



TECNOLOGICO  
NACIONAL DE MEXICO



*INSTITUTO TECNOLÓGICO DE  
CANCÚN*

*INGENIERIA EN SISTEMAS  
COMPUTACIONALES*

*FUNDAMENTOS DE  
TELECOMUNICACIONES*

*INVESTIGACION DEL SDN*

*PERAZA SOBERANIS GABRIEL  
ALFREDO*



TECNOLÓGICO  
NACIONAL DE MÉXICO



## Investigar sobre el concepto de SDN

### What are Software Defined Networks (SDN)?

Software-defined networking (SDN) is an agile network architecture designed to help organizations keep pace with the dynamic nature of today's applications. It separates network management from the underlying network infrastructure, allowing administrators to dynamically adjust traffic flow throughout the network to meet changing needs.

Software-defined networks aim to reduce the complexity of statistically defined networks, automate network functions, accelerate the deployment of applications and services, and simplify the deployment and management of network resources.

A software defined network allows you:

- Support dynamic movement, replication and virtual resource allocation
- Ease the administrative burden of setting up and providing features such as quality of service and security
- Implement and expand network functions more easily
- Design traffic with an end-to-end view of the network
- Make better use of network resources
- Reduce OPEX
- Make network functions evolve faster based on a software development life cycle
- Enable applications to dynamically request services from the network
- Implement a more effective security function
- Reduce complexity

How does SDN work?

A software-defined network consists of three layers (the application layer, the control layer and the infrastructure layer), connected through upstream and downstream communication APIs.

The application layer includes applications and network functions, such as firewalls and load balancing. Traditional networks use a specialized device for these functions, but a software-defined network uses the controller to manage the behavior of the data plane. The control layer manages policies and traffic flow through the network. And the infrastructure layer contains the physical switches of the network.



TECNOLÓGICO  
NACIONAL DE MÉXICO



Figure 1 contains a graphical representation of the SDN architecture as envisioned by the ONF.

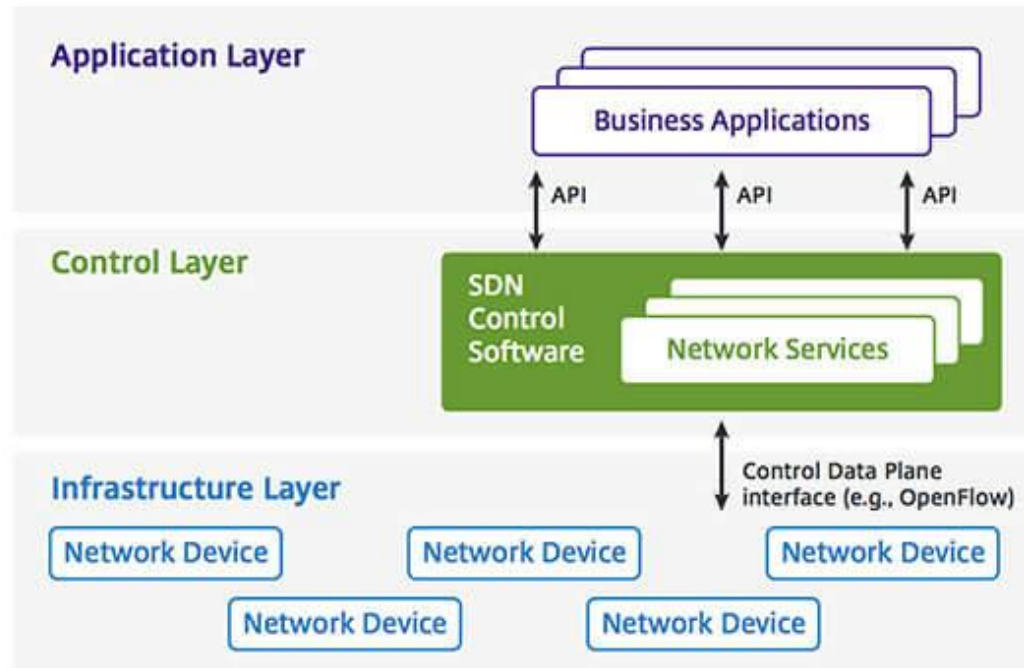


Figure 1: The SDN System Architecture  
Source: ONF

### Network and security services

This refers to the functions that enable business applications to perform efficiently and securely. The possibilities include a wide range of tier 4-7 features, including ADC, WOC and security capabilities such as firewalls, IDS/IPS and DDoS protection.

**Pure SDN switch:** In a pure SDN switch, all control functions of a traditional switch (such as routing protocols used to create redirection information bases) are executed in the central controller. The functionality of the switch is completely restricted to the data plane.

**Hybrid Switch:** In a hybrid switch, SDN technologies and traditional switching protocols run together. A network administrator can configure the SDN controller to discover and control certain traffic flows while traditional distributed network protocols continue to direct the rest of the traffic on the network.

**Hybrid network:** A hybrid network is a network where traditional switches and SDN switches, whether pure or hybrid SDN switches, operate in the same environment.



TECNOLOGICO  
NACIONAL DE MEXICO



**Upstream API:** The upstream API enables communications between the control layer and the business application layer. Currently, there is no upstream API that is based on standards.

**Downstream API:** The downstream API enables communications between the control and infrastructure layers. The protocols that can enable this communication include OpenFlow, the Extensible Messaging and Presence Protocol (XMPP) and the Network Configuration Protocol.