Campus Network Best Practices: IP Addressing

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Who Needs Public IP Space?

- Every campus must have Public IP address space
  - Where do you get it?
- A REN needs must have IP address space
- If the REN becomes ISP, it must have address space for its “customers”
- Any University can get their own IP address space that is independent of the ISP

Provider Independent IP Addresses

- What are provider independent IP addresses?
  - Public IP addresses that are not allocated to you by your Internet Service Provider.
- Can move between service providers without changing IP addresses
- If your REN gets space, then addresses provided to you by your REN is not provider independent

NAT is a reality

- NAT is common technique to reduce number of public IP addresses required
- NAT makes some things hard
  - NAT breaks some things
    - SIP (standard-based VoIP)
    - H.323 Video Conferencing
  - Makes it harder to track down viruses and hackers

Who Needs Provider independent IP and ASN?

- REN
  - Must have both ASN and Provider Independent IP
- Campus Network
  - All campuses must have Public IP, doesn't have to be provider independent
  - Only need ASN if campus is multi-homed
- How much IP address space?

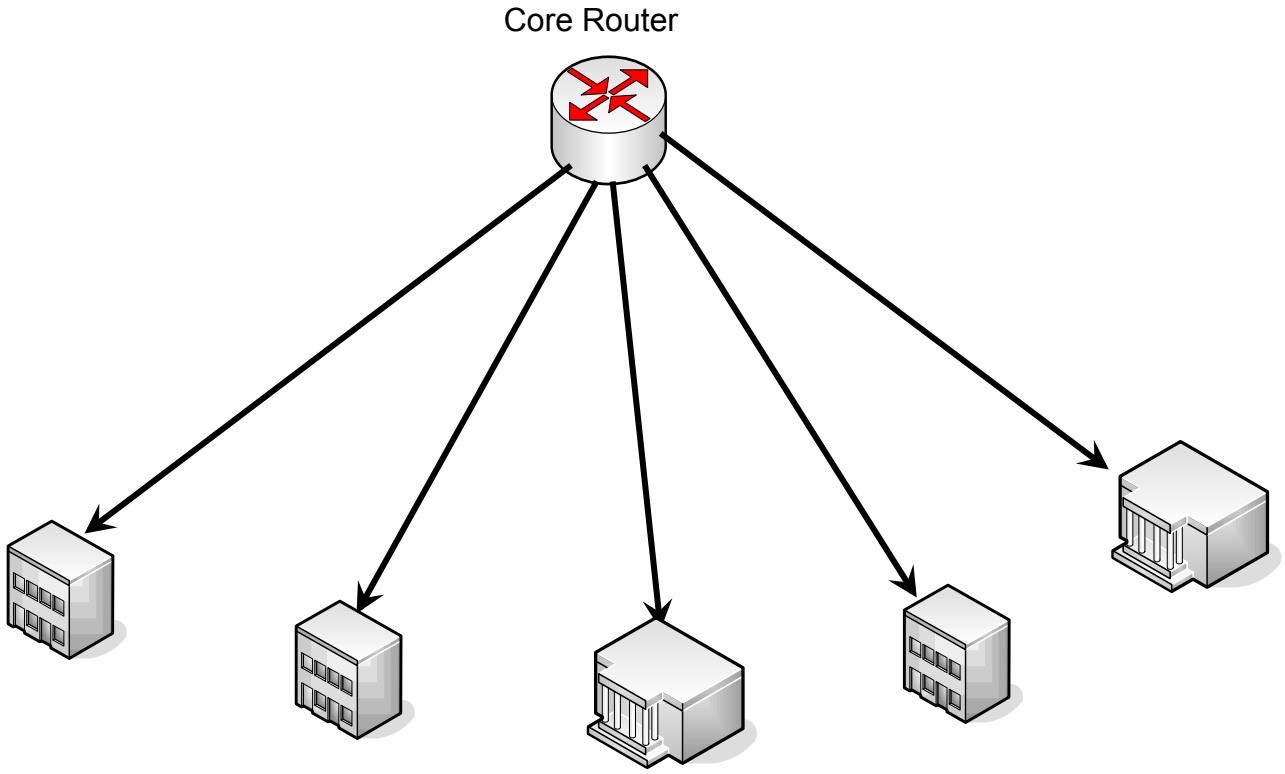
General Notes on IP Addressing

- IP version 4 addresses are 32 bits long
- IP address blocks allocated in powers of 2
  - Blocks of addresses: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, etc.
- CIDR notation: Address blocks are described with a notation of /number. /32 = 1 address, /31 = 2, /30 = 4, …. /24 = 256

Campus Network IP Addressing

- Build a spreadsheet
  - One row for every building on your campus
  - Write down how many computers will be in each building
  - Round up to the nearest power of 2
  - Add a row for servers
  - Add a row for wireless

A Simple Campus Example



A Simple Campus Example

Building	Hosts	CIDR Block	Size	Total
Administration Building	68	/25	128	128
Physics Building	220	/24	256	256
Chemistry Building	120	/24	256	256
Computer Science	200	/24	256	256
Literature Building	44	/26	64	64
Server Network	20	/27	32	32
Wireless Network	300	/23	512	512
Total				1504

Round 1504 up to the next CIDR block gives you 2048 or a /21
Note: this doesn't provide for any expansion of number of networks

Questions?