



White Paper

SD-WAN: The Pathway to a Digitally Transformed Branch

Sponsored by: EarthLink

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IDC OPINION

Enterprises in all sectors are adopting digital technologies to improve back-office operations and strengthen customer engagement. Technologies like cloud computing, mobility, social networking, and big data and analytics are being applied to this transformation. With a fundamental core in connectivity, digital technologies magnify the role of the enterprise network and its contribution to all aspects of enterprise operations. Distributed enterprises, in particular, will be impacted by digital transformation. Distributed enterprises have not only multiple diverse sites – headquarters, regional offices, branch offices, storefronts, warehouses, and distribution centers – but also home and remote offices, which are commonplace. The number of users, applications, and devices is growing and is increasingly dispersed across these multiple locations and diverse environments.

Network managers and decision makers in distributed enterprises are finding that legacy WAN technologies are creating pain points in the digital era and that a new WAN paradigm is needed.

Software-defined WAN (SD-WAN) has emerged as an architecture that can address many organizations' digital network connectivity challenges. Through providing improved visibility and optimization among common WAN connectivity protocols, SD-WAN promises organizations reduced costs and improved performance while offering improved security and control over the applications traversing the network. In fact, an extensive worldwide SD-WAN survey by IDC finds that end users are already becoming aware of these potential benefits. When asked what were the top 3 motivators for considering SD-WAN adoption, substantial portions of respondents indicated "consistent security," "price," and "reduced complexity of IT support" (36%, 35%, and 31%, respectively) (source: IDC's *Software-Defined WAN [SD-WAN] Survey*, April 2016).

The promise of SD-WAN is leading to a burgeoning market: IDC forecasts the worldwide market for SD-WAN infrastructure and services will grow to more than \$6 billion by 2020. The need for SD-WAN is particularly acute for distributed enterprises that generally have a relative lack of onsite infrastructure and application hosting expertise across their distributed sites. As such, these organizations are heavily dependent on connections to private datacenters and, where appropriate, public cloud applications for ongoing IT needs as well as enablement of digital initiatives.

This IDC White Paper examines how digital transformation has necessitated a rethinking of WAN connectivity for distributed enterprises. It evaluates the role of SD-WAN for next-generation distributed networks and its role in enabling business models, operational transformation, and customer engagement. Finally, it introduces EarthLink's SD-WAN solutions for the distributed enterprise, powered through VeloCloud, leveraging EarthLink's extensive portfolio of customized professional services and long-established network capabilities.

SITUATION OVERVIEW

Distributed enterprises – a term that IDC uses to describe enterprises that are organized around centralized headquarters and multiple, dispersed branch locations – are poised to be among the greatest beneficiaries of digital transformation. Digital transformation refers to the phenomenon of organizations leveraging new technological innovations to disrupt and transform business models from back-end operations to front-end customer engagement. Digital transformations are powered through IDC's 3rd Platform of IT, built upon cloud, mobility, big data, and social technologies. Because distributed enterprises are frequently found in public-facing verticals (e.g., chain retail and restaurants, commercial banks, healthcare systems, insurance and real estate agencies, and government organizations), there are tremendous opportunities to increase competitive advantage vis-à-vis operational efficiency and customer engagement.

Many network decision makers and line-of-business (LOB) leaders in distributed enterprises recognize what these opportunities mean in organizations where every dollar in the budget is scrutinized and customer perceptions mean everything to the long-term viability of the business. To this end, digital transformation is becoming one of the major strategies that distributed enterprises will use to meet competitive challenges. Cloud-based application deployment will become common because of advantages such as simple operations and management (O&M), on-demand usage, and quick provisioning. In branch offices, there is a pressing need for the network to more efficiently provide access to data and applications to enable decision making for frontline employees who are closest to where customers are located.

These evolving dynamics bring the following challenges to remote locations and branch offices within enterprise networks:

- **Challenge 1:** Companies are investing in business apps and tools but are not providing wider accessibility and bandwidth needed across their remote offices. This can contribute to a bottleneck and reduce business agility.
- **Challenge 2:** Connectivity methods used for remote locations today (branch offices, storefronts, warehouses, distribution centers, and remote/auxiliary offices) may not be appropriately secure and reliable for the demands of digital strategies.
- **Challenge 3:** Traditional branch office connectivity can be costly, inefficient, and discouraging for users with diverse application needs to fully leverage the power of available network technologies. All applications and internet access were prioritized equally, contending for limited bandwidth resources. There is a need for a more efficient way of leveraging multiple methods for connecting remote locations to private or public or hybrid cloud, including internet, DSL/cable, private line, MPLS, Ethernet, and 4G/LTE, in an optimized manner. In addition, there needs to be a way to optimally match applications to the connectivity method that best fits.

Without question, the WAN is critical to the success of enterprise cloud strategies and initiatives. Although WAN optimization and traditional WAN services have addressed a broad range of client/server requirements, new capabilities are required for 3rd Platform applications and cloud computing – hence the rise of the SD-WAN, which leverages the principles of software-defined networking and adapts them to the needs of enterprise IT, seeking to optimize application delivery for the enterprise branch.

SD-WAN Emerges

The tide of digital transformation of the enterprise shows no signs of subsiding. The plethora of mission-critical cloud-hosted applications rapidly being adopted by distributed enterprises has pushed legacy WAN architectures to their limits in terms of efficient connectivity and application performance. The first step in evolving WAN architectures for modern use cases was the development of "hybrid WAN" architectures, which refers to WANs that include at least two connections from each branch office, leveraging two or more access technologies (such as MPLS, broadband, and 3G/4GLTE). SD-WAN goes beyond hybrid WAN by including a centralized, application-based policy controller; analytics; a software overlay that abstracts underlying networks; and an optional SD-WAN forwarder (routing capability) that together provide intelligent path selection across WAN links. In addition, dynamic WAN selection provides for the efficient use of all of the available bandwidth in an active-active configuration and provides a fully meshed network at the branch level.

These features lead to the following SD-WAN business benefits, which help meet the evolving operational requirements of the modern branch and remote site while adding efficiency:

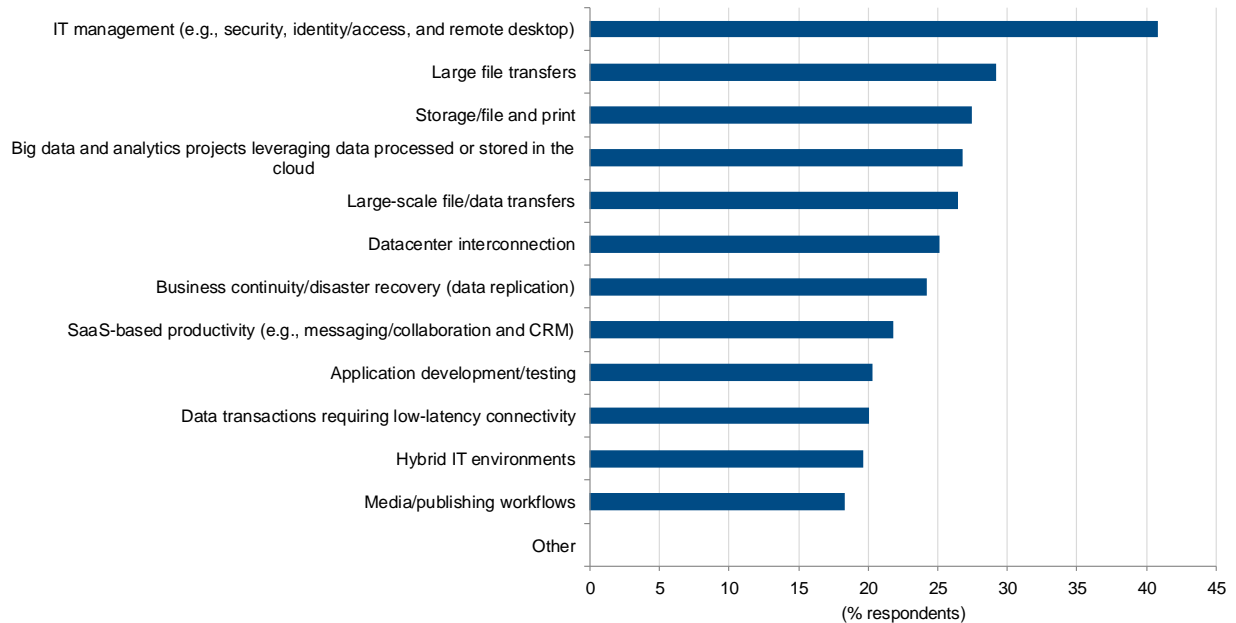
- Cost-effective delivery of business applications
- Optimization of SaaS and cloud-based services
- Matching of applications to optimal connectivity method
- Reduction of MPLS costs
- Simplification of VPN capabilities
- Automation of branch IT
- Analytics-enabled application and network visibility
- Automated provisioning and application policy that can be pushed uniformly throughout branch offices and remote sites

It is especially important to note SD-WAN's role in optimizing hybrid cloud environments for today's branch enterprise. For hybrid IT, enterprises require not only access from branch offices (and other sites) directly to SaaS and public cloud applications (e.g., Office 365, salesforce.com, and Workday) but also secure access to traditional IT and private cloud applications that are typically hosted in corporate datacenters. Enterprise IT finds a distinct challenge in balancing public cloud and private cloud applications with regard to performance, latency, security, and policy considerations while optimizing applications for best-in-class user experience that enables business objectives. SD-WAN can improve access to cloud-hosted applications through WAN optimization, reliable private connectivity, and intelligent connectivity matching on an application-by-application basis. In fact, an IDC survey of enterprise WAN decision makers reveals that a substantial percentage of respondents believe that their organizations' SaaS-based productivity stands to benefit from a virtualized SD-WAN environment (see Figure 1).

FIGURE 1

SD-WAN Use Cases

Q. Which three of the following use cases do you believe will benefit most from a virtualized SD-WAN environment?



n = 744

Source: IDC's *U.S. Enterprise Communications Survey*, December 2015

Thus it is clear that SD-WAN promises valuable benefits to branch networks within distributed enterprises. This is a timely development. As digital business models proliferate even within the most distributed of organizations, seamless connectivity to cloud applications and the ability to choose the most cost-effective network access methods are critical to distributed enterprises, which are often characterized by verticals where low margins and sensitivity to the bottom line prevail. Similarly, application visibility and policy setting are important for network optimization. Network managers need to be able to set granular application policies in terms of both user policies and path selection policies, to ensure optimal business application performance and that the branch network can serve all of its critical constituents.

SD-WAN Market Trends and the Impact on Network Infrastructure

Recognition of SD-WAN's transformative potential has been swift, resulting in torrid uptake of SD-WAN solutions. As mentioned previously, the market for SD-WAN technologies, which totaled a mere \$224.7 million in 2015, is projected to grow to over \$6 billion by 2020, representing a CAGR of 93.0% for that time period. This suggests that the need for SD-WAN is pressing and acutely felt.

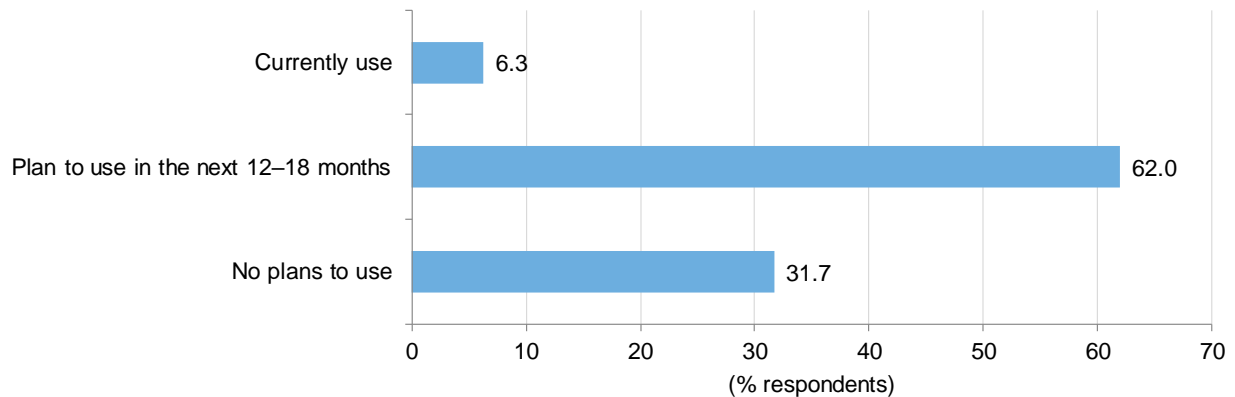
In segmenting the SD-WAN market, we find that two areas stand out: CSP SD-WAN managed services (third-party services from carriers) and cloud-managed SD-WAN services. These services – which are geared toward distributed enterprises with smaller IT footprints and, in some cases, limited IT staff – are expected to grow the fastest from 2015 to 2020, at a CAGR of 211.8% and 207.6%, respectively. CSP SD-WAN managed services will account for over one-third of the total market by 2020.

According to an April 2016 survey of 605 enterprise network decision makers, nearly 70% of respondents anticipated implementing SD-WAN technologies within 18 months (see Figure 2). There are myriad motivations and considerations for implementing SD-WAN. In the same survey, those decision makers who anticipated deploying SD-WAN were asked to give their top 3 reasons for doing so. Figure 3 shows that over 30% of these decision makers consider consistent security, price, reduced complexity of IT support, faster deployment, and optimization of WAN bandwidth as key drivers.

FIGURE 2

SD-WAN Adoption

Q. Does your organization currently use or plan to use SD-WAN?



n = 605

Base = all respondents

Notes:

Data is managed by IDC's Quantitative Research Group.

Data is not weighted.

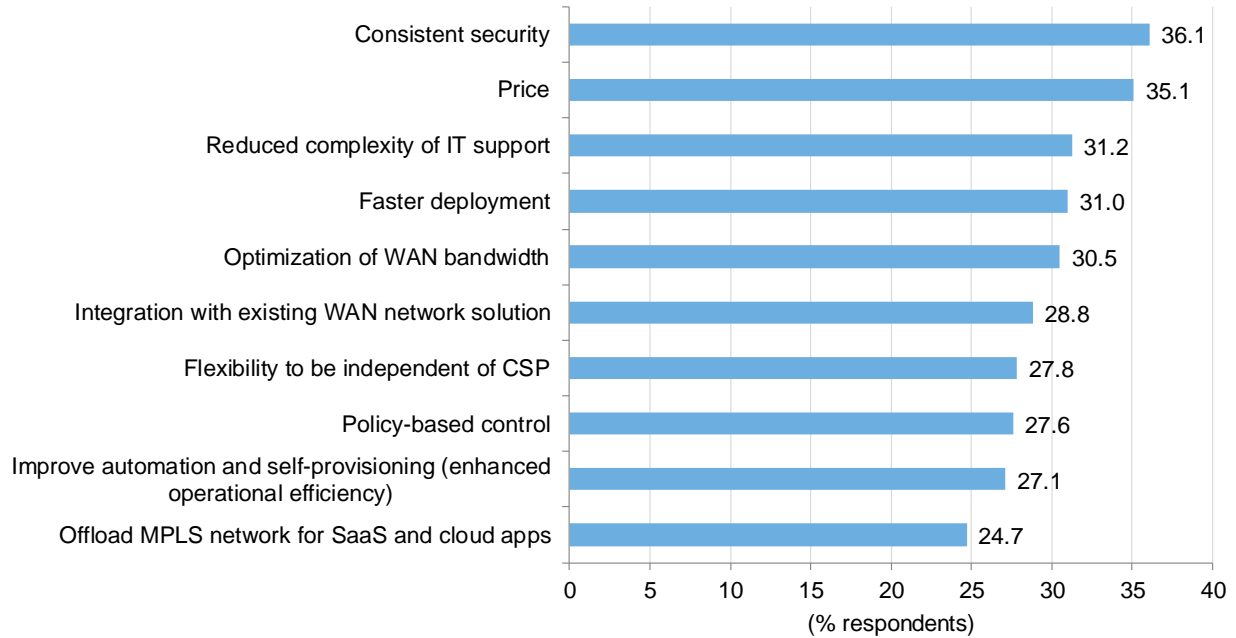
Use caution when interpreting small sample sizes.

Source: IDC's *Software-Defined WAN (SD-WAN) Survey*, April 2016

FIGURE 3

Drivers of SD-WAN Adoption

Q. Which are the top motivations for considering SD-WAN deployment?



n = 413

Base = respondents indicated organization currently uses/plans to use SD-WAN in the next 12-24 months

Notes:

Data is managed by IDC's Quantitative Research Group.

Data is not weighted.

Use caution when interpreting small sample sizes.

Multiple responses were allowed.

Source: IDC's *Software-Defined WAN (SD-WAN) Survey*, April 2016

Although the aforementioned data demonstrates that there are many benefits expected of SD-WAN, there may be a gap in terms of understanding how to deploy the optimal SD-WAN-enabled branch architecture. How do enterprises realize the organizational, operational, and business model innovation that creates the robustly secure, reliable, and cost-efficient branch network of the future and, ultimately, new ways of operating, innovating, and growing the business? Many respondents to IDC's April 2016 *Software-Defined WAN (SD-WAN) Survey* indicated an interest in or need for any number of consultative services, likely depending on where organizational strengths and weaknesses lie, as well as their primary objectives for SD-WAN. One thing that is clear is that third-party services will be sought after – nearly 80% of respondents indicated as much.

Until the introduction of SD-WAN, the primary way to solve network performance issues was to just increase bandwidth. Now with SD-WAN, IT and network professionals have the ability to identify and prioritize their business-critical applications and match the application to the optimal connectivity method, cutting through the congestion and maximizing their existing bandwidth with consistent visibility and more uniform security enforcement. This helps streamline WAN operations while improving ROI and leveraging all available access options in a fully active-active mode.

EarthLink's SD-WAN Branch Connectivity Strategy

Overview of the EarthLink Strategy

To solve the aforementioned challenges, EarthLink partners with VeloCloud to offer an SD-WAN managed service geared toward the needs of the distributed enterprise. On top of VeloCloud's differentiated multitenant SD-WAN solution, EarthLink provides personalized and proactive expert guidance delivered through its EarthLink SD-WAN Concierge service. The EarthLink SD-WAN solution contains the following key features:

- **Application visibility and control.** Applications can be prioritized on the basis of business policies, and visibility is provided through the myLink centralized cloud-based network management application.
- **Dynamic WAN selection.** Business priority and minimum performance benchmarks can be set on a per-application basis and can be adjusted automatically.
- **Path conditioning.** The service provides continuous monitoring and automatically improves network paths based on the performance benchmarks, and the path conditioning includes forward error correction and jitter buffering.
- **Dynamic IPsec deployment.** The SD-WAN service automatically sets up IPsec tunnels with end-to-end encryption, enabling dynamic branch-to-branch connectivity.
- **Stateful firewall.** An integrated stateful firewall allows for deployment and management of security policies, which can be managed centrally with options for edge overrides by location. In addition, application layer filtering provides some next-generation firewalling capabilities.
- **Network analytics.** Real-time analytics allow for policy creation and troubleshooting and provide insight into application utilization and bandwidth consumption.

EarthLink SD-WAN Differentiators

EarthLink is able to bring expertise from years of experience in serving branch networks to VeloCloud's SD-WAN solutions to create a differentiated offering for distributed enterprises. EarthLink believes its SD-WAN differentiation derives from four essential capabilities, which are described in the sections that follow.

Concierge Service

The fully managed EarthLink SD-WAN Concierge is designed to help customers get the most from SD-WAN, delivering continuous and proactive monitoring and optimization of network environments. An assigned service manager provides personalized guidance, analyzes network and application performance, and recommends actions needed to get the greatest possible value from customers' network investments. Professional service support options include network diagnostics and design as well as SD-WAN integration/implementation.

SD-WAN Concierge comprises personalized guidance designed to ensure that customers maximize the value of SD-WAN while focusing their resources on delivering innovations related to digital transformation. EarthLink SD-WAN specialists create, adjust, and deploy application and security policies based on real-time analytics and business requirements. Concierge is designed to be affordable so that it can be leveraged by enterprises of all sizes.

The EarthLink SD-WAN Advisor is a self-service option designed for customers that possess experienced IT and network teams, providing them with the capability to manage the SD-WAN solution through EarthLink's myLink network management application. With SD-WAN Advisor, guidance is provided on a pay-for-service basis. Through the myLink network management application, customers can view, control, and deliver routing and security policy changes across locations within seconds as opposed to weeks associated with traditional WANs.

Business Aware Cloud Network

EarthLink's Business Aware Cloud Network is designed to improve cloud-based application performance through low-latency connections to cloud providers as well as through EarthLink-provided services. The network enables dynamic real-time traffic steering to provide the flexibility, agility, and reliability necessary for application performance. EarthLink believes its ISP heritage, including its deep experience in last-mile access options and managing hybrid networks for customers of every size, is a key advantage over other network service providers.

For mission-critical applications that must run continuously, an EarthLink SD-WAN with dual-access connections provides an active-active network configuration that includes a 100% SD-WAN service availability SLA.

Tailored Industry Solutions

EarthLink delivers a suite of consulting and professional services specifically designed to amplify SD-WAN's impact on customer experience. This is in addition to cloud-based unified communications, security, and WiFi services. EarthLink tailors each SD-WAN deployment to specific customer needs, beginning with the sales engineering process, and also offers vertical-specific solutions. EarthLink has developed deep expertise with regard to the networking needs of enterprises in the retail, restaurant, financial services, healthcare, government, and professional services verticals.

Cloud-Optimized Management

EarthLink's cloud-based network management application, myLink, provides visibility and control for the company's SD-WAN customers through a single interface. The management tool facilitates zero-touch configuration for new locations, services, and security policies. It also provides control over business policies and enables application prioritization based on location, user, and time/date while allowing for real-time changes that can dynamically optimize application performance and customer experience. The management platform also provides real-time performance analytics and insights, which can be leveraged to enhance overall business productivity, while enabling management and control over other services, such as voice, WiFi, and security functions such as firewalls.

EarthLink believes that its SD-WAN solution delivers a business-aware cloud network – one that is designed to improve cloud-based application performance through low-latency connections to major cloud service providers. The network also provides dynamic, real-time traffic steering.

EarthLink contends that its consulting and professional services – which have helped a number of well-known brands initiate digital transformation initiatives to improve customer experiences – represent a key market differentiator. This is particularly true in the retail industry where EarthLink's acquisition of BRP, formerly known as Boston Retail Partners, has helped give the company a broad and deep array of consulting capabilities that also extend into day-to-day delivery operations.

Case Study: Dunn-Edwards

Dunn-Edwards is a chain of retail paint stores that serves both contractors and "do it yourself" consumers. In its digital transformation efforts, Dunn-Edwards seeks to create a best-in-class in-store experience while leveraging technology to introduce new design and delivery services to its customers. Understanding the need for a customized network architecture based on its distribution of locations across five western states in the United States, Dunn-Edwards chose EarthLink based on its expertise in serving midmarket distributed retail enterprises. Specifically, EarthLink SD-WAN helped Dunn-Edwards tackle problems with slow network speeds that were negatively impacting customer experience. The solution's network analytics feature provided insight that enabled Dunn-Edwards to prioritize its most mission-critical applications like point of sale (POS). Dunn-Edwards credits EarthLink's responsiveness as an important factor in its digital success.

Challenges/Opportunities

Any technological transition comes with unavoidable challenges, and transitioning to EarthLink managed SD-WAN enabled by VeloCloud is no exception. Changing the way that the WAN or any other element of network infrastructure is architected requires the learning of new skills and an adjustment period when migrating applications and workloads. Deliberate education and change management efforts will be necessary to weather this transition, and this is another area where an established managed service partner can add value. Some potential customers may also be understandably concerned about vendor lock-in. IDC believes that VeloCloud is a viable solution for SD-WAN in managed distributed branch environments. IDC recommends discussing vendor lock-in among all relevant stakeholders and comparing multiple SD-WAN solution vendors and managed service providers against the organization's unique needs.

Of course, there are many opportunities with managed SD-WAN from EarthLink. Distributed enterprises that previously found SD-WAN implementation inaccessible may now be able to derive the benefits of dynamic access and path selection, application visibility, and more consistent security. Leveraging an established and trusted managed service provider such as EarthLink can bring expertise and scale to time-strapped distributed enterprises.

Conclusion

SD-WAN is a conduit by which to imagine and implement the next-generation branch network. It offers a number of features that optimize connectivity, streamline WAN management, improve security, and harness the power of data through analytics and reporting in a cost-effective manner. With organizations of all sizes, including distributed enterprises, enacting digital transformation through the leveraging of cloud-based business applications delivered to a growing roster of connected devices, it is important to have a next-generation branch network supporting those initiatives. EarthLink and VeloCloud together for SD-WAN represent a powerful partnership for supporting distributed enterprises in succeeding with digital transformation.

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