

## White Paper

# Software-Defined Networking: Underpinning Successful Enterprise Digital Transformation

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## IDC OPINION

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- Reliable, secure, and scalable networking has become a vital asset for businesses in the digital age. The potential for agile, new technologies to help transform customer experiences, improve service delivery, and enhance product development cycles depends on effective connectivity. Without network infrastructure that is designed for the modern age, such operational and business ambitions may not be realized.
- Software-defined networking (SDN) is a network architecture approach that allows the network to be intelligently and centrally controlled, or 'programmed,' using software applications. This helps enterprises and operators to manage the entire network consistently and holistically, regardless of the underlying network technology.
- More centralized management capabilities allow for greater network infrastructure reliability as well as efficient migration of services to software-defined networks and overall better management of networking costs.
- Software-defined WAN (SD WAN) devices offer enterprises improved visibility of WAN performance, as well as security enhancements such as built-in firewall functionality. They also enable users to better prioritize network traffic and effectively and efficiently roll out new applications over the network.
- Increasing adoption of cloud-based services is creating a need for more cloud-centric network architecture.
- The benefits of SDN go beyond the enterprise environment: Small and medium-sized businesses (SMBs) that adopt SDN can avoid large investments in infrastructure and staff.
- In some instances, users may already have SD-WAN equipment, or hardware capable of operating in an SDN environment.

## IN THIS WHITE PAPER

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Enterprises are increasingly looking for technology and solutions that can help them on their digital transformation journeys. This IDC White Paper takes a closer look at why many enterprises are increasingly looking to SDN to reduce costs by virtualizing their networks, simplifying their networking infrastructure, and enabling the agility and scalability they need in order to take advantage of other technologies such as cloud computing, analytics, artificial intelligence (AI), Internet of Things (IoT), and robotic process automation (RPA).

## SITUATION OVERVIEW

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As growing numbers of users and new network services exact huge demands on network resources, and with the increasing size and complexity of networks, traditional approaches to network management are becoming highly inefficient.

Being able to dynamically manage capacity alongside usage and prioritize key applications allows businesses to thrive; thus, network transformation must go hand-in-hand with digital transformation initiatives to ensure optimal results.

In addition, the emergence of technologies such as cloud applications and AI-driven robotics highlight the need for next-generation networks that are more flexible and able to keep pace with changes in capacity and usage. SDN is key to such networks.

SDN's features include:

### Flexibility

SDN enables network behavior to be controlled by software that resides beyond the networking devices that provide physical connectivity. It also allows enterprises to keep up with the changing nature of their businesses, enabling them to be more aware of users, customers, and market opportunities.

### Reliability

SDN technology enables network operators to exercise greater control over network behavior via programs written using SDN application programming interfaces (APIs). Network operators can develop network-aware applications, intelligently monitor network conditions, and automatically adapt the network configuration as required.

SDN also allows for more agile operations and execution, which, in turn, helps control costs. Furthermore, end-to-end service automation enables provisioning of network resources – reducing errors and improving service levels while using APIs to deliver seamless, near real-time management of network functions and traffic.

### Scalability

Scalability in SDN is achieved through logically centralized network topologies, which enable intelligent control and management of network resources. This allows bandwidth management, restoration, security, and policies to be extremely smart and optimized.

It also allows the network to be sufficiently elastic and versatile to handle high traffic demands during the busiest times, while prioritizing the most important applications and reducing congestion through intelligent automation.

### Enabling Cloud

Intelligent network solutions are often deployed to provide connectivity to the cloud on an as-needed basis to reduce costs, allowing organizations to pay only for the services they require.

Network function virtualization provides a strong medium in which to run multiple concurrent virtual networks over a shared substrate. Cloud providers offers virtual networks with a topology and a configuration customized to the users' needs.

## FUTURE OUTLOOK

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Many benefits are being gradually realized by major telecom providers, datacenter operators, large internet service providers, and enterprises implementing SDN. While the benefits of SDN in enterprise environments are quickly apparent, SMBs can also gain from the technology by avoiding big investments in infrastructure and staff and reducing costs.

The sectors that stand to benefit the most from SDN include the public sector, education, retail and wholesale, and banking/finance – typically sectors that rely heavily on networking and branch networks.

SDN's benefits can be broadly summarized as:

- **Reduced operating costs**, as software-defined networks are more reliable and reduce hardware costs, as well as freeing up space used as server rooms
- **Greater adaptability**, as the entire network is centrally controlled allowing for quick adjustments and troubleshooting.
- **A better management console and visibility into network resources**, simplifying the planning and set-up of the network
- **Increased productivity** due to a reduction in networking errors that cause downtime
- **Better security** as software-defined networks can handle the increased security demands and issues created by software run on the network

In the post COVID-19 environment, where remote working is becoming the new normal for many businesses, some SDN vendors offer additional benefits such as small edge devices that address security and access control issues – which, in turn, may lead to a trend where businesses invest less in campus equipment and more into such devices that enable remote working.

It is expected that SDN will flourish in areas where provisioning connectivity is seamless, such as SD-WAN over LTE, 5G, or multiprotocol label switching (MPLS). Ideally, an SD-WAN provider would send the end-user SD-WAN devices to the customer premises for them to connect to their preferred connection. Currently in Sub-Saharan Africa, this may only work well in urban areas where the required connectivity infrastructure is readily available.

## CONCLUSION

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Enterprises looking to leverage SDN need to consider a few factors as they evaluate their current environment and plan for future adoption.

### Cloud Strategies

Enterprises' cloud strategies will influence the nature and adoption of SDN in the context of the organization's networking plans. For example:

- Whether to deploy some virtual networking functions to public cloud or utilize those offered by cloud provider, including firewalls
- The types of applications that the organization deploys to the cloud – some may have specific requirements that require elasticity (e.g., development capacity) or peak traffic periods
- The architecture of applications and whether they are ready to be migrated to cloud
- The current cybersecurity needs for applications deployed to the cloud and networking capability to support security

- Determining which applications may be more cost effectively run on premises, rather than in the cloud

## Security

Organizations will require cybersecurity systems that are effective for traffic traveling outside the network into the cloud, alongside visibility mechanisms to monitor the security of cloud-based applications. Providers should expect the cloud security requirements of customer organizations to vary.

Some enterprises may need to reconsider their current security architecture, how their installed base will be integrated with the new SDN provider, and whether they require a single integrated solution or a mix provided by different vendors.

## Partnerships and Skills

While most vendors lead with a security-based offering, others form alliances with security vendors. Customers also need to evaluate the suitability of services from global cloud suppliers, especially in relation to in bandwidth and internet speeds.

As is the case with most emerging technologies, skills availability is a key consideration for SDN, and more so when new requirements are based on a new vendor's equipment. Partnerships should therefore be pursued with systems integrators and providers that possess the necessary skills.

Bandwidth requirements of applications will have bearing on whether users want to migrate to the internet as opposed to MPLS-based virtual private networks. In some instances, a hybrid of MPLS and internet connectivity may serve end users' needs.

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