

SDN (Software Defined Networking)

SDN centralizes the control plane into an application called a controller, centralizes functions like calculating routes, SBI is used for communications between the controller and the network devices it controls, NBI allows us to interact with the controller with our scripts.

Application layer: contains scripts/apps that tell the SDN controller what network behaviors are desired.

Control layer: contains the SDN controller that receives and processes instructions from the application layer.

Infrastructure Layer: Contains the network devices that are responsible for forwarding messages across the network.

Cisco SD-Access is Cisco's SDN solution for automating campus LANs (office, wired and wireless LANs).

Cisco ACI (Application Centric Infrastructure): for automating data center networks.

Cisco SD-WAN for automating WANs.

Cisco DNA (Digital Network Architecture) Center is the controller at the center of SD-Access.

App layer has Script, App and GUI for controlling the controller.

Fabric is combination of the overlay and underlay (physical and virtual) network.

Underlay: the physical network of devices and connections including wired and wireless which provide IP connectivity (using IS-IS) as multilayer switches and their connections, used to support VXLAN tunnels of the overlay.

Switches have three different roles in SD-Access:

Edge Nodes: connect to endhosts. Border nodes: connect to devices outside SD-Access domain (WAN routers).

Control nodes: use LISP (Locator ID Separation Protocol): to perform various control plane functions.

SD-Access can be added on top of an existing network (brownfield deployment) if the network hardware and software supports it (DNA center won't configure the underlay).

New (greenfield) deployment: will be configured by the DNA center to use the optimal SD-Access underlay for example: all switches are layer 3 and use IS-IS as their routing protocol, all links between switches are routed ports so STP is not needed, edge nodes act as default gateway for end hosts.

LISP provides the control plane of the SD-Access: a list of mappings of EIDs (Endpoint Identifiers) that identify end hosts connected to edge switches to RLOCS (routing locators) that identify the edge switch which can be used to reach the end host.

CTS (Cisco TrustSec): provides policy control (QoS, security policy,.. etc).

VXLAN provides the data plane of SD-Access.

Cisco DNA center has two roles: 1- the SDN controller in SD-Access, the network manager in a traditional network non SD-Access.

DNA Center app is installed on Cisco UCS server hardware, has a REST API to interact with it, SBI supports protocols as NETCONF, RESTCONF and traditional; protocols as Telnet, SSH, SNMP, enables Intent-Based Networking (IBN), more buzzwords to allow the engineer to communicate their intent for network behavior to the DNA center and the DNA center will take care of the details of the actual configurations and policies on devices.