Information Infrastructure II

INFO I211 – Spring 2014 – Sections 18530 & 22519

Lecture 2 – 2014.01.15 & 2014.01.16

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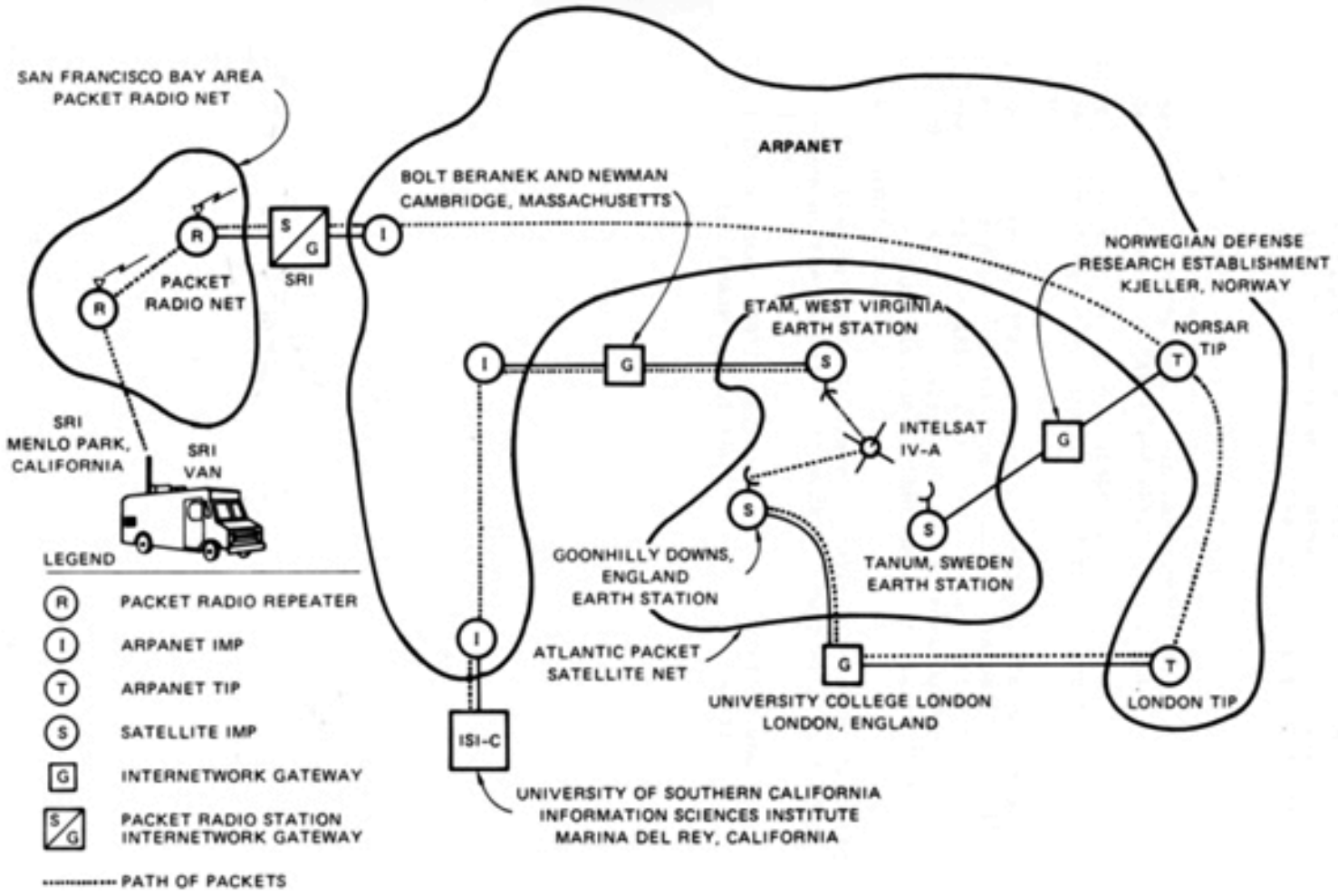
I211 – Lecture 2

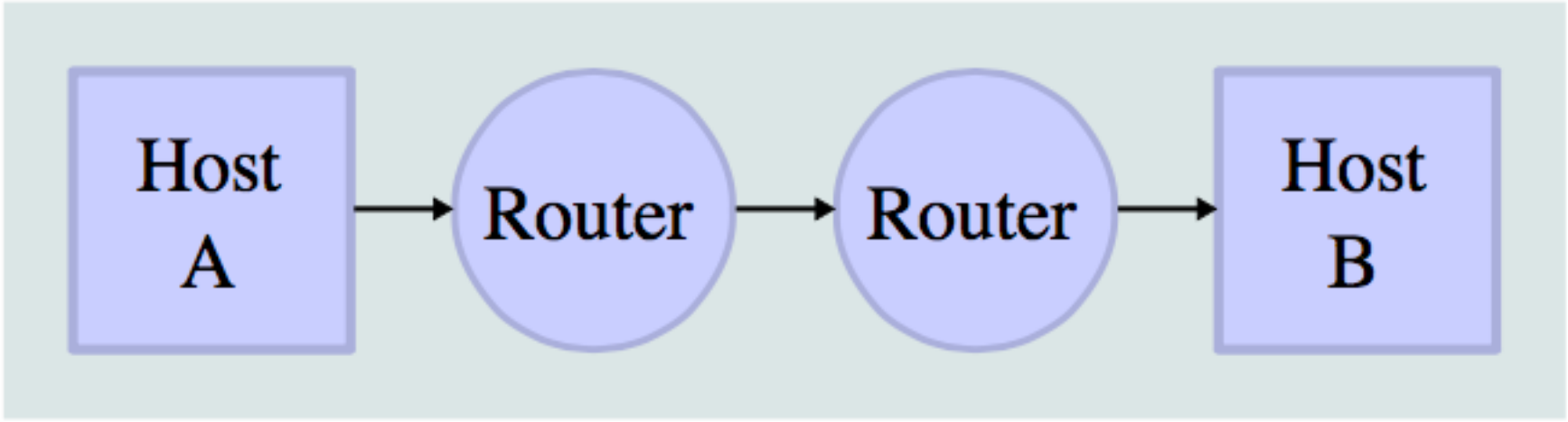
Distributed?

Applications?

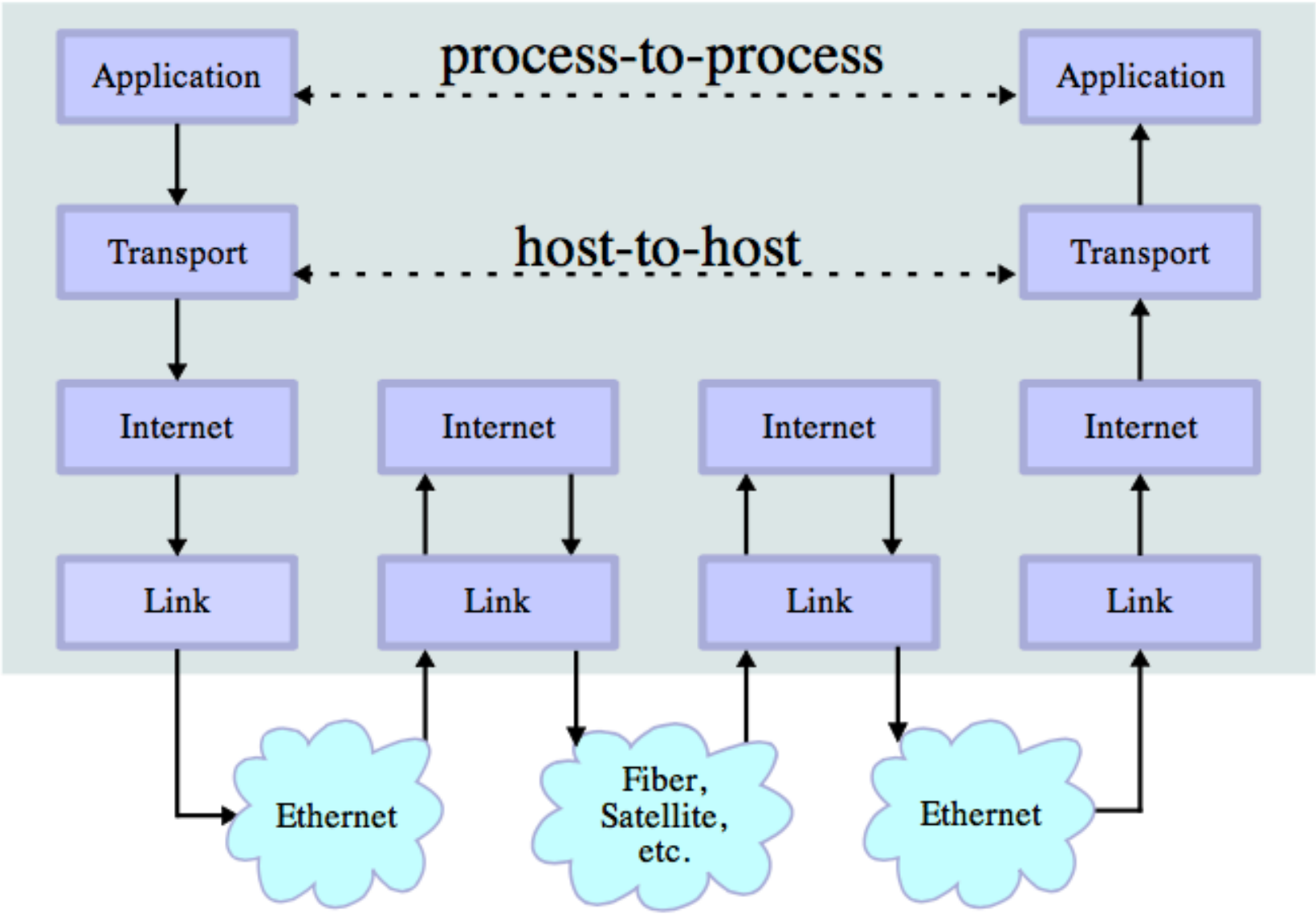
The Net

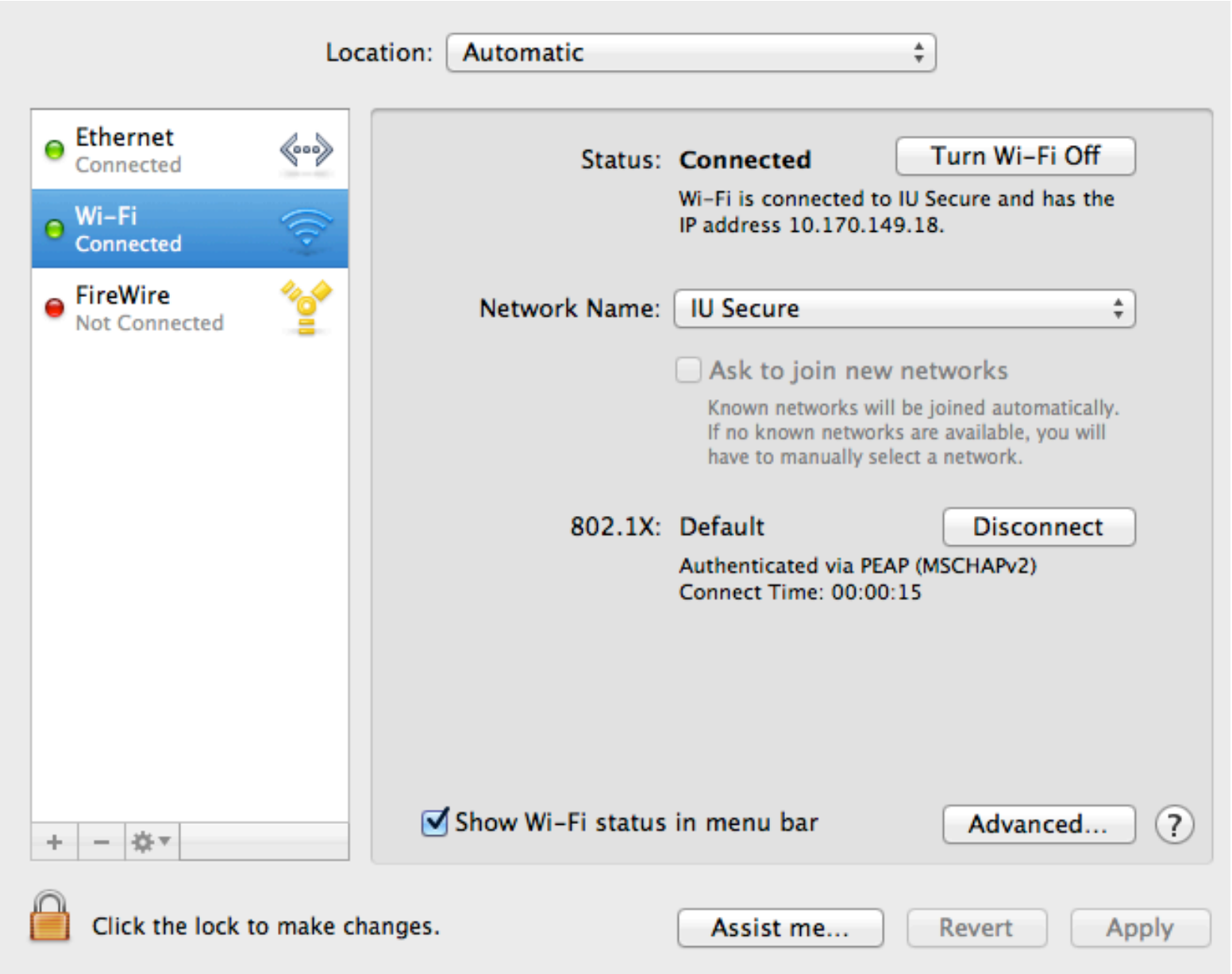

SAN FRANCISCO BAY AREA
PACKET RADIO NET
PACKET
RADIO NET
SRI
ARPANET
BOLT BERANEK AND NEWMAN
CAMBRIDGE, MASSACHUSETTS
NORWEGIAN DEFENSE
RESEARCH ESTABLISHMENT
KJELLER, NORWAY
ETAM, WEST VIRGINIA
EARTH STATION
NORSAR
TIP
INTELSAT
IV-A
SRI
MENLO PARK,
CALIFORNIA
SRI
VAN
GOONHILLY DOWNS,
ENGLAND
EARTH STATION
TANUM, SWEDEN
EARTH STATION
ATLANTIC PACKET
SATELLITE NET
UNIVERSITY COLLEGE LONDON
LONDON, ENGLAND
LONDON TIP
ISI-C
UNIVERSITY OF SOUTHERN CALIFORNIA
INFORMATION SCIENCES INSTITUTE
MARINA DEL REY, CALIFORNIA
LEGEND
PACKET RADIO REPEATER
ARPANET IMP
ARPANET TIP
SATELLITE IMP
INTERNETWORK GATEWAY
PACKET RADIO STATION
INTERNETWORK GATEWAY
PATH OF PACKETS

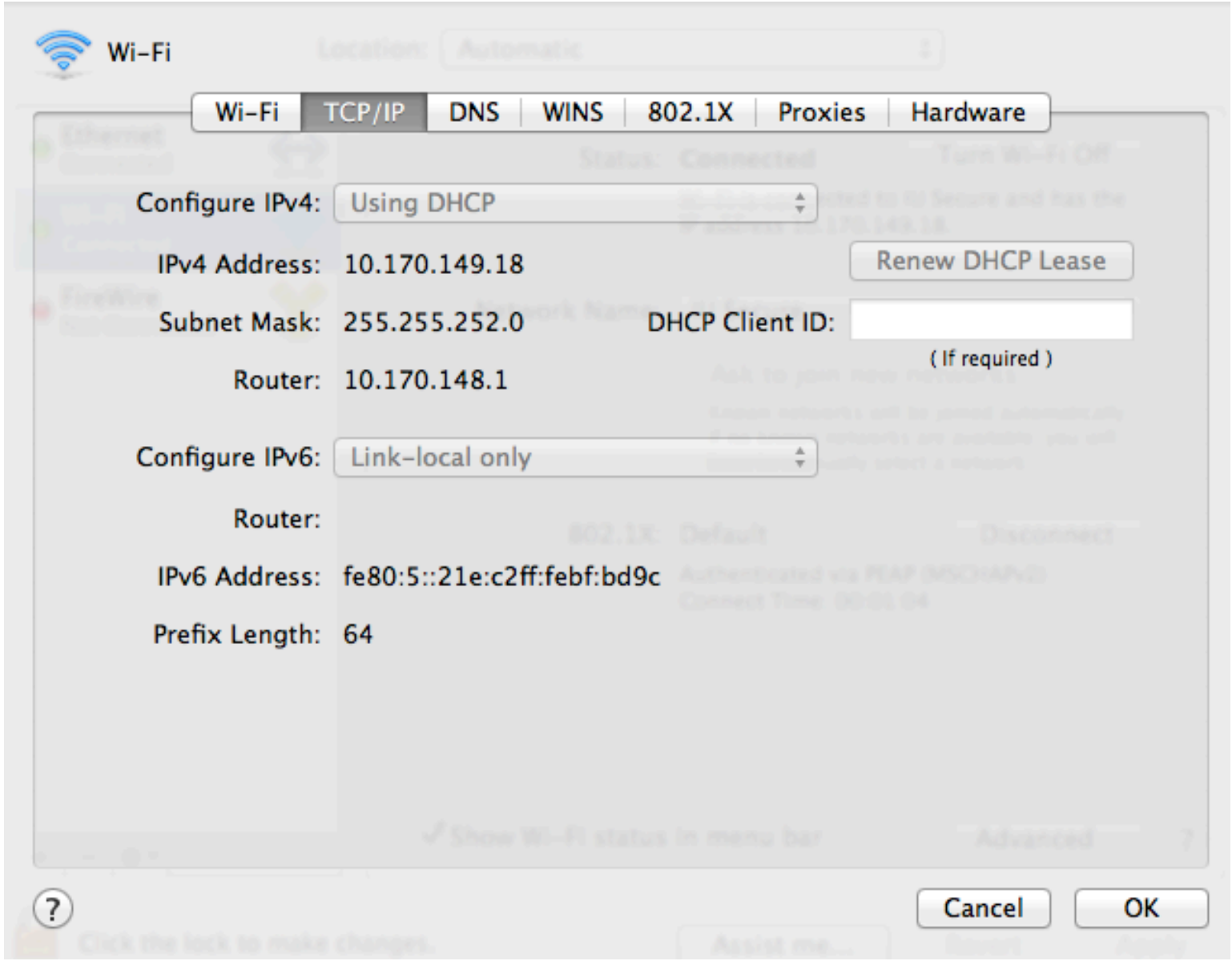
Network Topology

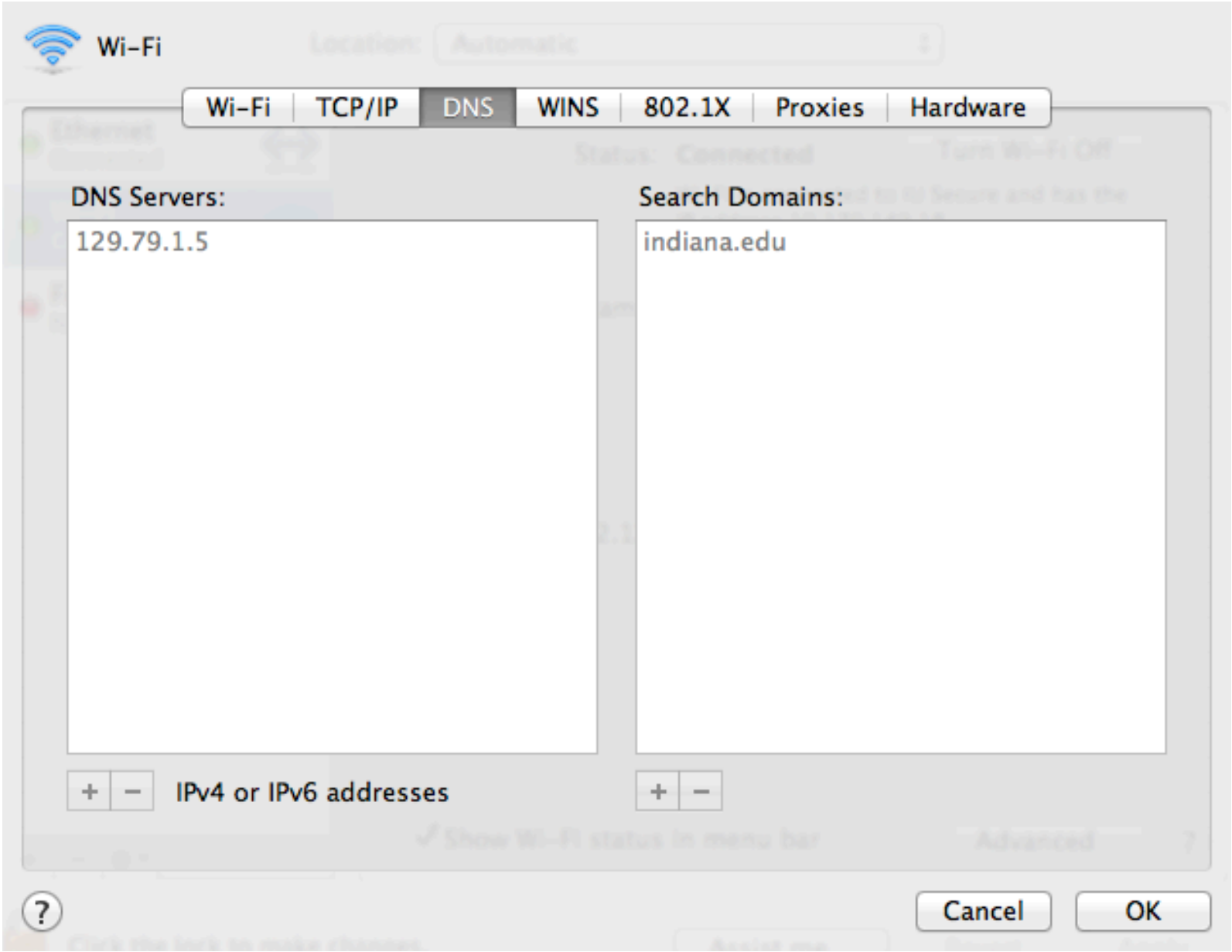


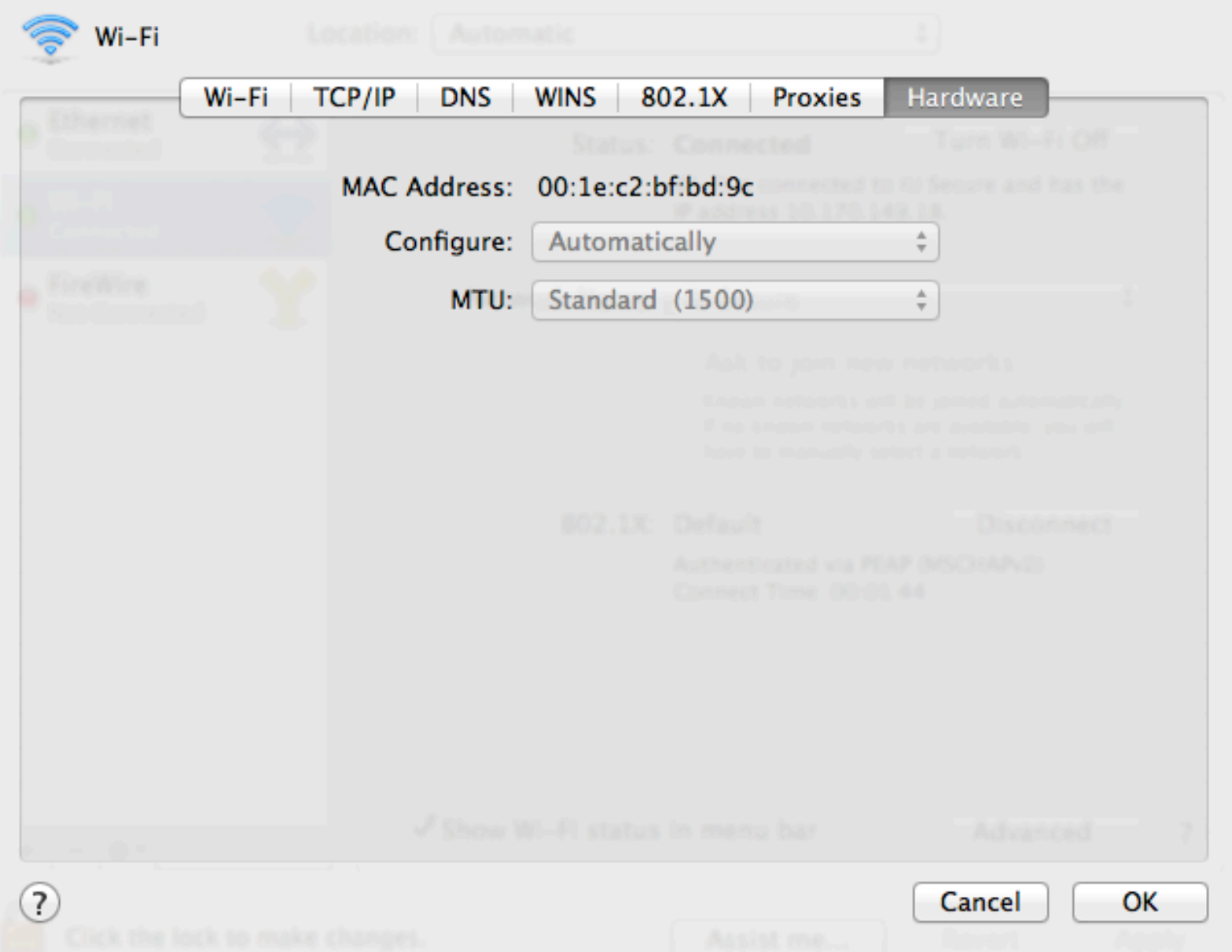
Data Flow

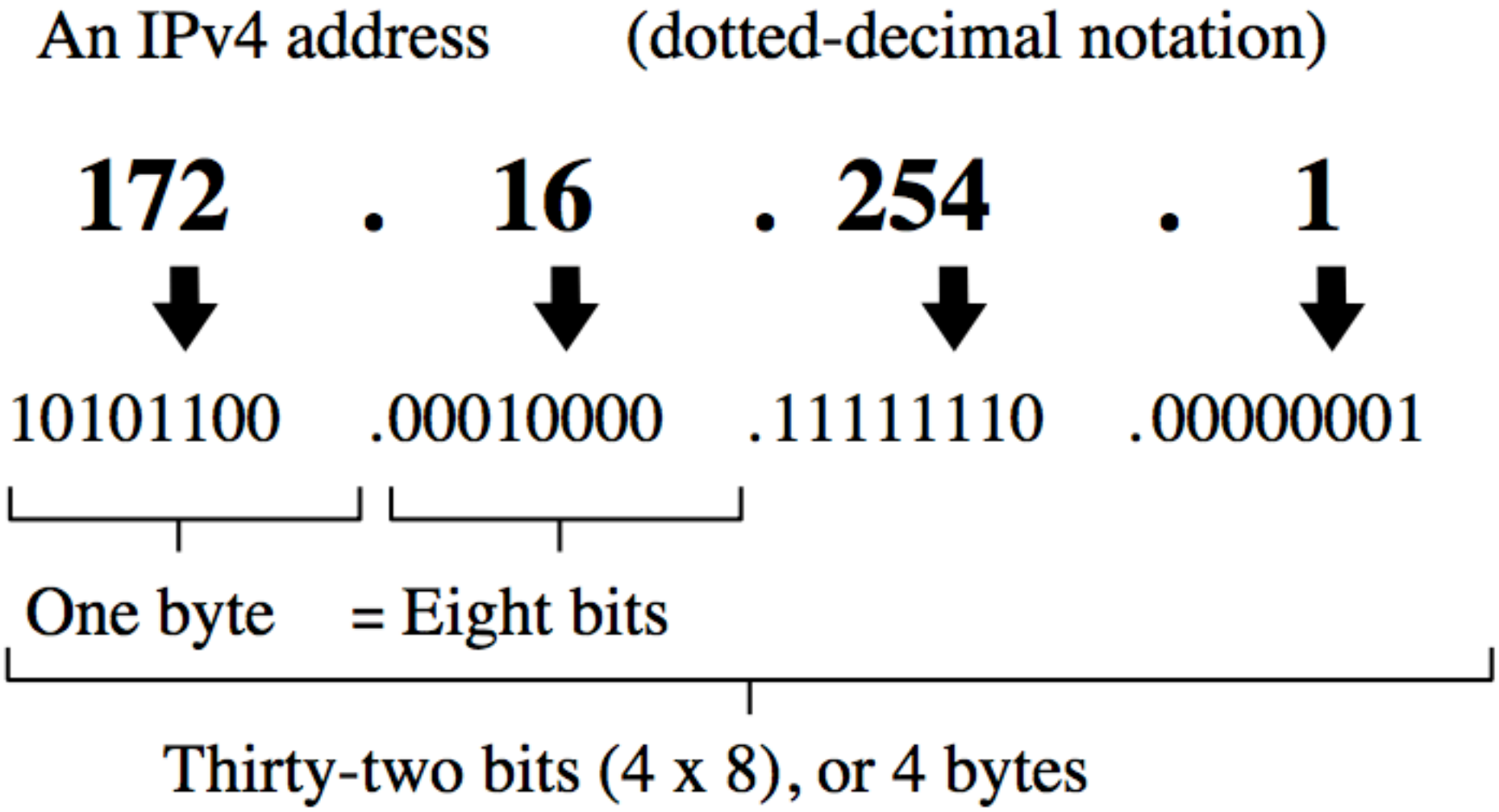

Application
process-to-process
Application
Transport
host-to-host
Transport
Internet
Internet
Internet
Internet
Link
Link
Link
Link
Ethernet
Fiber,
Satellite,
etc.
Ethernet


Location: Automatic
Ethernet
Connected
Wi-Fi
Connected
FireWire
Not Connected
Status: Connected
Turn Wi-Fi Off
Wi-Fi is connected to IU Secure and has the IP address 10.170.149.18.
Network Name: IU Secure
Ask to join new networks
Known networks will be joined automatically. If no known networks are available, you will have to manually select a network.
802.1X: Default
Disconnect
Authenticated via PEAP (MSCHAPv2)
Connect Time: 00:00:15
Show Wi-Fi status in menu bar
Advanced...
?
Click the lock to make changes.
Assist me...
Revert
Apply


Wi-Fi
Wi-Fi
TCP/IP
DNS
WINS
802.1X
Proxies
Hardware
Configure IPv4:
Using DHCP
IPv4 Address:
10.170.149.18
Renew DHCP Lease
Subnet Mask:
255.255.252.0
DHCP Client ID:
(If required)
Router:
10.170.148.1
Configure IPv6:
Link-local only
Router:
IPv6 Address:
fe80:5::21e:c2ff:febf:bd9c
Prefix Length:
64
Cancel
OK


Wi-Fi
Wi-Fi
TCP/IP
DNS
WINS
802.1X
Proxies
Hardware
DNS Servers:
129.79.1.5
Search Domains:
indiana.edu
IPv4 or IPv6 addresses
Cancel
OK


Wi-Fi
Wi-Fi
TCP/IP
DNS
WINS
802.1X
Proxies
Hardware
MAC Address: 00:1e:c2:bf:bd:9c
Configure: Automatically
MTU: Standard (1500)
Cancel
OK


An IPv4 address
(dotted-decimal notation)
172 . 16 . 254 . 1
10101100 .00010000 .11111110 .00000001
One byte = Eight bits
Thirty-two bits (4 x 8), or 4 bytes

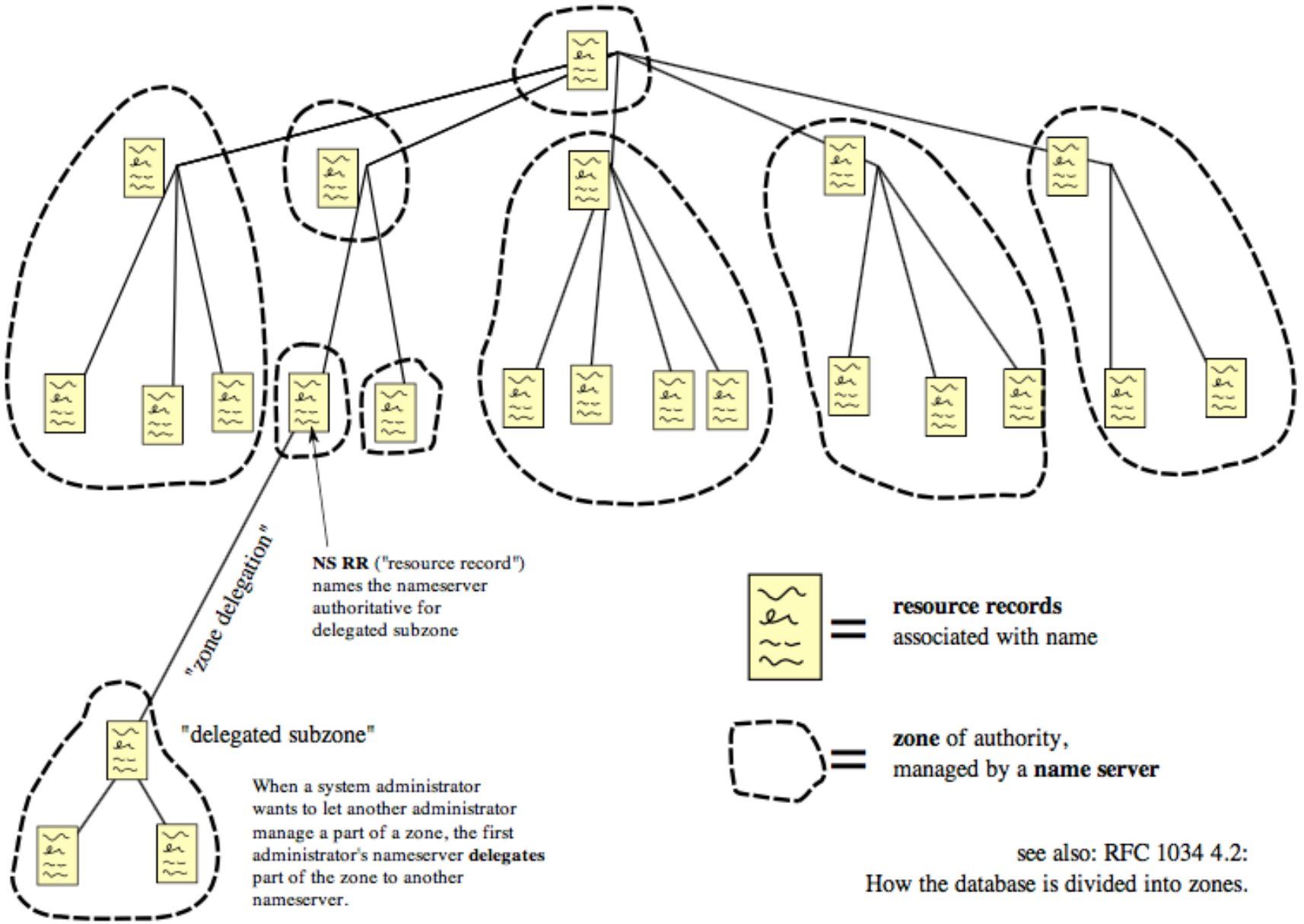
Historical classful network architecture

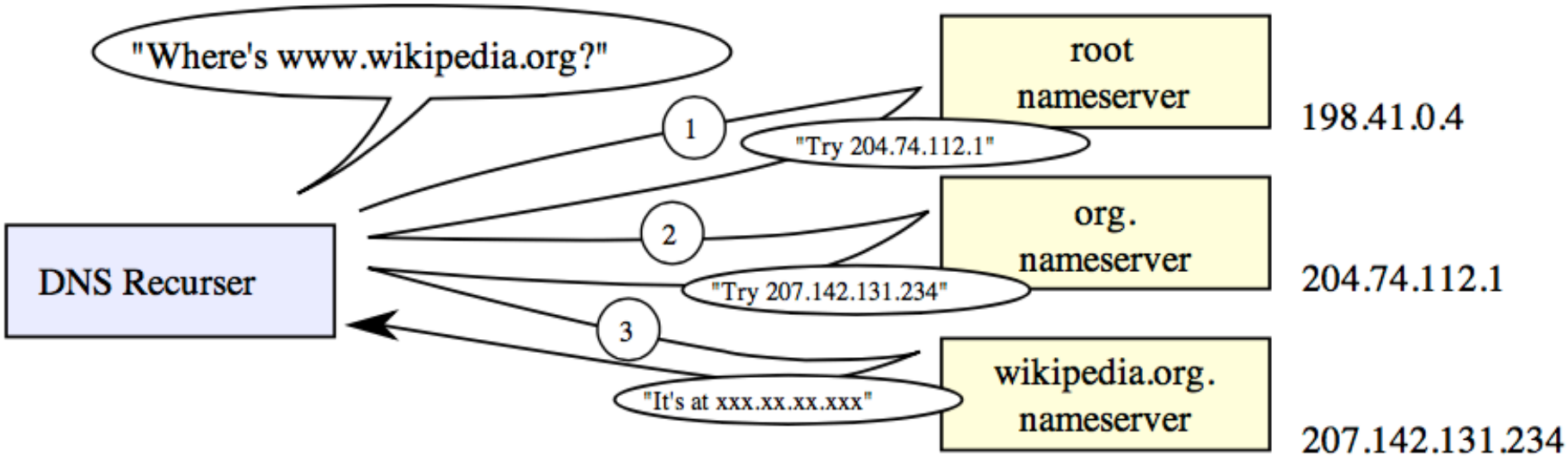
Class	Leading bits	Size of *network number* bit field	Size of *rest* bit field	Number of networks	Addresses per network	Start address	End address
A	0	8	24	128 (2^7)	16,777,216 (2^{24})	0.0.0.0	127.255.255.255
B	10	16	16	16,384 (2^{14})	65,536 (2^{16})	128.0.0.0	191.255.255.255
C	110	24	8	2,097,152 (2^{21})	256 (2^8)	192.0.0.0	223.255.255.255

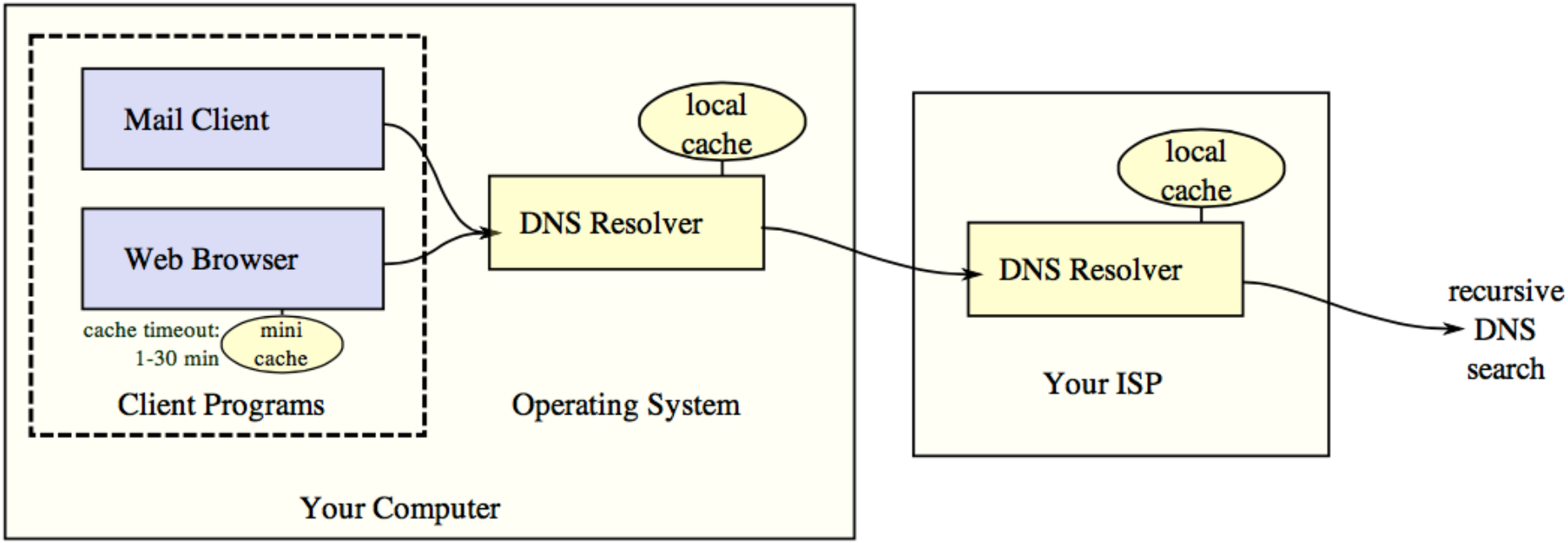
IANA-reserved private IPv4 network ranges

	Start	End	No. of addresses
24-bit block (/8 prefix, 1 × A)	10.0.0.0	10.255.255.255	16 777 216
20-bit block (/12 prefix, 16 × B)	172.16.0.0	172.31.255.255	1 048 576
16-bit block (/16 prefix, 256 × C)	192.168.0.0	192.168.255.255	65 536

Domain Name Space




"Where's www.wikipedia.org?"
DNS Recurser
1
"Try 204.74.112.1"
root
nameserver
198.41.0.4
2
"Try 207.142.131.234"
org.
nameserver
204.74.112.1
3
"It's at xxx.xx.xx.xxx"
wikipedia.org.
nameserver
207.142.131.234


Mail Client
Web Browser
cache timeout:
1-30 min
mini
cache
Client Programs
local
cache
DNS Resolver
Operating System
Your Computer
local
cache
DNS Resolver
Your ISP
recursive
DNS
search