SDWN

software define networking (SDN) compare to Traditional networks

Traditional networks

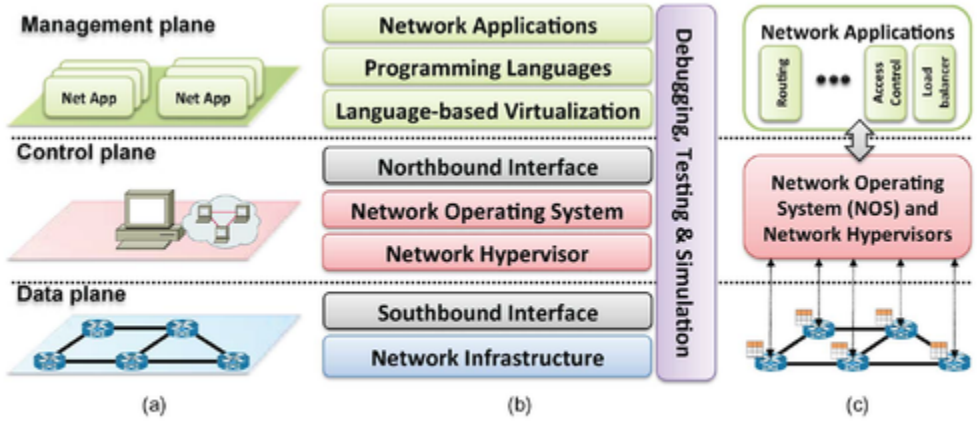
vertical integration (combine control plane and data plane together) router, switches

programmable feature, the logical centralization of network control

SDN

separating network control and underlying routers and switches

SDN is a logically centralized system not postulate a physically centralized system.



Software-Defined Networks in (a) planes, (b) layers, and (c) system design architecture.

Three planes:

data plane: forwarding data

control plane: the protocols used to populate the forwarding tables of data plane elements.

management plane: software services. network policy is defined in management plane, the control plane enforces the policy, and the data plane executes it by forwarding data accordingly. (running applications)

Applications

routing, firewalls, load balancers, monitoring.

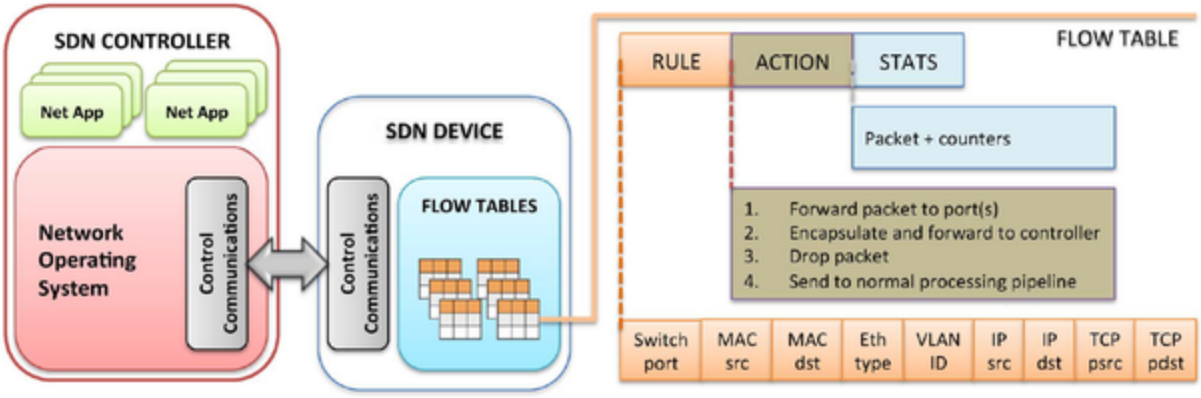
SDN advantages

improve flexibility and easy to maintain and upgrade network.

take advantage of global information

control plane: decides how to handle network traffic

data plane: forwards traffic according to the decisions made by the control plane.



. 7. OpenFlow-enabled SDN devices.

SDN need to **define** programming **interface** between data plane (switches) and controller.

The most notable example is **OpenFlow**.

SDN scalablity, security, dependability.

Software define wireless networking

Challenges

Relibility: wireless communiction is unstable, suffered by surrounding environment interference.

Energy: nodes often battery powered and difficult to recharge, energy cunsumption is important metric.

Memory and computing ability limitation: data plane in wireless networks often has small memory and limited CPU speed. It can not save a lot of flow tables and fast traverse tables.

Software define wireless networking in UAV-enabled system

Why using UAV?

Improving relibility, reduce hop number to reduce package lost, meanwhile, reducing latency.

Reducing energy consumption by reducing hop number.

More powerful computing platform on UAV (control plane).

Mobility: UAV can fly to every part of network to configure nodes via wireless communication.

Design

Route:

- UAV---UAV---nodes
- nodes---nodes---base sation

Trajectory:

- communication range-constraint
- energy-constraint

Neighbor discovery:

- UAV-UAV

- UAV-nodes

Flow table?