IP Addressing
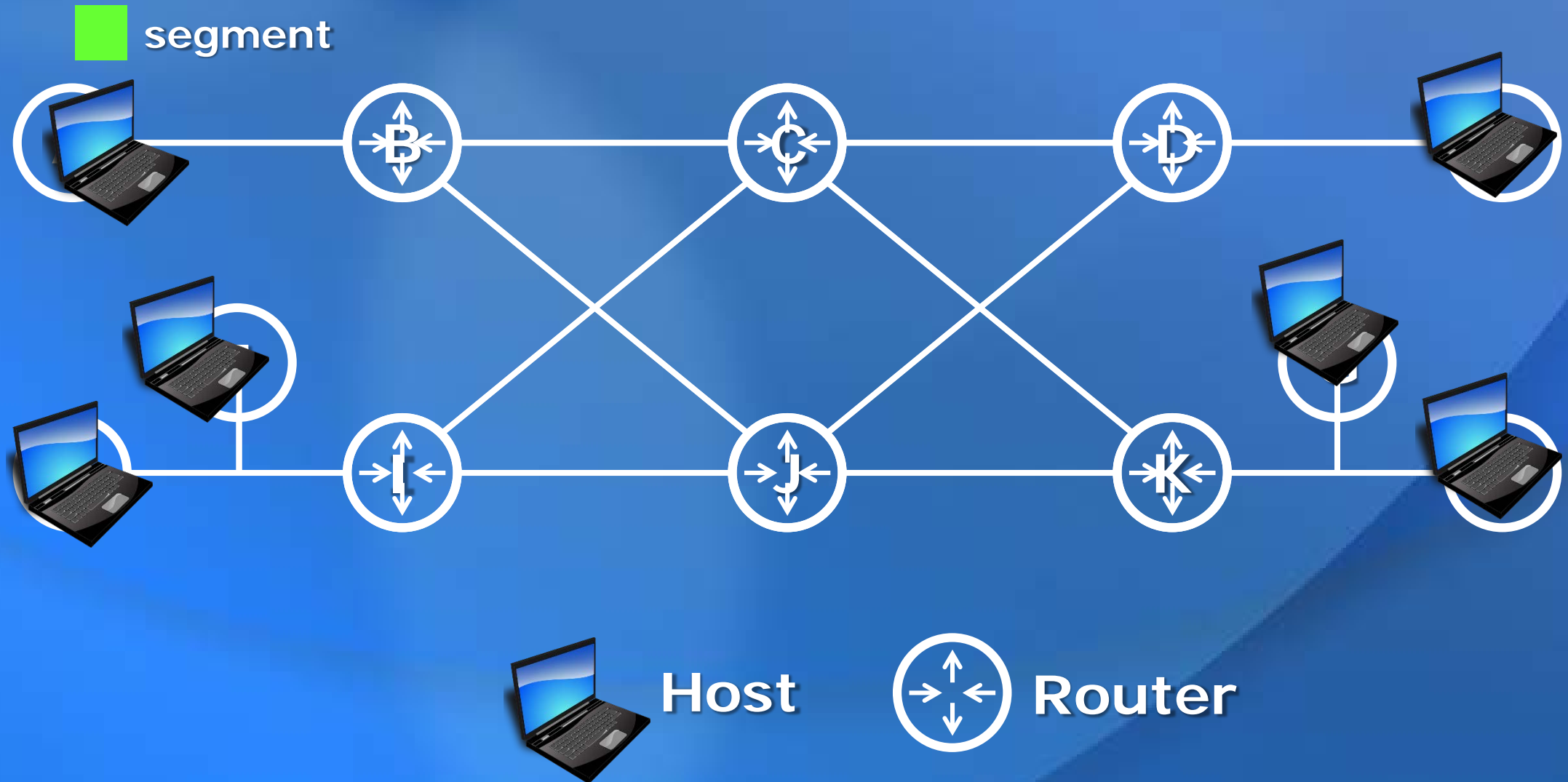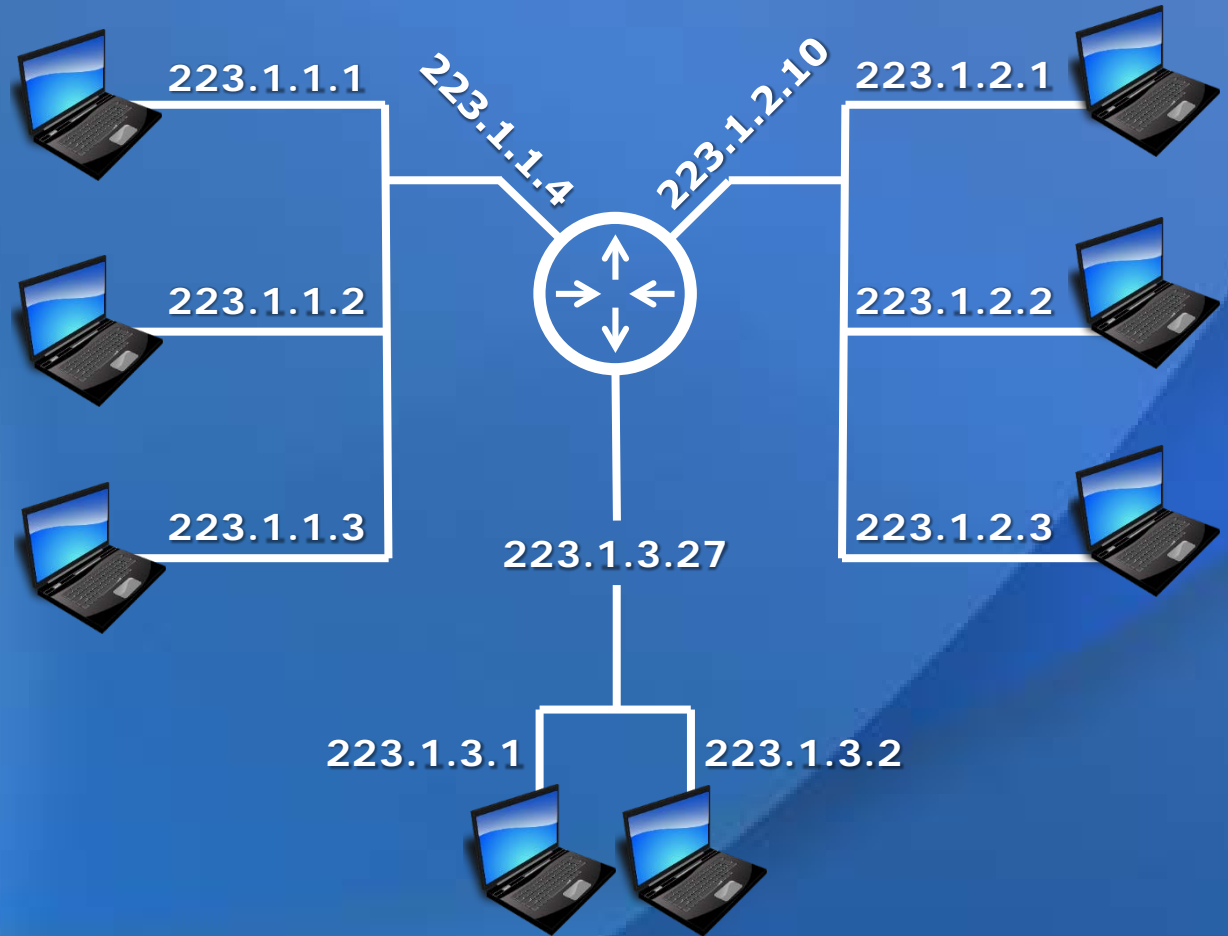
IP Addresses

- An IP (Internet Protocol) address is a unique global address for a network interface

- Network interface: connection between host or router and a physical link
  - routers typically have many interfaces
  - host typically has one or two interface (e.g. wired/wireless)

Subnets

- **The IP address is a 32 bit number split into**
  - subnet part
  - host part
- **A subnet consists of device interfaces that**
  - share same subnet address
  - can physically reach each other without intervening router
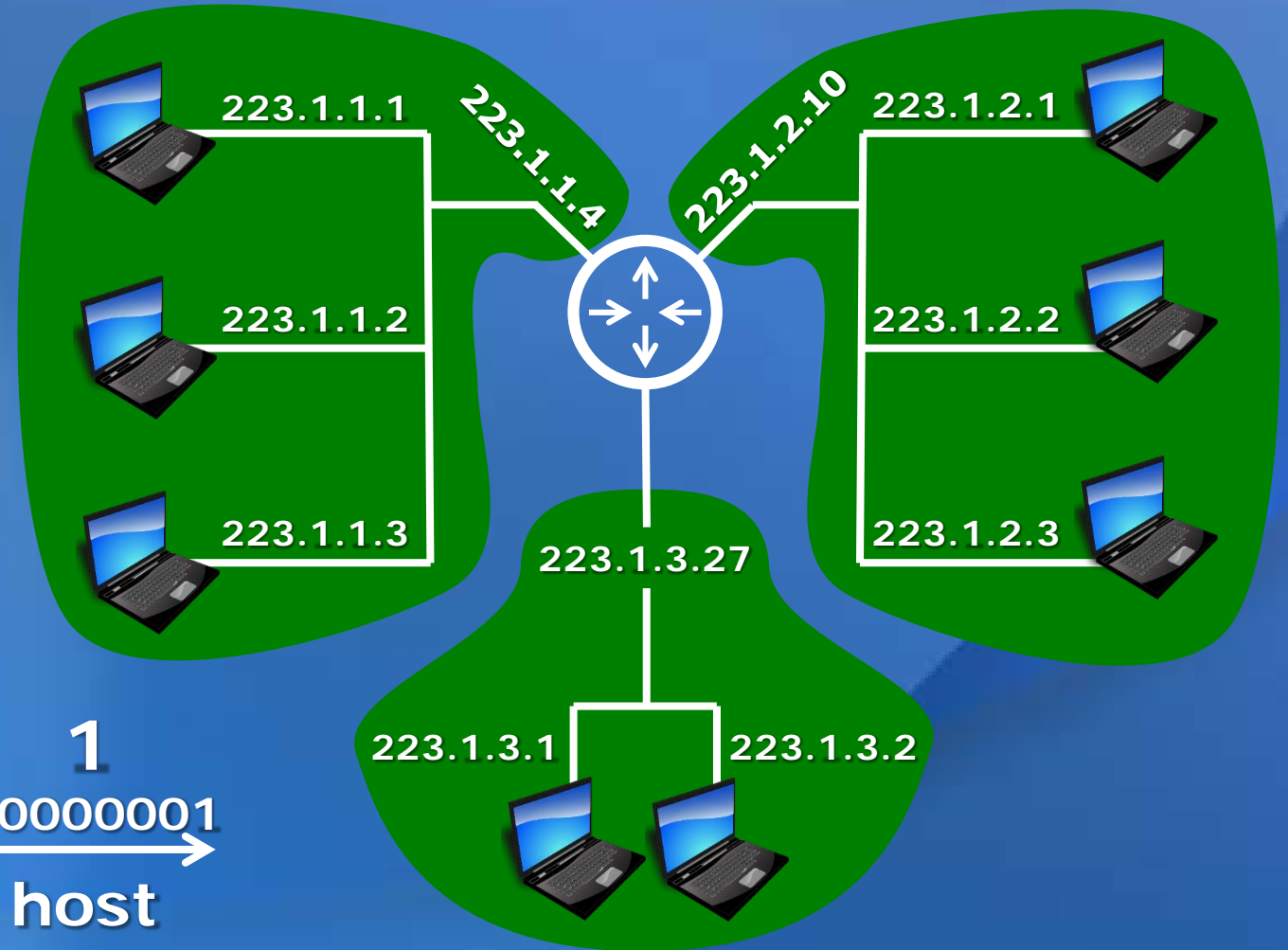
223 . 1 . 1 . 1

11011111.00000001.00000001.00000001

← **subnet** → ← **host** →

Classless InterDomain Routing (CIDR)

- **Subnet portion of address of arbitrary length**
- **Address format:**

a.b.c.d/x

where x is the length of the subnet portion in bits

200.23.16.0/20

11001000 00010111 0001 0000 00000000

←———————————— subnet ————————————→ ←——————— host ———————→

200.23.16.0/23

11001000 00010111 0001000 0 00000000

←———————————— subnet ————————————→ ←———— host ————→

Getting an IP Address

- **Host: Obtains address from network via Dynamic Host Configuration Protocol (DHCP)**

- **Network: Allocated a portion of its Internet Service Provider's (ISP) address space**

```
ISP's space:   11001000  00010111  00010000  00000000   200.23.16.0/20  (4094 hosts)

Network 0:     11001000  00010111  00010000  00000000   200.23.16.0/23  (510 hosts)
Network 1:     11001000  00010111  00010010  00000000   200.23.18.0/23
       ⋮
Network 7:     11001000  00010111  00011110  00000000   200.23.30.0/23
```

- **ISP: From Internet Corporation for Assigned Names and Numbers (ICANN)**