

# Princeton's Next Generation Network

Cyberinfrastructure for Research Data Management

Chris Teng, Sr. Architect, Network Services - May 23, 2023



# The Problem to be Solved

## Legacy Network

- 20+ year old design
- Single border router, no firewall
- Single core router
- Layer 2 VLANs shared between buildings
- Mostly 1 Gb/s building connections, with a few 10 Gb/s
- No redundancy
- Manual port configuration
- Automation-hostile



# The Solution

## Next Generation Network

- New (to Princeton) design
- Dual border routers, and firewalls
- Dual core routers
- Layer 3 to the buildings
- Layer 2 VLANs within each building
- Mostly 2x10 Gb/s building connections, with some 2x40 Gb/s and some 2x100 Gb/s
- Dual/redundant “everything” (except APs)
- Colorless ports
- Enhanced security
- Automation-friendly



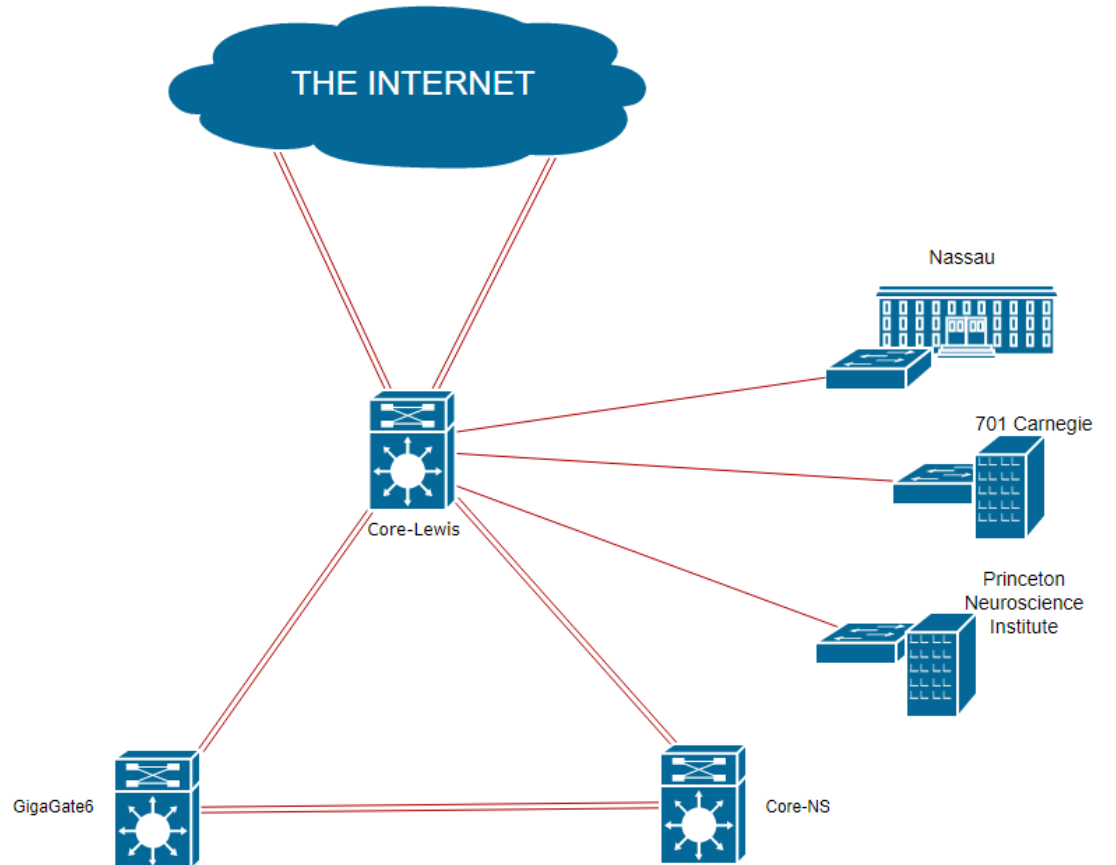
# The Legacy Network (after the border upgrade)

Single core router (core-lewis)

Dual border connections

(Mostly) low-speed building uplinks

Connections to 2 data centers



# The Next Gen Border

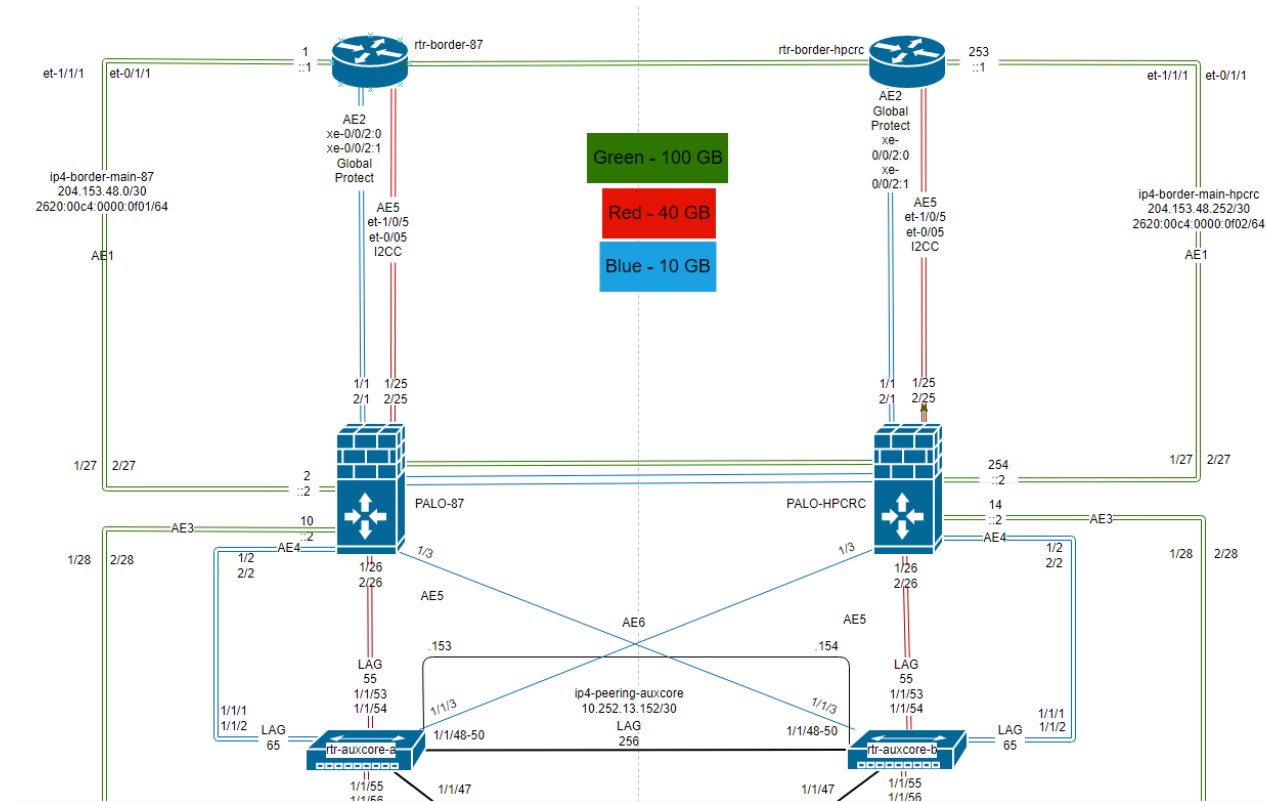
2, 10 Gb/s Commodity Internet (Edge)

2, 100 Gb/s Internet2 (Edge)

2 Border Routers

2 Border Firewalls

2 “auxcore” switch-routers for AL2S and Legacy L2 over NGN



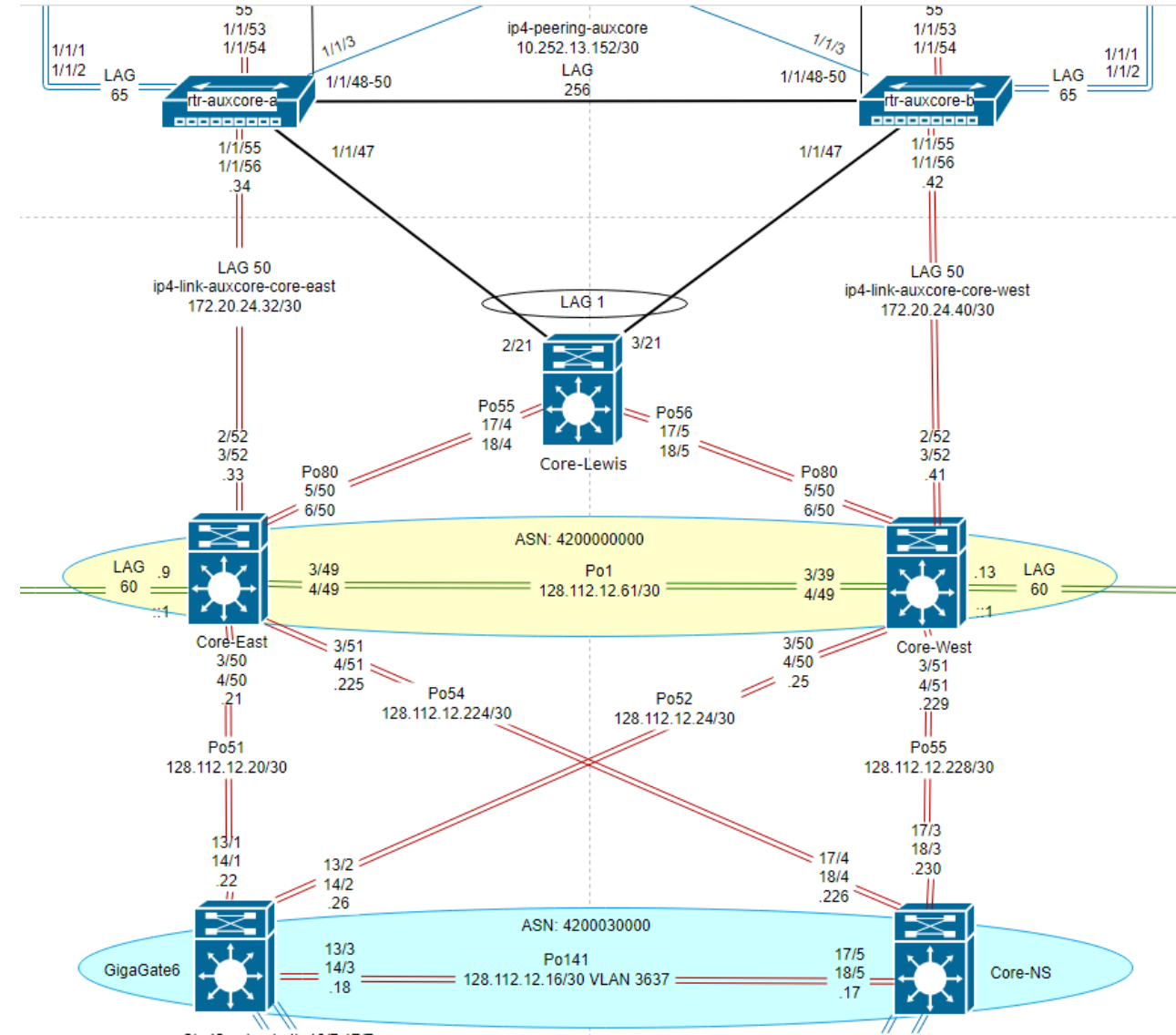
# The Next Gen Core

Dual NGN core routers

“auxcores” connect to core-lewis for L2

“auxcores” connect to NGN for VXLAN

All connections redundant



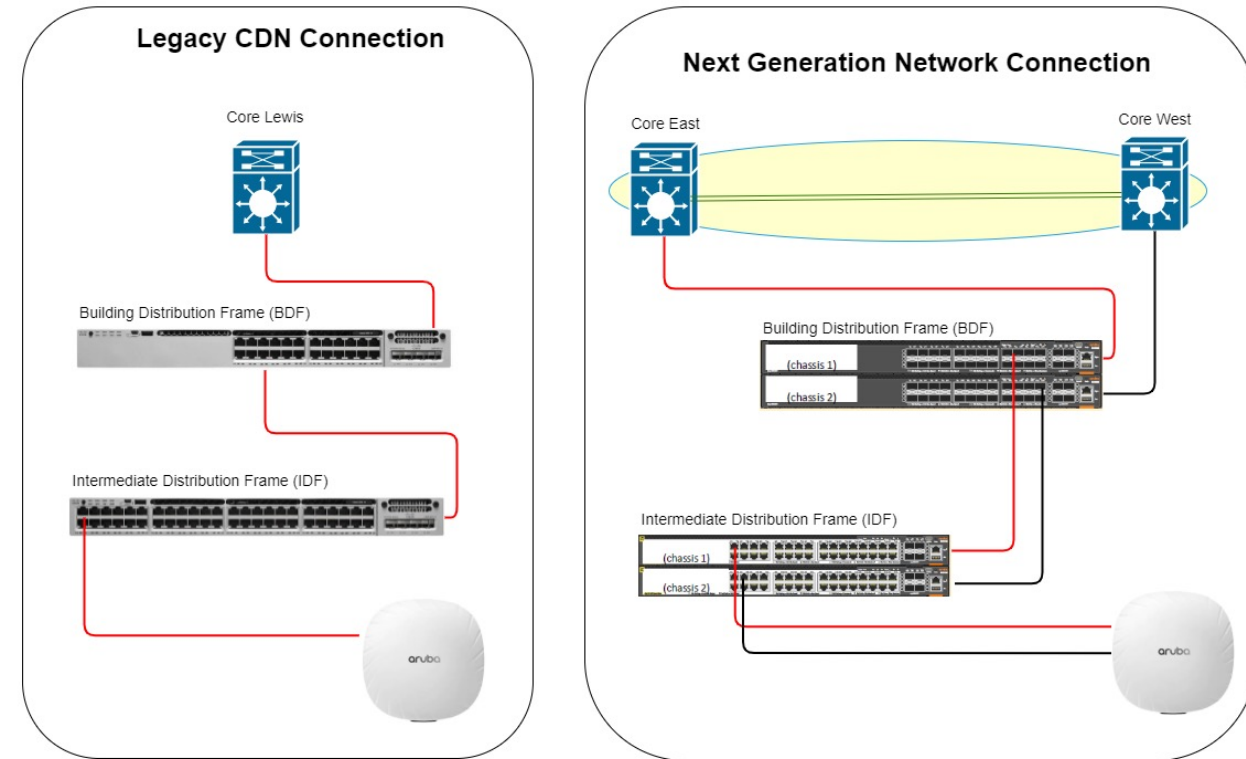
# Redundancy in the Buildings

## Legacy

- 1 uplink
- 1 aggregation switch
- 1 access switch
- 1 AP link

## NGN

- 2 uplinks
- 2 aggregations switches
- 2 access switches
- 2 links per AP



# NGN Bandwidth and Security

**All buildings get 2 uplinks to the NGN core routers, for redundancy**

**Guaranteed bandwidth of 10 Gb/s, 40 Gb/s or 100 Gb/s**

**Upgrading “100 gig” buildings to “200 gig” buildings is easy**

**Colorless ports use Aruba ClearPass to determine correct network for each device**

**Devices profiled/fingerprinted by MAC address and operating system**

**“Unverified” devices can be placed on a network without access to sensitive data and infrastructure**





# Questions?

