tools and technologies are being leveraged to do data costing and value assessment and then automate the placement of the data. In 2018, 27% of data location optimization services used AI/ML for data costing and value assessment. By 2020, 32% of data location optimization services will use AI/ML for data costing and value assessment. Use of these solutions will increase as enterprise data continues to proliferate to support DX initiatives, leading to investment in automated data location optimization services that use SLA profiles or machine learning for workload optimization and data life-cycle management.
- » **Growing demand for infrastructure services delivered as opex.** Modern enterprises increasingly rent IT resources from cloud services providers and procure software solutions for primary and secondary data services that also align with this model. This means today's enterprise software purchasers expect to have a choice between traditional software licensing models (e.g., term or perpetual license and maintenance agreements) and subscription-based models, or even a hybrid pricing model that combines elements of both. In 2018, 45% of infrastructure services were delivered as opex. By 2020, 55% of infrastructure services will be delivered as opex. The optimum use of an enterprise's financial resources is essential in maximizing DX business opportunities, and the ability to abstract compute, storage, and networking resources through software, and then allocate and price those resources as needed within the organization, enables the highest levels of optimization and efficiency within an enterprise IT environment.
- » **Increasingly stringent infrastructure SLAs.** SLA requirements around downtime, availability, latency, and a host of other performance levels are growing in complexity and rigor. In 2018, 45% of business-facing IT services met stringent business SLAs. By 2020, 58% of business-facing IT services will be required to meet stringent business SLAs. With continual adoption of new DX options, IT's ability to respond rapidly, effectively, and conclusively to all types of disabling issues is paramount. The ability to provide intelligence and monitoring of composable and disaggregated infrastructure resources will be key for internal IT departments and IT services providers to guarantee these increasingly stringent SLAs.
- » **Consolidation and automation of IT operations.** The lines between previously discrete IT activities are slowly eroding. Data protection is a clear case in point, where backup, disaster recovery, and high availability are evolving from disciplines to points on a continuum. This situation challenges organizations to develop an infrastructure strategy that increasingly converges storage, networking, and compute resources but also can be maintained by as few full-time employees as possible. Increasingly, these resource pools are managed by an IT generalist who has experience across all parts of enterprise IT infrastructure (e.g., virtualization, networking, compute, storage). This generalist leverages analytics and AI to manage a wide swath of resources. In 2018, 44% of IT operations were replaced by AI or analytics-driven automation. By 2020, 55% of IT operations will be replaced by AI or analytics-driven automation. This evolution toward

IT generalists, and the subsequent demands placed on IT managers and administrators, makes the adoption of infrastructure management and orchestration software increasingly necessary in order to perform all tasks in a consistent, timely manner.

- » **Requirements for IT to drive customer-facing initiatives and contribute to positive customer experience.** In 2018, 27% of IT investments were focused on customer-facing initiatives. By 2020, 32% of IT investments will be focused on customer-facing initiatives. By tying traditionally internal IT decisions to customer-facing initiatives, organizations ensure that IT investments support business objectives, increase efficiency, and have a more direct impact on competitive advantage. This also helps create buy-in across IT and business decision makers, who are increasingly tasked to work together to manage a range of tier 1 applications that may reside in hybrid and multicloud environments.

Considering Veritas InfoScale

Veritas InfoScale fills a critical gap by helping organizations manage, orchestrate, and ensure the availability of their tier 1 applications regardless of the underlying storage infrastructure. InfoScale is built to act as the central hub for software-defined storage provisioning and application availability. The layer of abstraction and control provided by InfoScale allows storage and application administrators to better optimize application deployment, performance, and quality of service.

InfoScale abstracts the underlying infrastructure hardware (primarily storage resources) from applications via virtualization. Once storage resources are virtualized, InfoScale then applies a range of functionality to deliver two key services:

- » **Business continuity.** Many business applications require high availability in the event of an outage.
 - InfoScale provides several services that are designed to help organizations achieve high availability. InfoScale's Intelligent Monitoring Framework (IMF) monitors applications and automatically triggers a failover when an application service failure is detected. Volume-level replication and file-level replication ensure that application data is replicated to other physical sites, the cloud, or additional availability zones to protect against a large-scale infrastructure outage. InfoScale also provides application-aware agents for popular enterprise applications, with the capability to create custom agents for in-house applications. Organizations can perform "fire drills" to identify potential problems and ensure that applications will fail over predictably.
- » **Data and application mobility.** Digital transformation and the evolution of virtual infrastructure, cloud, and containers demand that IT organizations be able to support modernization initiatives and application portability. InfoScale supports application migration across multiple scenarios — from physical to physical, physical to virtual, and physical and virtual to cloud and containers. InfoScale includes SmartMove, a technology that reduces transfer times and costs by optimizing CPU usage and bandwidth.
 - InfoScale also leverages Virtual Business Services to manage complex multitier business applications, allowing enterprises to move applications to the cloud and back or move from one public cloud to another.

By helping organizations achieve application mobility, InfoScale effectively extends the life spans of applications, makes it easier for IT organizations to evolve their application infrastructure, and helps establish a unified migration framework across the business.

What Do Business Continuity and Infrastructure Agility Mean for Organizations?

Business continuity and infrastructure agility help organizations effectively implement and manage critical elements of their software-defined infrastructure and, by extension, support digital transformation initiatives. As discussed in this paper, infrastructure environments are becoming increasingly complex in terms of the amount and types of data gathered and the various applications that require access. These services are designed to help manage (and minimize) this complexity and allow IT organizations to future proof their software-defined infrastructure with a platform that can accommodate a host of applications (both legacy and next generation) that require access to data on-premise or across multiple clouds.

These two core services allow InfoScale users to improve application performance and mobility through a set of high-availability services and by virtualizing back-end storage, transforming it into a pool of capacity that can be efficiently managed. Importantly, this management is done at the application level, as opposed to the hardware or array level, so applications can scale, be performance optimized, and migrate seamlessly without the need to reprovision resources or migrate underlying systems. In addition to improving application performance and automated access to resources, users can leverage InfoScale as another means to mitigate and prevent downtime through application monitoring. If individual application services or components fail, InfoScale can automatically orchestrate the connection to other computing and data resources, onsite or across sites, providing faster recovery and minimal downtime — without manual intervention.

InfoScale Key Use Cases

InfoScale is positioned prominently within Veritas' portfolio to act as the control center for all of the vendor's availability services. The value of InfoScale starts with infrastructure resource abstraction and then extends deeper with integrations into both on-premise systems and cloud platforms including AWS, Google Cloud, and Azure and application orchestration platforms such as Chef and Ansible. Historically speaking, it has been difficult for providers in the SDI space to bridge the gap between secondary storage functions such as backup and recovery and primary storage workloads attached to mission-critical applications (e.g., ERP, OLTP, BI). InfoScale is designed to solve this problem and builds on Veritas' proven history of protecting and managing secondary storage data via NetBackup. InfoScale is designed to address the following key use cases. Focusing on these use cases and articulating the value (in terms of cost savings/return on investment (ROI)/agility/customer experience) may be an effective strategy for many organizations to demonstrate the value of SDI and build a business case for adoption.

- » **Application-level availability and recovery.** InfoScale provides single-click recovery options locally (high availability), in a metro region (through campus clusters), and globally (through wide-area disaster recovery). InfoScale can also be used to automate the process of replication management and application start-up at a remote site.
- » **Automated application management.** InfoScale allows users to diagnose application problems and set performance alerts/parameters as well as monitor application availability.
- » **Application migration.** InfoScale can act as the management platform for application migration across a wide range of operating systems, public cloud environments, databases environments, or storage systems.

Challenges

InfoScale — and all software-defined infrastructure solutions — faces an inherent adoption challenge in any organization that has invested significant time and money in its legacy infrastructure. Every organization will be tasked with reconciling the integration of modern software-defined infrastructure with existing legacy infrastructure systems. The fact is that SDI capabilities aren't always on par with traditional, more mature systems widely deployed today. This can be attributed primarily to the use of dedicated silicon and specialized system tuning. Although these levels of performance require hours of manual tuning and the use of proprietary infrastructure and/or hardware dedicated to specific tasks, once these systems are set up, they may offer performance comparable to that of SDI solutions.

However, SDI solutions need not be an all-or-nothing deployment strategy that results in complete replacement of existing systems. Indeed, one can expect SDI to be blended into an overarching strategy that identifies key scenarios in which SDI-based deployments are targeted where they can be most beneficial. Such strategies, however, are likely to require some aspects of the SDI solutions to coexist with existing infrastructure systems. That said, the downsides of needing to manage SDI and traditional systems independently are likely to be offset in the long term by the capital and operational cost savings associated with the workloads running on SDI solutions.

Conclusion

Software-defined infrastructure solutions can help catalyze transformative change both organizationally and technologically. These advanced networking, storage, and compute environments should be considered by organizations undergoing digital transformation initiatives and may be critical to achieving these initiatives in a timely, cost-effective manner. IDC believes that in the long term, SDI solutions, and platforms such as Veritas InfoScale, have the potential to transform enterprise infrastructure procurement and management. It will take time for software-defined infrastructure solutions to disrupt the massive, established storage system, server, and networking markets. But there is no question that the rapid evolution and growth experienced by SDI-related markets in recent years will continue to create opportunities for and interest in emerging software-defined datacenter and networking infrastructure.

About the Analyst



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Andrew Smith is a Research Manager within IDC's Enterprise Infrastructure Practice, covering a broad range of storage research with a primary focus on archiving and data management software and services. Andrew contributes to market sizing efforts across IDC's storage software segments and is responsible for tracking the revenues of leading software and cloud services providers within IDC's Worldwide Storage Software and Cloud Services QView and Worldwide Semiannual Software Tracker.

MESSAGE FROM THE SPONSOR

Veritas InfoScale is designed to help organizations implement and manage these infrastructure changes and maintain application availability within increasingly complex, abstracted IT environments. This value proposition should resonate with any IT group or application owner looking to provide a secure and efficient experience for their end users. More information on InfoScale is available at <https://www.veritas.com/availability/infoscale>



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