

Computer Science E-1

Understanding Computers and the Internet

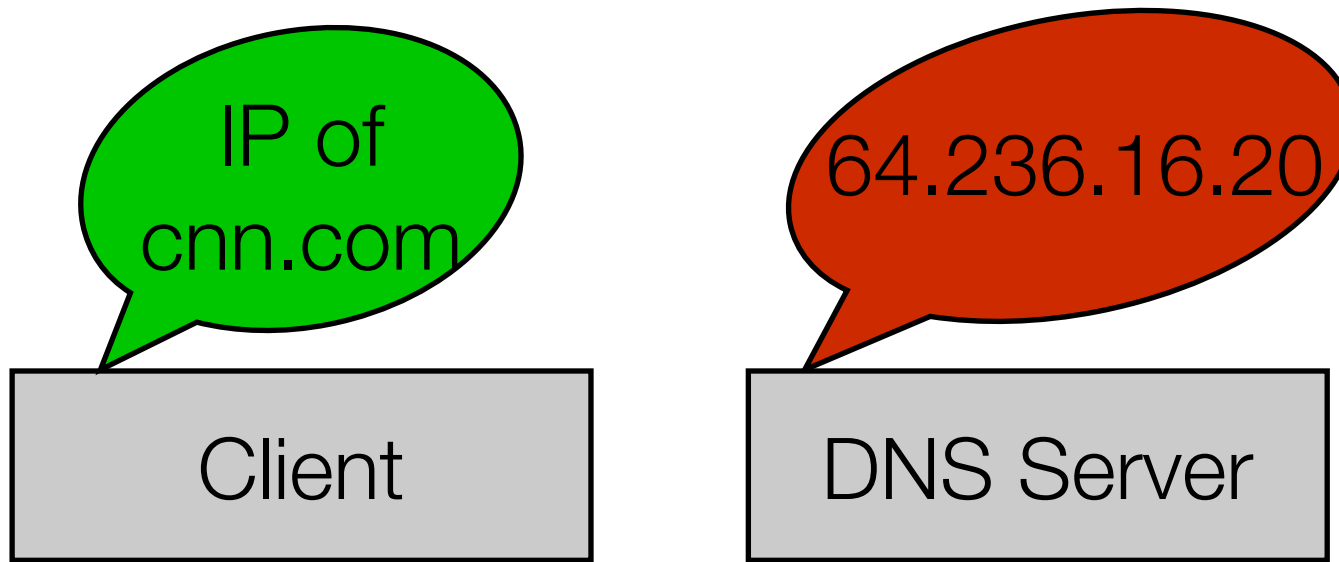
Lecture 4: The Internet, continued
February 28, 2011

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Canonical Form (IPv4):

#.#.#.#

is 0-255



Networking

DNS

Domain
harvard.edu

The Internet

Domains

.com

.edu

.gov

.mil

.net

.org

Domains

TLDs from 1995

Generic TLDs	.aero .asia .biz .cat .com .coop .edu .gov .info .int .jobs .mil .mobi .museum .name .net .org .pro .tel .travel
Country Code TLDs	.ac .ad .ae .af .ag .ai .al .am .an .ao .aq .ar .as .at .au .aw .ax .az .ba .bb .bd .be .bf .bg .bh .bi .bj .bm .bn .bo .br .bs .bt .bv .bw .by .bz .ca .cc .cd .cf .cg .ch .ci .ck .cl .cm .cn .co .cr .cu .cv .cx .cy .cz .de .dj .dk .dm .do .dz .ec .ee .eg .er .es .et .eu .fi .fj .fk .fm .fo .fr .ga .gb .gd .ge .gf .gg .gh .gi .gl .gm .gn .gp .gq .gr .gs .gt .gu .gw .gy .hk .hm .hn .hr .ht .hu .id .ie .il .im .in .io .iq .ir .is .it .je .jm .jo .jp .ke .kg .kh .ki .km .kn .kp .kr .kw .ky .kz .la .lb .lc .li .lk .lr .ls .lt .lu .lv .ly .ma .mc .md .me .mg .mh .mk .ml .mm .mn .mo .mp .mq .mr .ms .mt .mu .mv .mw .mx .my .mz .na .nc .ne .nf .ng .ni .nl .no .np .nr .nu .nz .om .pa .pe .pf .pg .ph .pk .pl .pm .pn .pr .ps .pt .pw .py .qa .re .ro .rs .ru .rw .sa .sb .sc .sd .se .sg .sh .si .sj .sk .sl .sm .sn .so .sr .st .su .sv .sy .sz .tc .td .tf .tg .th .tj .tk .tl .tm .tn .to .tp .tr .tt .tv .tw .tz .ua .ug .uk .um .us .uy .uz .va .vc .ve .vg .vi .vn .vu .wf .ws .ye .yt .yu .za .zm .zw

Information from <http://www.iana.org/domain-names.htm>

Domains

TLDs Now

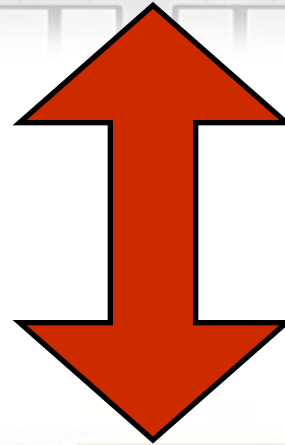
Domain	Sub-Domains
harvard.edu	dce., fas., eeecs., post., law., etc

Domains

Sub-Domains



Server



Network

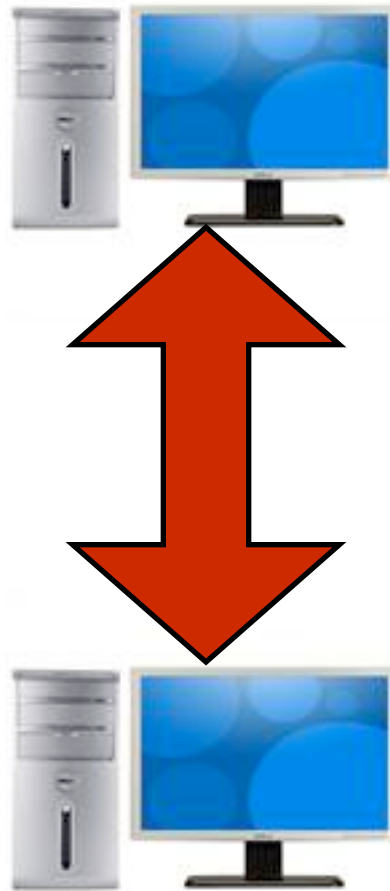


Client

Images from apple.com (© Apple, Inc) and dell.com (© Dell)

Networking

Services, Servers, Clients



Peer

Network

Peer

Images from *dell.com* (© Dell)

Networking

Peer-to-Peer

FTP File Transfer Protocol

HTTP HyperText Transfer Protocol

IMAP Internet Message Access Protocol

NTP Network Time Protocol

POP3 Post Office Protocol Version 3

RTSP Real-time Transport Streaming Protocol

SSH Secure Shell

SMTP Simple Mail Transfer Protocol

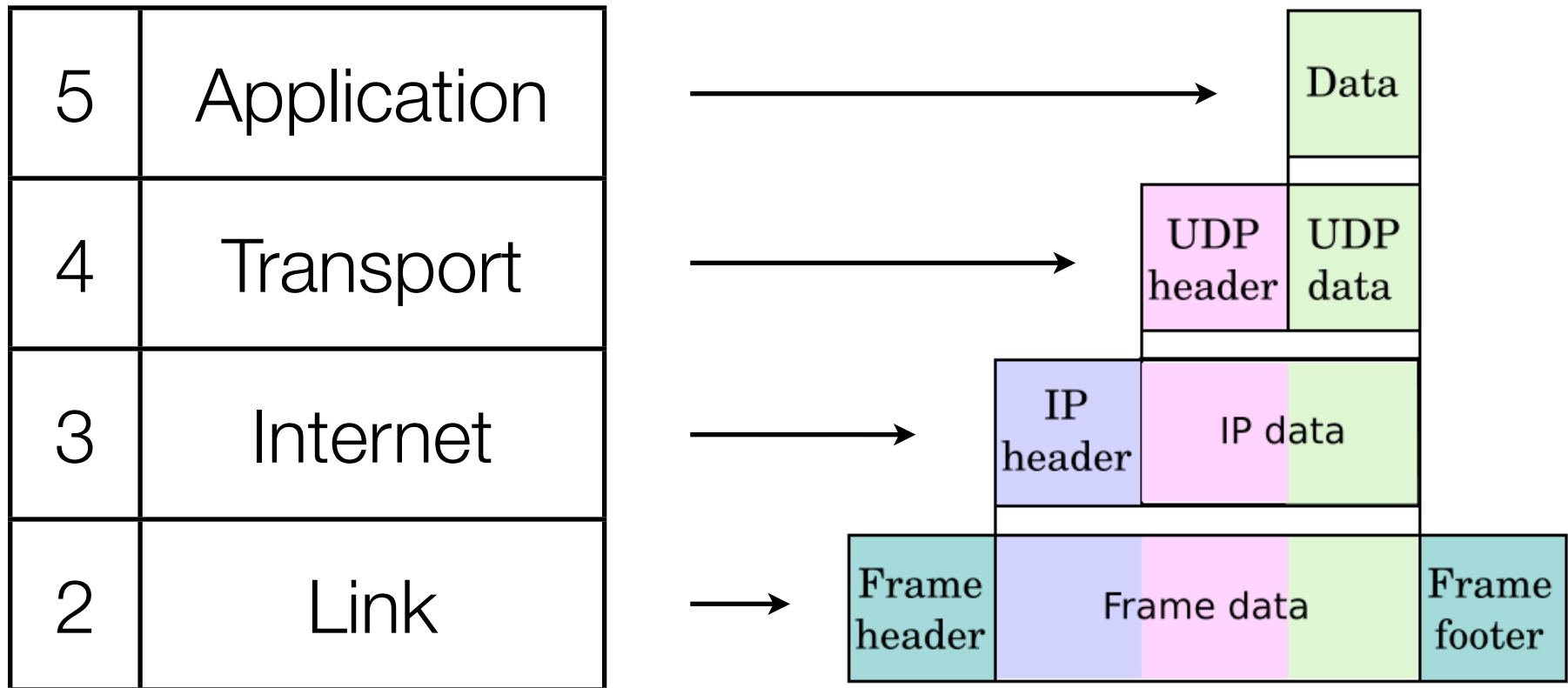
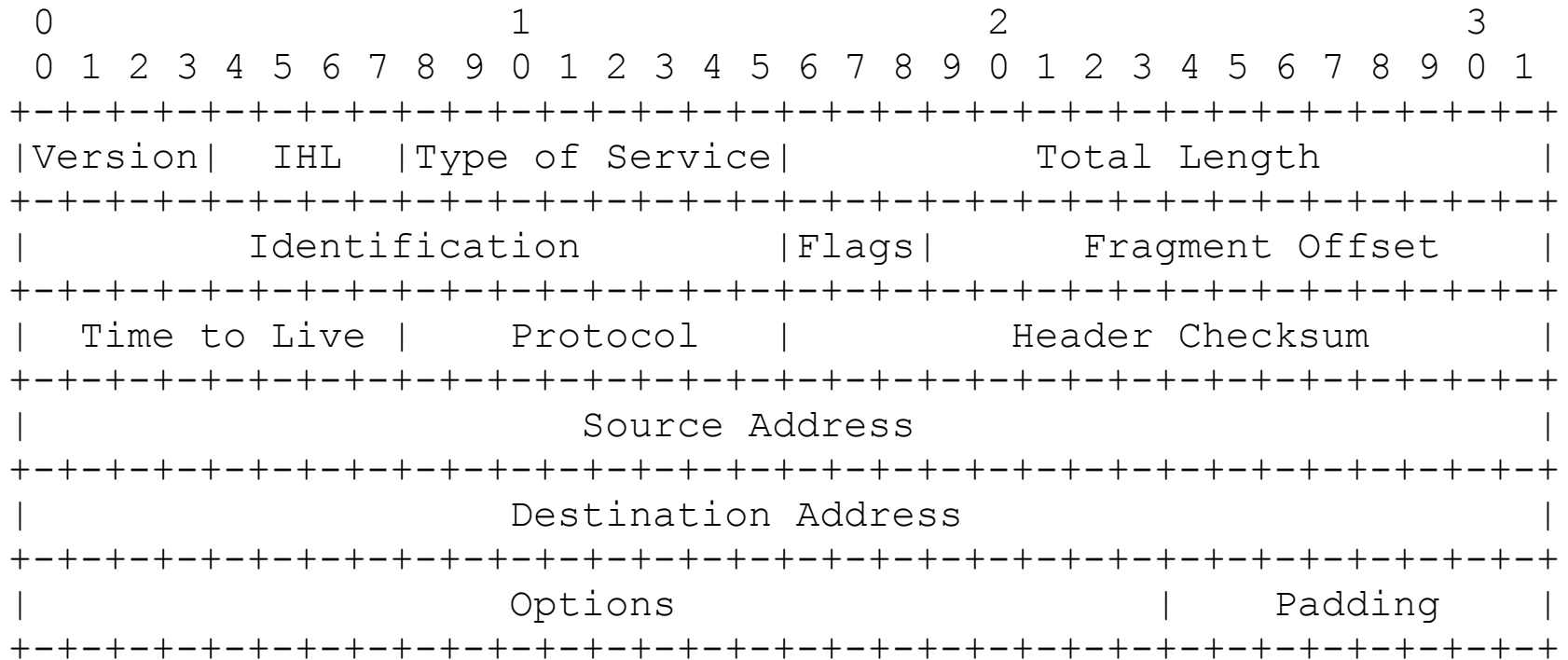


Image adapted from http://en.wikipedia.org/wiki/Internet_protocol_suite

Networking

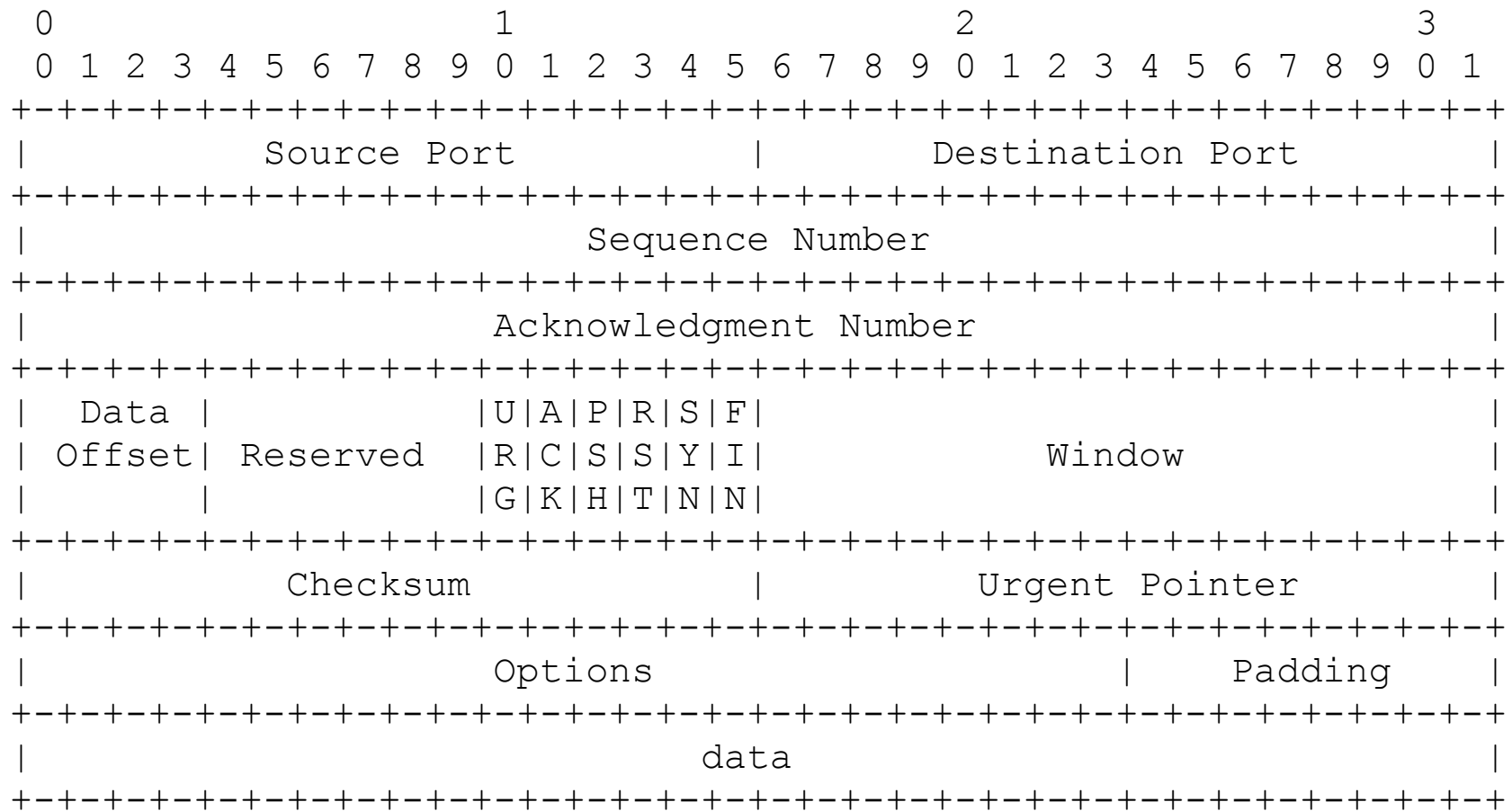
TCP/IP Model

Internet Header Format

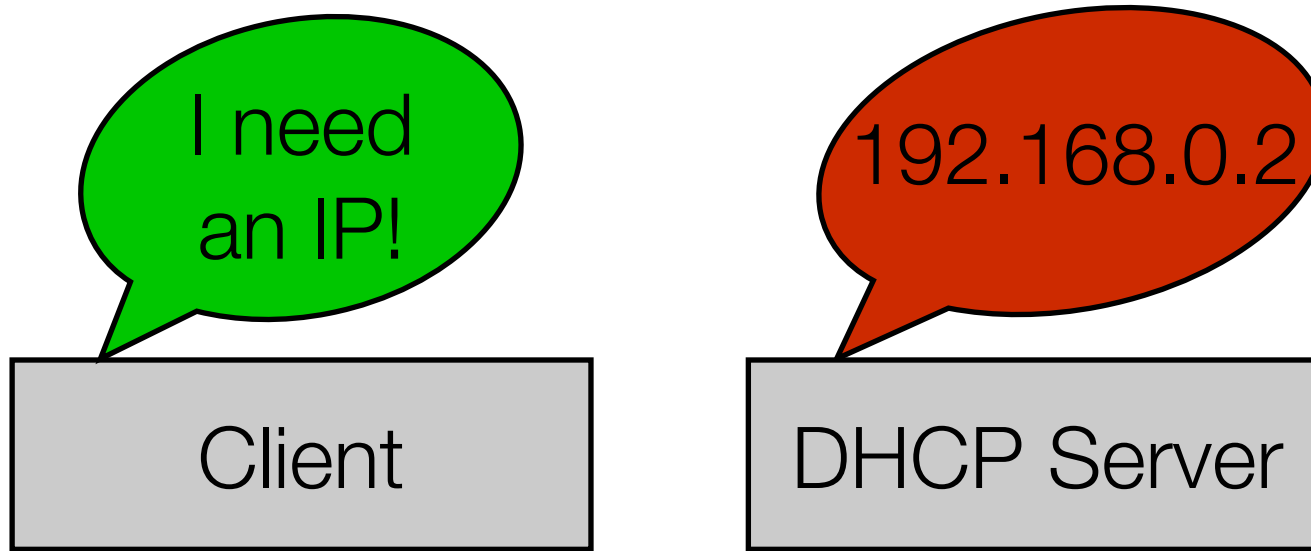


Example Internet Datagram Header

TCP Header Format

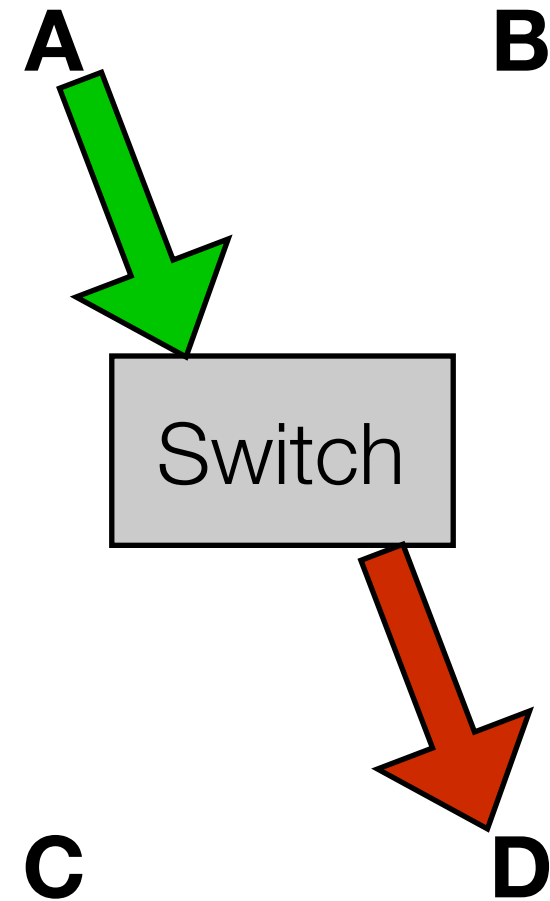
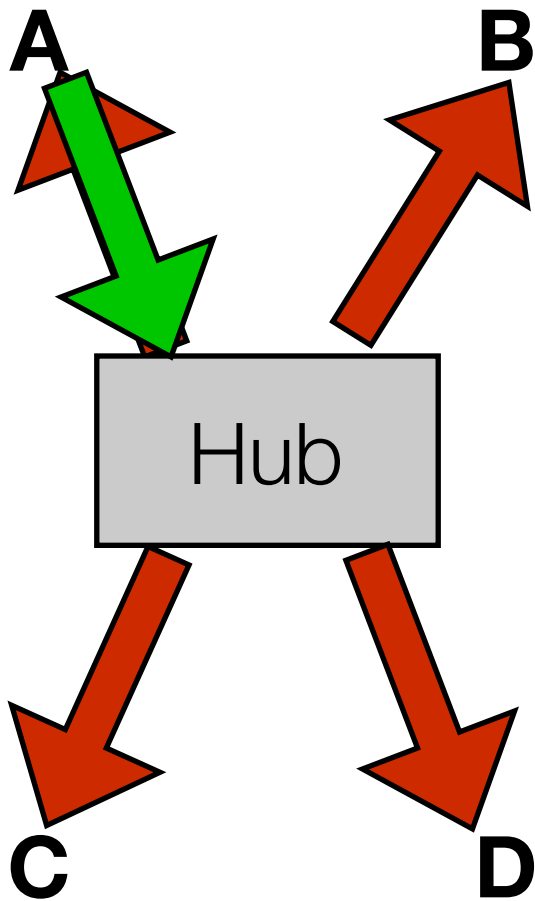


TCP Header Format



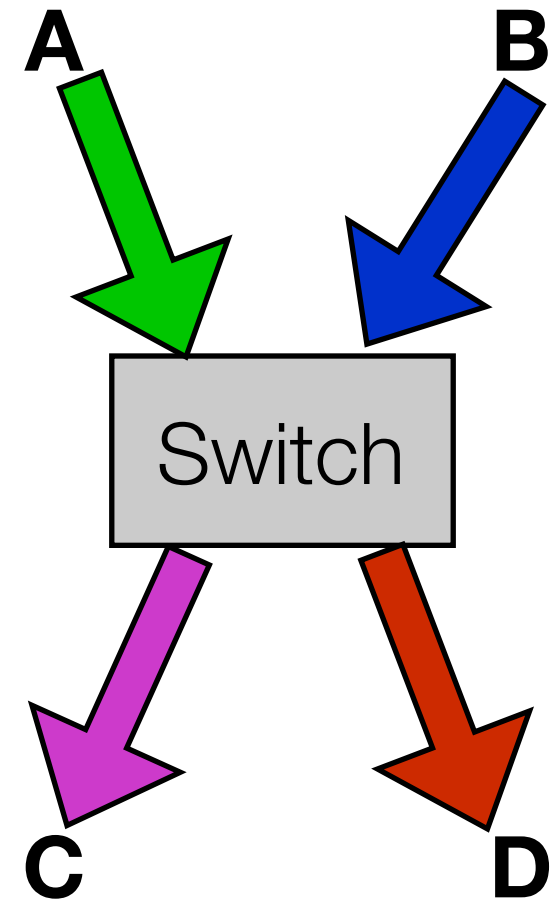
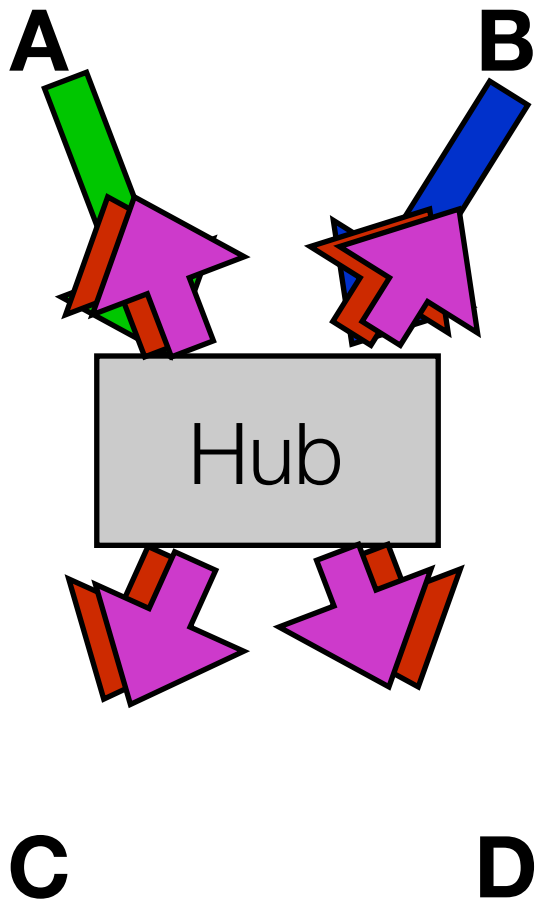
Networking

DHCP



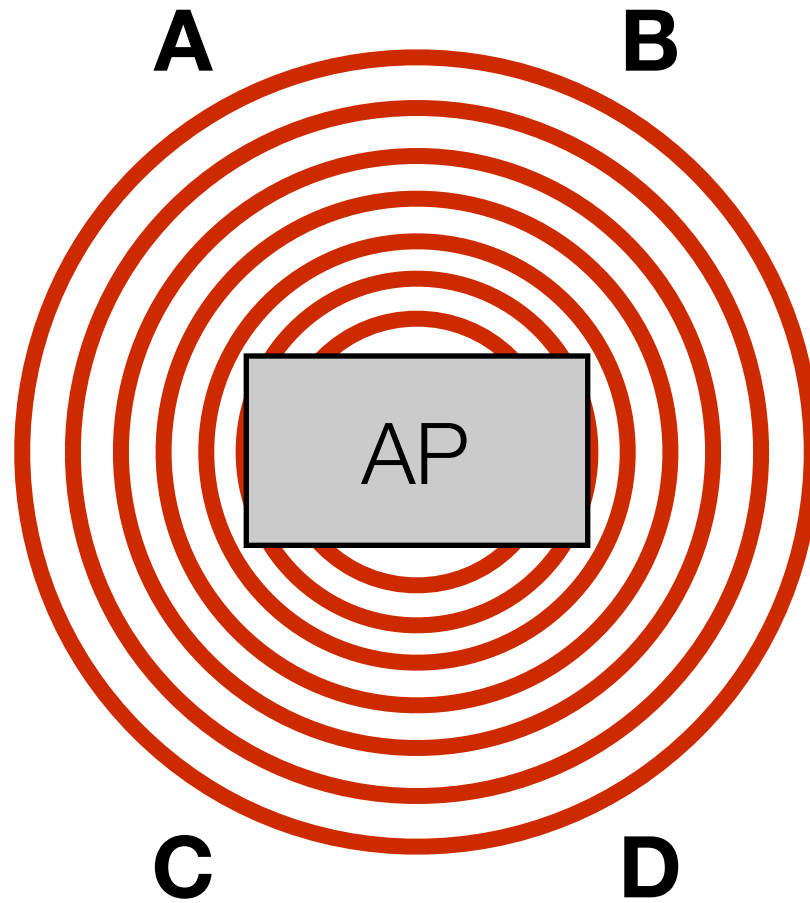
Network Devices

Hub and Switch Review



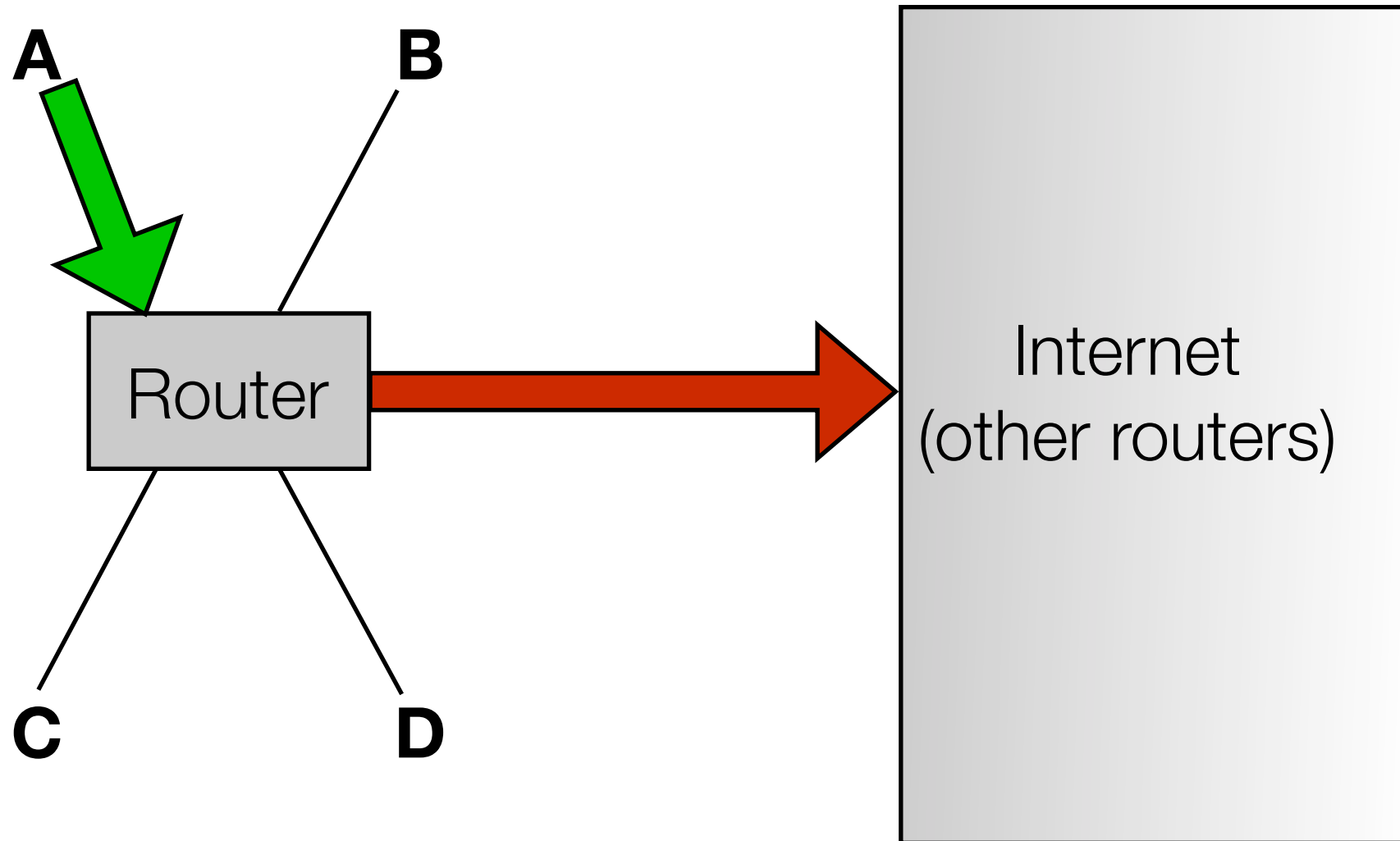
Network Devices

Hub and Switch Collisions



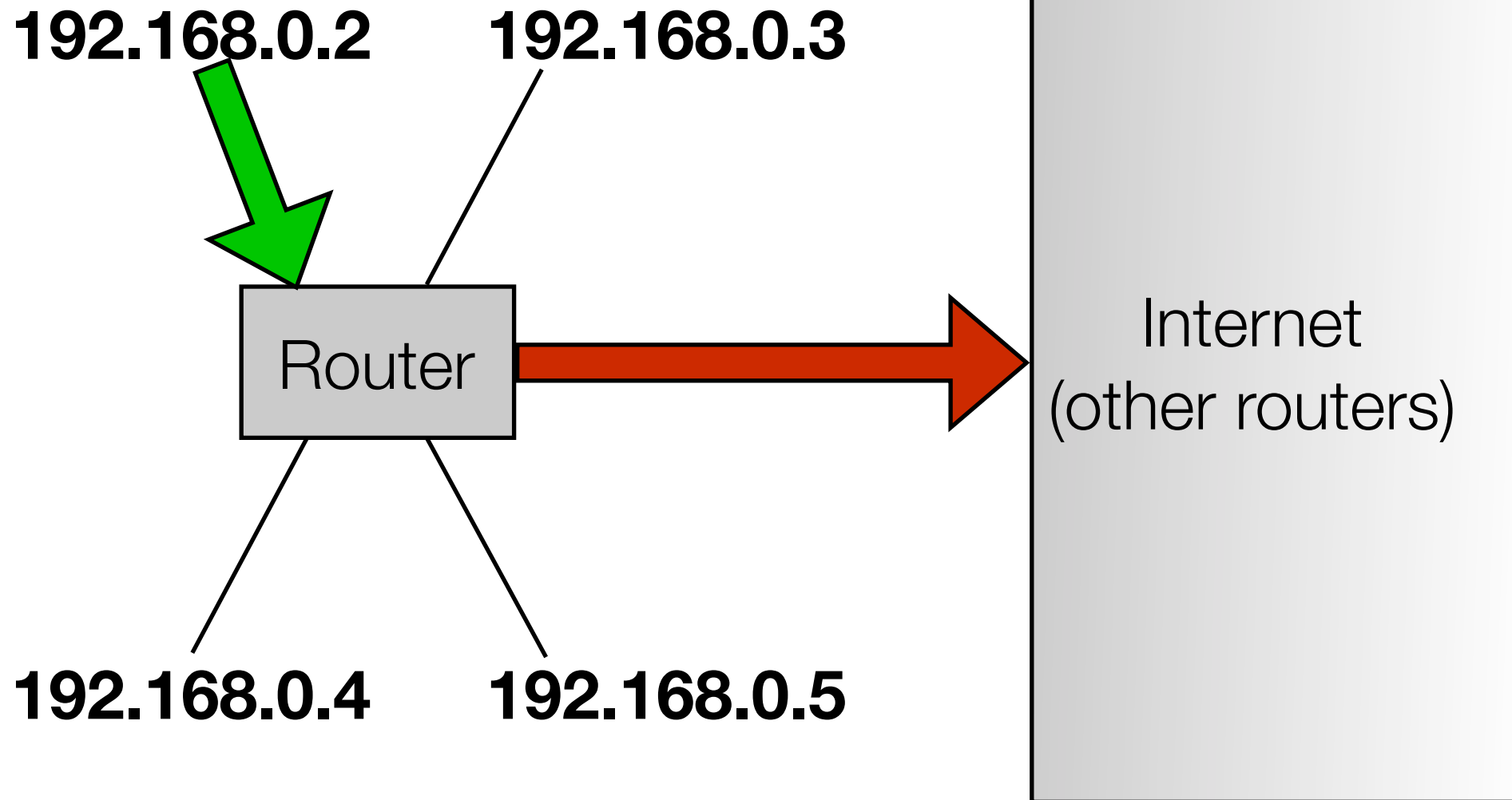
Network Devices

Wireless access point



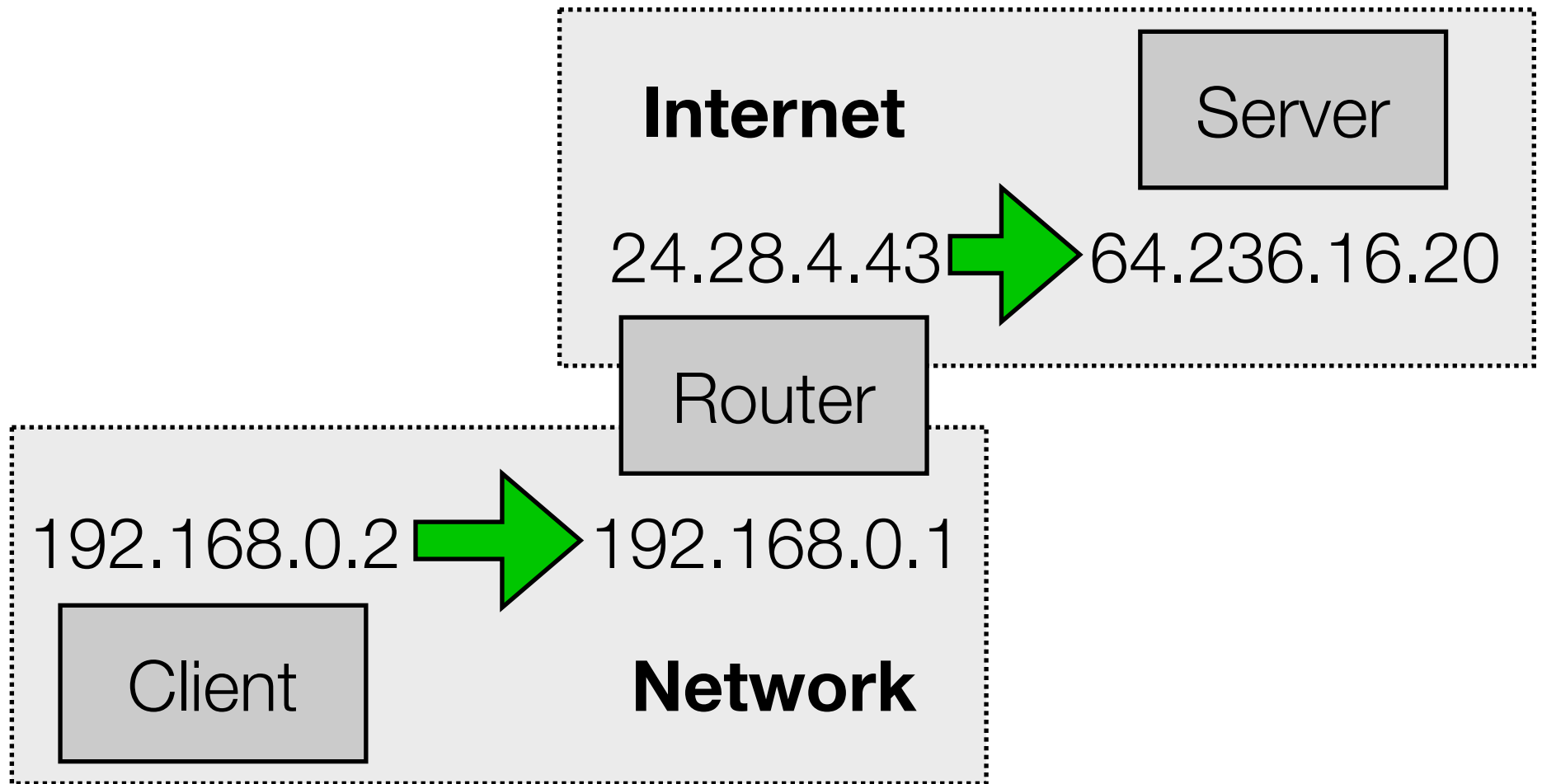
Network Devices

Router



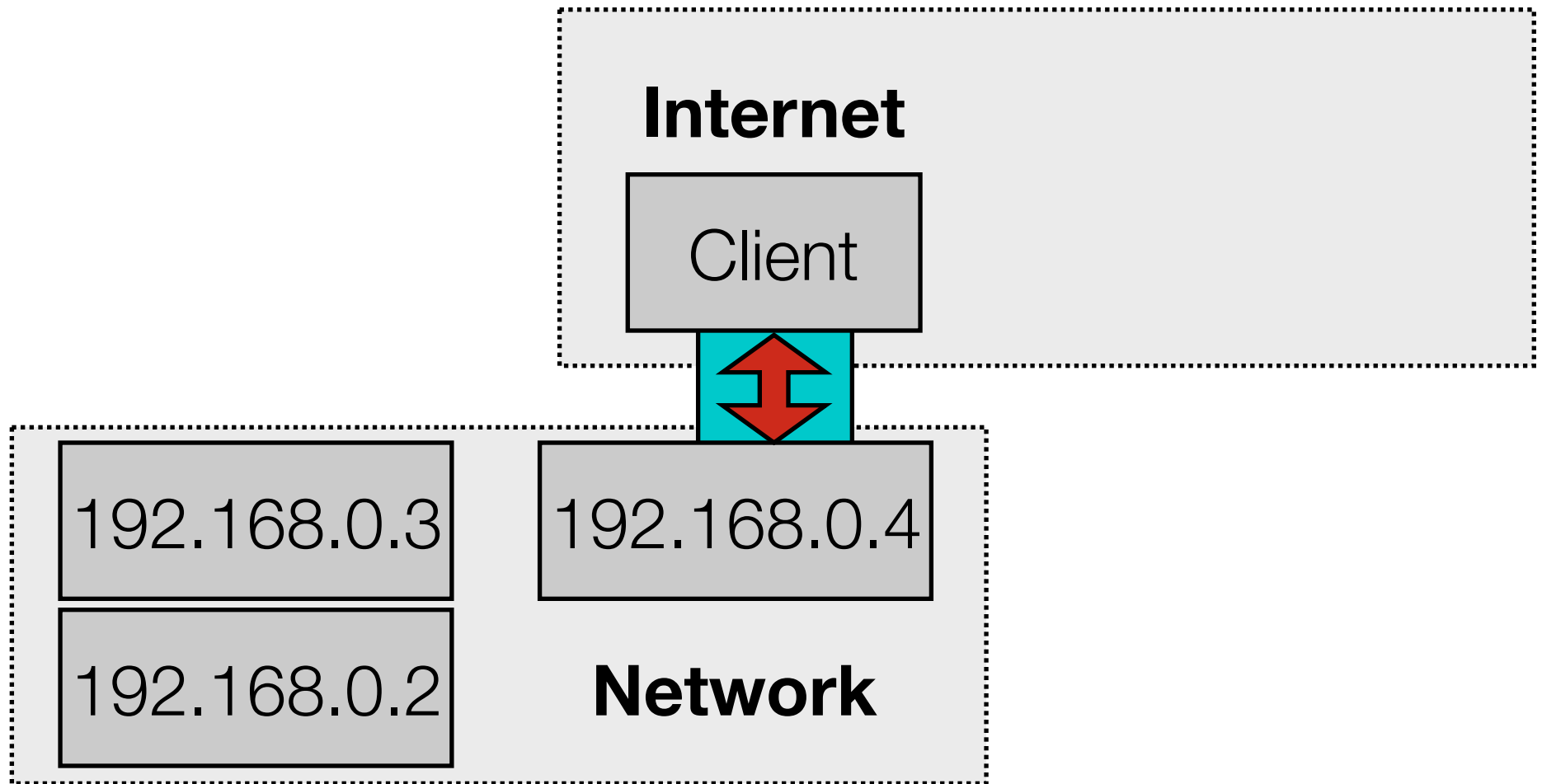
Network Devices

Adding IP addressing



Networking

NAT



Networking

VPN



Networking

Firewall



Network Devices

Home Routers



The Internet

ISPs

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