

Practical 10

Aim:

To work with SDN technology and SD WAN

Theory:

SDN

Software-defined networking (SDN) is an architecture designed to make a network more flexible and easier to manage. SDN centralizes management by abstracting the control plane from the data forwarding function in the discrete networking devices.

SDN elements

SDN architecture delivers a centralized, programmable network and consists of the following:

- A controller, the core element of an SDN architecture, that enables centralized management and control, automation, and policy enforcement across physical and virtual network environments
- Southbound APIs that relay information between the controller and the individual network devices (such as switches, access points, routers, and firewalls)
- Northbound APIs that relay information between the controller and the applications and policy engines, to which an SDN looks like a single logical network device

SDN adoption

SDN has seen wide adoption across data centres (64%), WANs (58%), and access networks (40%). For more information on SDN trends, see the [2020 Global Networking Trends](#) report.

SDN and IBN

SDN serves as a foundational element of a comprehensive [intent-based networking](#) (IBN) architecture. SDN has been limited to automated provisioning and configuration. IBN now adds "translation" and "assurance" so you can automate the complete network lifecycle and continuously align the network to business needs. Watch our [Beyond SDN](#) webinar recording to explore more ways intent is changing how we network.

Features and Benefits

Simplify operations

Reduce complexity by decoupling the control and data planes, while making automation highly secure and scalable.

Achieve faster time to market

Deploy applications and services faster by leveraging open APIs. Easily integrate third-party products.

Build programmable networks

Eliminate manual configuration. Provision and manage data centres, campuses, and wide-area networks.

Lay the foundation for intent

Centralize configuration, management, control, monitoring, service delivery, and cloud automation.

SD WAN

SD-WAN is a software-defined approach to managing the WAN.

Key advantages include:

- Reducing costs with transport independence across [MPLS](#), 4G/5G LTE, and other connection types.
- Improving application performance and increasing agility.
- Optimizing user experience and efficiency for software-as-a-service ([SaaS](#)) and public-cloud applications.
- Simplifying operations with automation and cloud-based management.

What are the benefits of SD-WAN?

The traditional WAN architecture was limited to enterprise, branch, and data centre. Once an organization adopts cloud-based applications in the form of SaaS and IaaS, its WAN architecture experiences an explosion of traffic accessing applications distributed across the globe.

These changes have multiple implications for IT. Employee productivity may be compromised by SaaS-application performance problems. WAN expenses can rise with inefficient use of dedicated and backup circuits. IT fights a daily, complex battle of connecting multiple types of users with multiple types of devices to multiple cloud environments.

With SD-WAN, IT can deliver routing, threat protection, efficient offloading of expensive circuits and simplification of WAN network management. Business benefits can include the following:

Better application experience

- High availability, with predictable service, for all critical enterprise applications
- Multiple hybrid active-active links for all network scenarios
- Dynamically routed application traffic with application-aware routing, for efficient delivery and improved user experience
- Improved OpEx, replacing expensive Multiprotocol Label Switching (MPLS) services with more economical and flexible broadband (including secure VPN connections)

More security

- Application-aware policies with end-to-end segmentation and real-time access control
- Integrated threat protection enforced at the right place
- Secure traffic across broadband Internet and into the cloud
- Distribute security to the branch and remote endpoints with NGFW, DNS security, and NGAV

Optimized cloud connectivity

- Seamless extension of the WAN to multiple public clouds
- Real-time optimized performance for Microsoft Office 365, Sales force, and other major SaaS applications
- Optimized workflows for cloud platforms such as Amazon Web Services (AWS) and Microsoft Azure

Simplified management

- A single, centralized, cloud-delivered management dashboard for configuration and management of WAN, cloud, and security
- Template-based, zero-touch provisioning for all locations: branch, campus, and cloud
- Detailed reporting of application and WAN performance for business analytics and bandwidth forecasting.

SDN Vs SD-WAN

SD-WAN can be seen as SDN for the WAN. It represents, arguably, the most popular and widely deployed use case in SDN. The SDN model became popular for abstracting network infrastructure in the data centre and other sections within the enterprise perimeter.

SD-WAN played a similar role but needed to abstract infrastructure elements that were diverse in terms of link types, providers, and geographies. Since it crossed the enterprise perimeter, it needed a robust security component as well.