

# **CSC4200/5200 – COMPUTER NETWORKING**

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**SOFTWARE DEFINED NETWORKING**

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# Data VS Control Plane

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Data plane is (mostly) in the hardware -

- Forward packets

Control plane

- How do we tell routers how to forward packets?
- BGP?
- How do you change something when network changes?

# Data and Control Plane together

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## Problems?

- No separate channel
- Expensive
- Hard to change

# What is SDN?

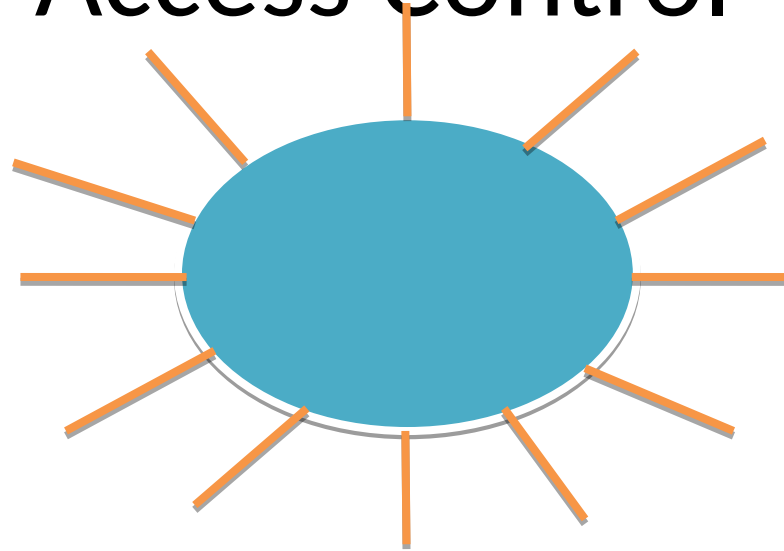
- Software-defined networking (SDN) provides abstraction for
  - Configuration, security, and forwarding
- SDN makes the network
  - Directly programmable
  - Agile: administrator can change the network
  - Centrally managed: network management is logically centralized.
  - Vendor-neutral

# Simple Example: Access Control

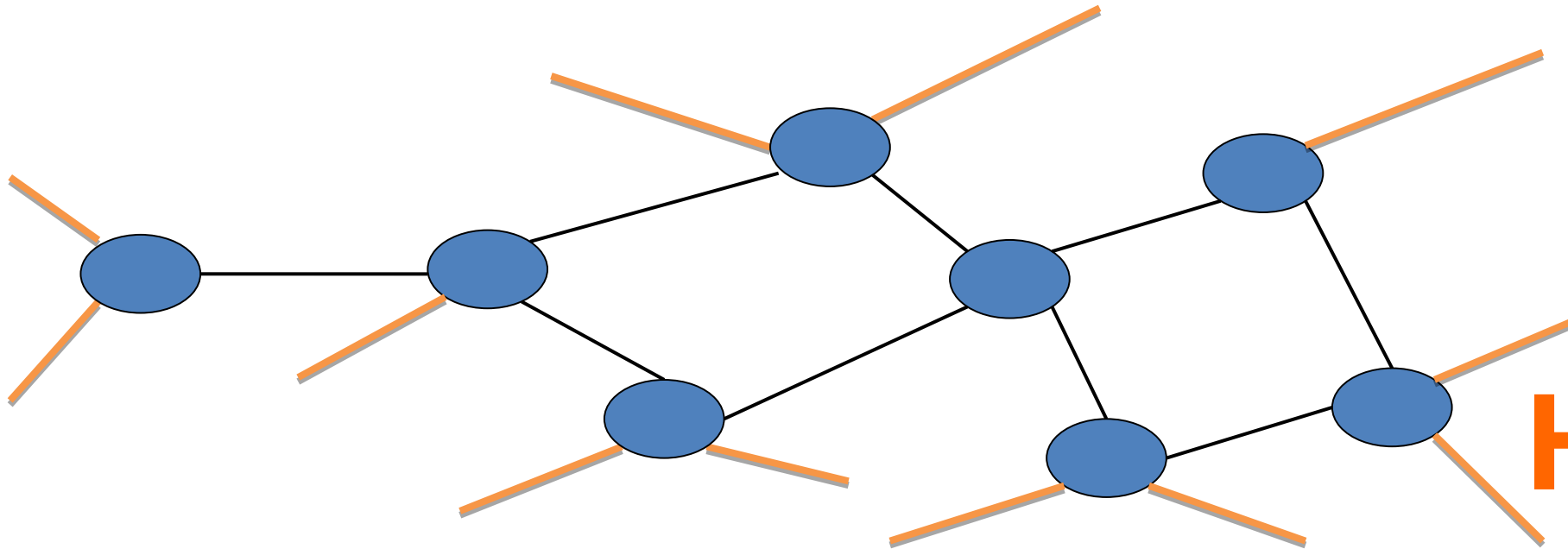
Source: Scott Shenker, UC Berkeley

## What

Abstract Network  
Model



Global  
Network View



## How

# Software Defined Networks

Source: Scott Shenker, UC Berkeley

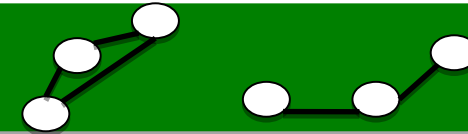
**Specifies  
behavior**

Control Program

Abstract Network Model

**Compiles to  
topology**

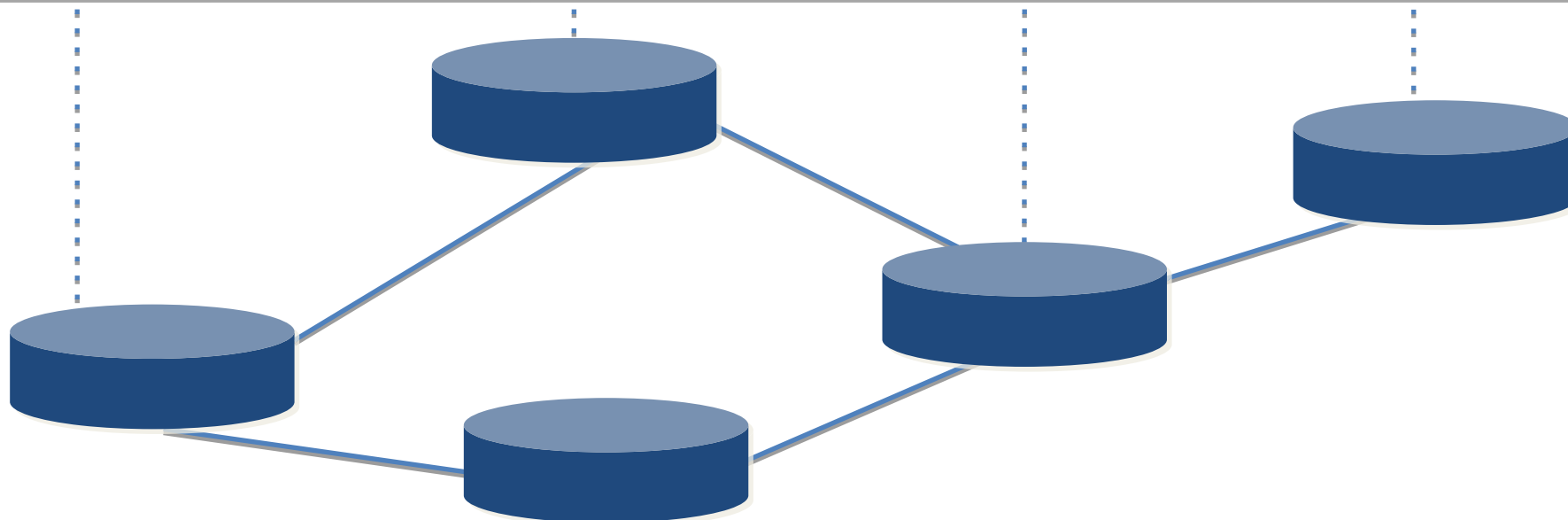
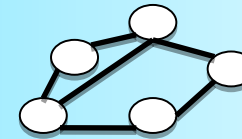
Network Virtualization



Global Network View

**Transmits to  
switches**

Network OS

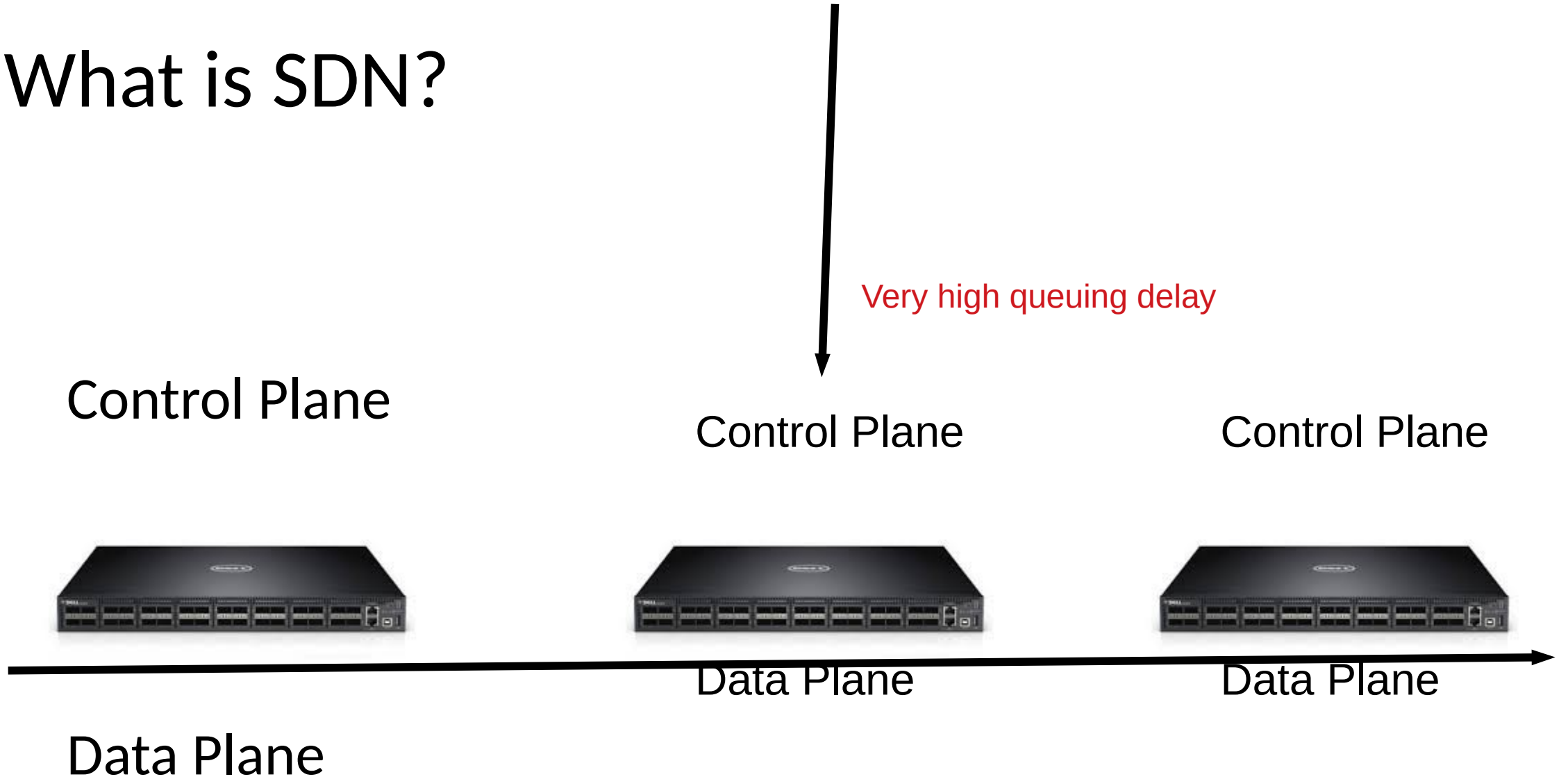


# What Does This Picture Mean?

Source: Scott Shenker, UC Berkeley

- Write a simple program to configure a simple model
  - Configuration merely a way to specify what you want
- Examples
  - ACLs: who can talk to who
  - Isolation: who can hear my broadcasts
  - Routing: only specify routing to the degree you care
    - Some flows over satellite, others over landline
  - TE: specify in terms of quality of service, not routes
- Virtualization layer “compiles” these requirements
  - Produces suitable configuration of actual network devices
- NOS then transmits these settings to physical boxes

# What is SDN?





# What is SDN?

