How SDN brings up NaaS via APIs?

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Software-defined networking (SDN) is changing the economics of large-scale datacenters.

Where is the software that defines the network?

SDN is a shift in network-based computing and communications.

SDN has been evolving for many years...

"Active networking" Nortel, 1998

"Application networking" Cisco, 2004

"OpenFlow" Stanford U

OpenFlow is both software and a protocol that specifies an API for programming the flow tables of a network switch.

The rules of the networking industry are being rewritten.

48-port 10 GbE switch costs roughly $5k

48-port 10 GbE router costs roughly $20k

x86 Linux server costs roughly $2k

5k + 2k < 20k

While value is being destroyed in the physical controller layer, it is being created in the software control and network management layer.

The business impact to large-scale datacenters is massive.

Let's jump to the API concepts...

The software that defines the network does so via APIs

While virtualization is a systems model, APIs are an abstract model.

An API is a programming model

Let's consider more practical scenarios...

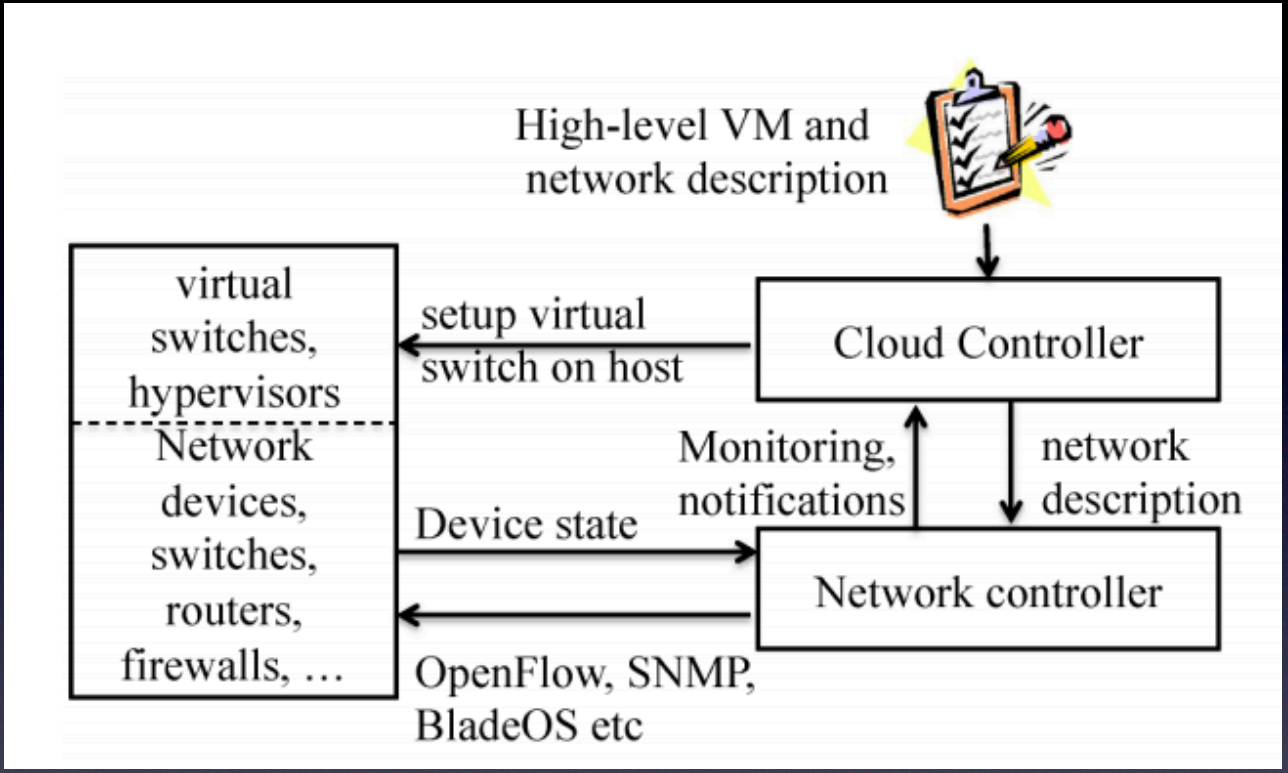
Decouple infrastructure management and service management in cloud networks

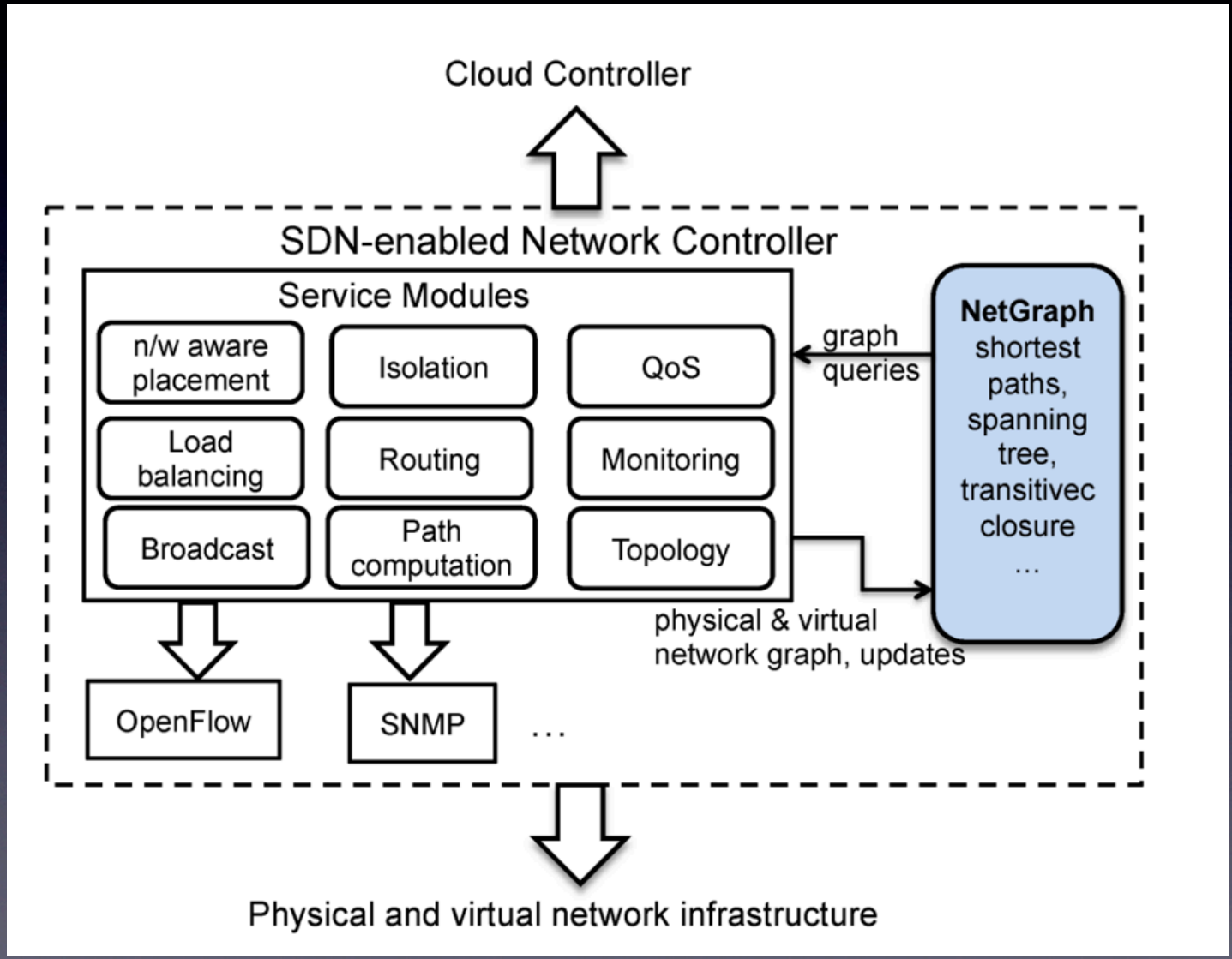
Networking-as-a-Service

network isolation

custom addressing

service differentiation


High-level VM and
network description
virtual
switches,
hypervisors
Network
devices,
switches,
routers,
firewalls, …
setup virtual
switch on host
Cloud Controller
Monitoring,
notifications
network
description
Device state
Network controller
OpenFlow, SNMP,
BladeOS etc


Cloud Controller
SDN-enabled Network Controller
Service Modules
n/w aware placement
Isolation
QoS
Load balancing
Routing
Monitoring
Broadcast
Path computation
Topology
graph queries
NetGraph shortest paths, spanning tree, transitivec closure …
physical & virtual network graph, updates
OpenFlow
SNMP
…
Physical and virtual network infrastructure

Thank you
Q & A?