



# Campus Networking Workshop

## 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

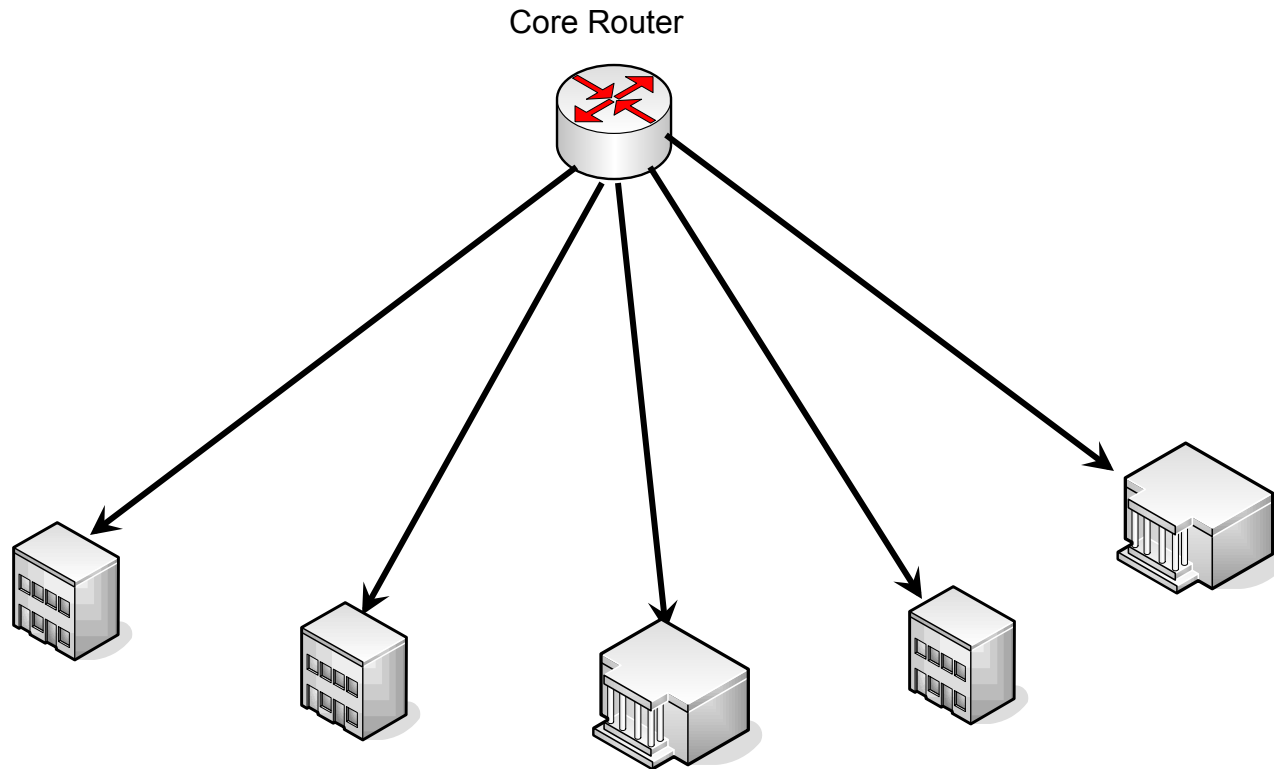
Round up to the nearest power of 2

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?

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