CSC4200/5200 – COMPUTER NETWORKING

Instructor: Susmit Shannigrahi

SFOTWARE DEFINED NETWORKING

sshannigrahi@tntech.edu

GTA: dereddick42@students.tntech.edu

Tennessee TECH

Data VS Control Plane

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

Problems?

- No separate channel
- Expensive
- Hard to change

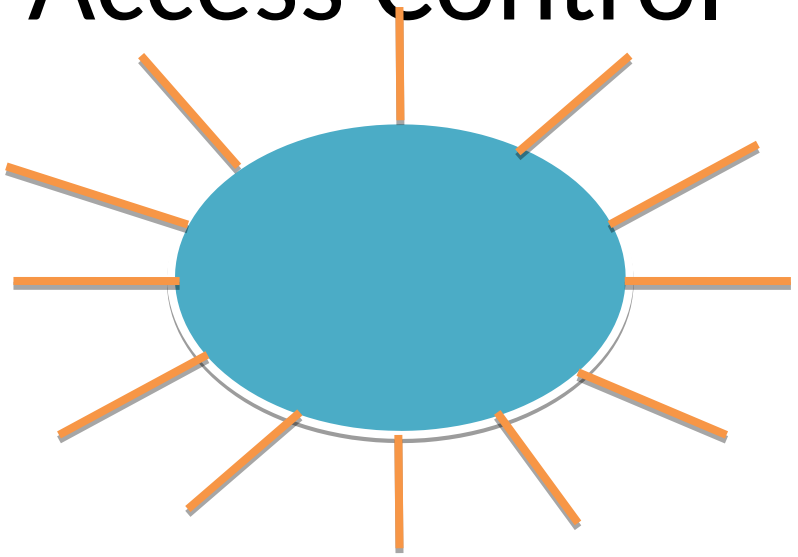
What is SDN?

- 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

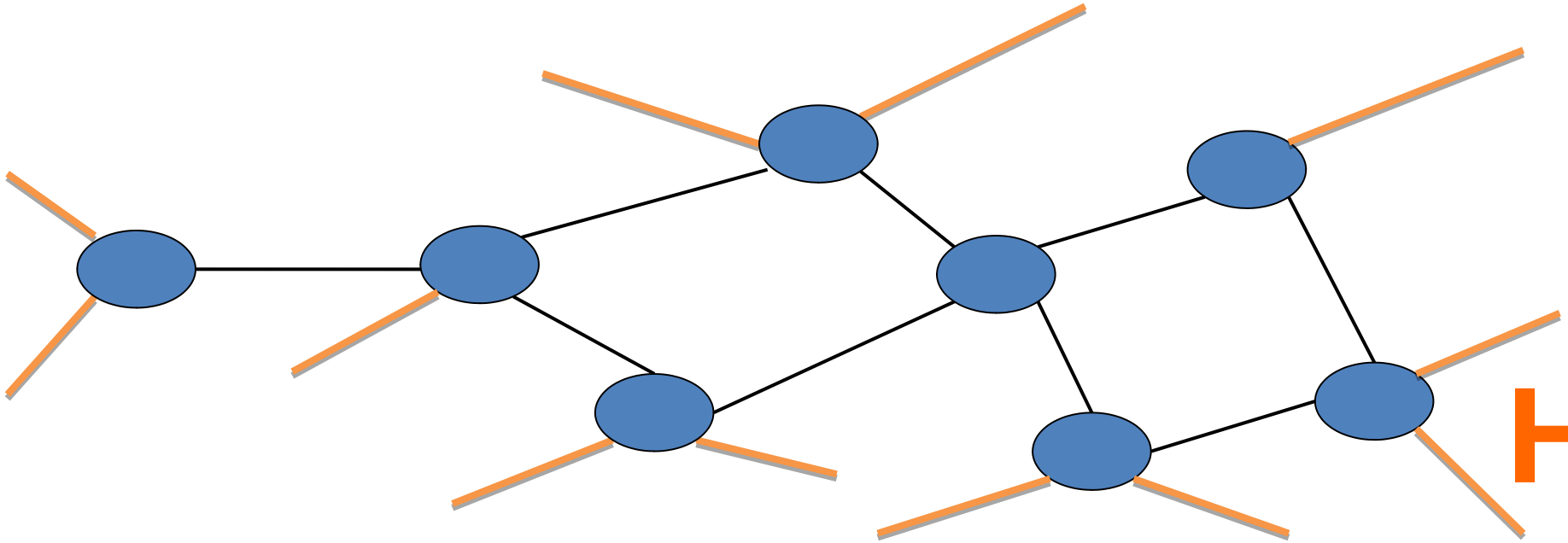
Simple Example: Access Control

Source: Scott Shenker, UC Berkeley



What

Abstract Network Model

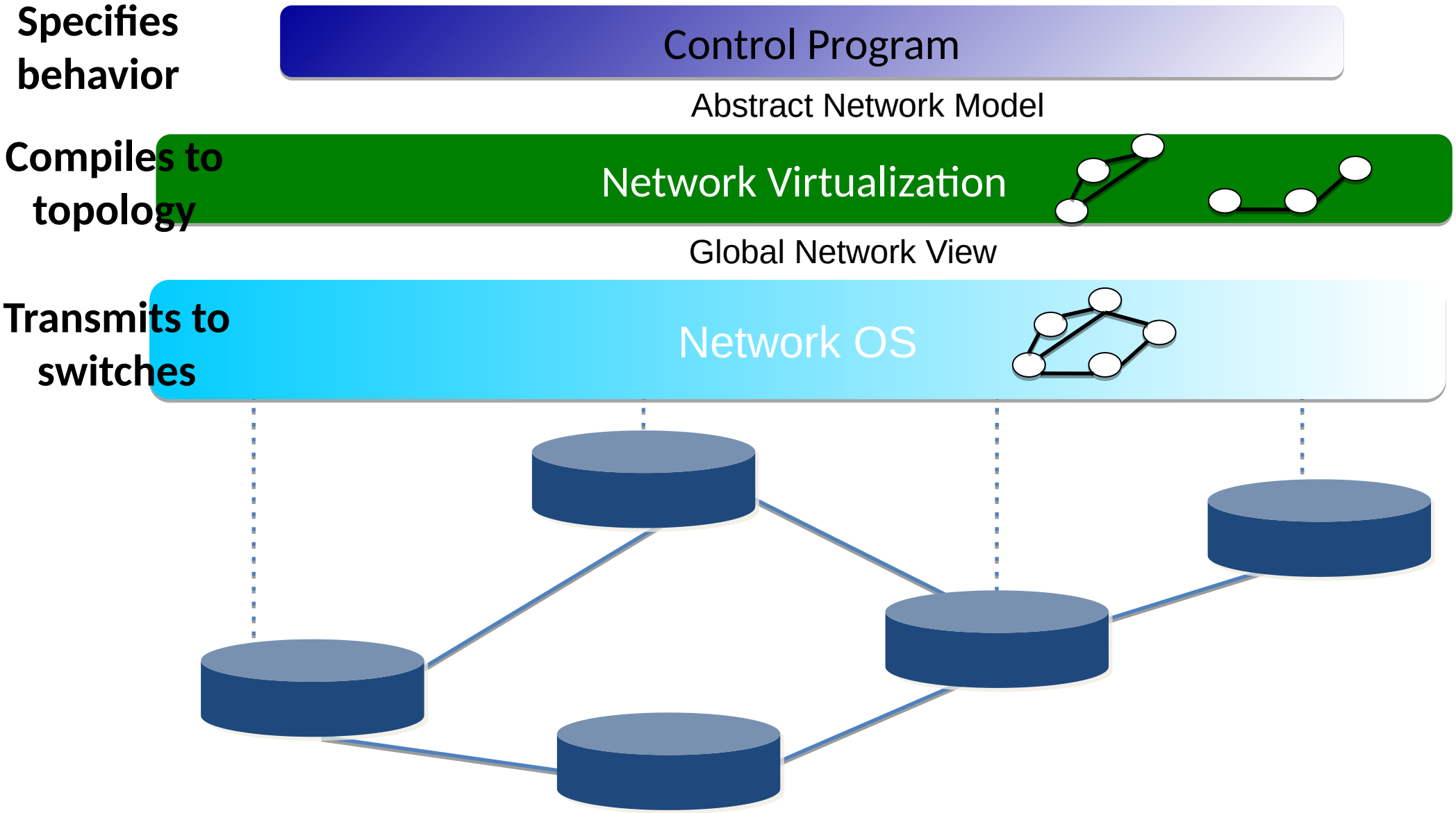


Global Network View

How

Software Defined Networks

Source: Scott Shenker, UC Berkeley

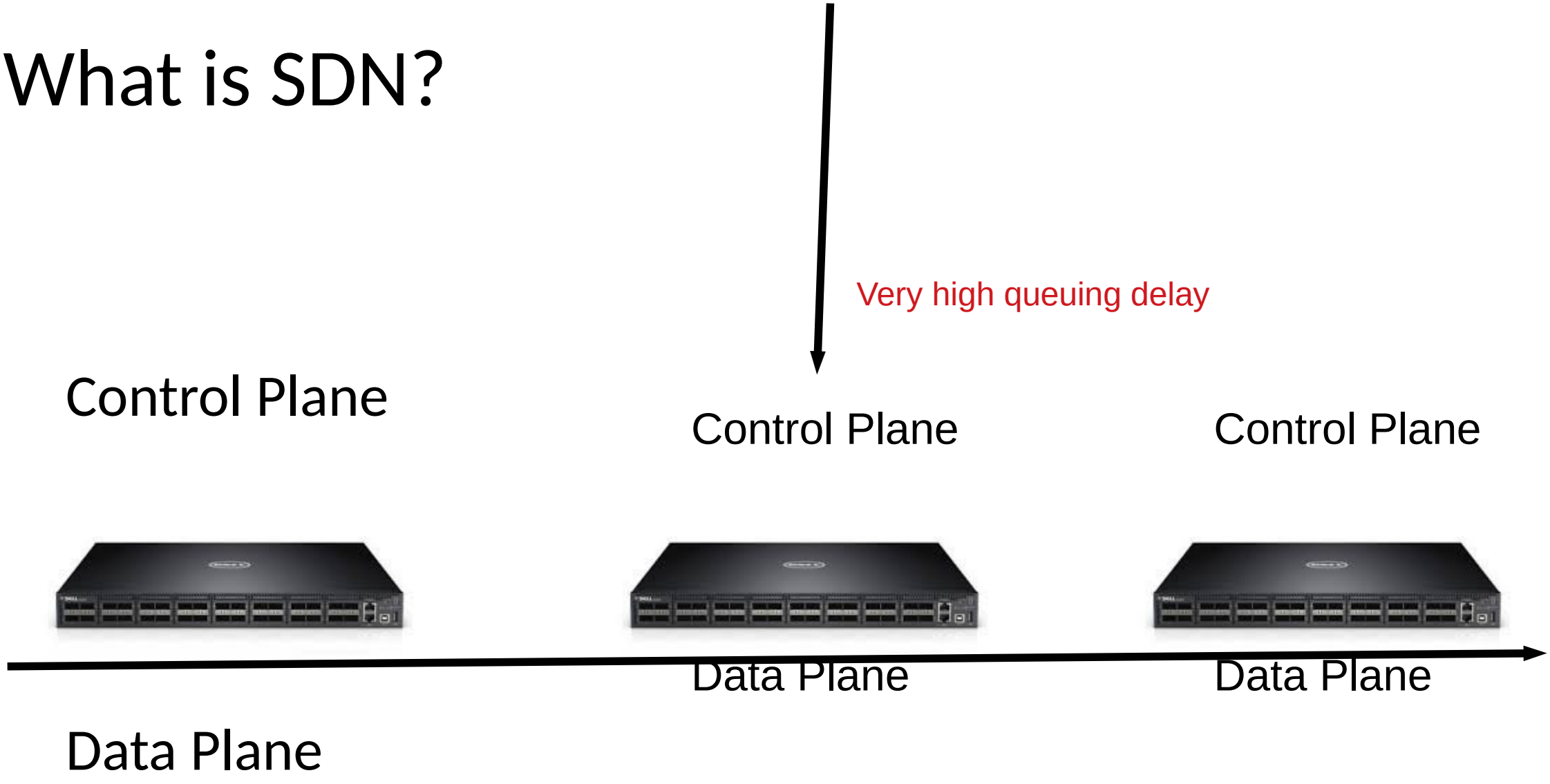


What Does This Picture Mean?

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?


Very high queuing delay
Control Plane
Control Plane
Control Plane
Data Plane
Data Plane
Data Plane

What is SDN?

Controller

Bypass

Very high queuing delay

Control Plane

Control Plane

Control Plane

Data Plane

Data Plane