GATEWAYS (the "fall-back" idea)

put an entry at the last line of the routing table:

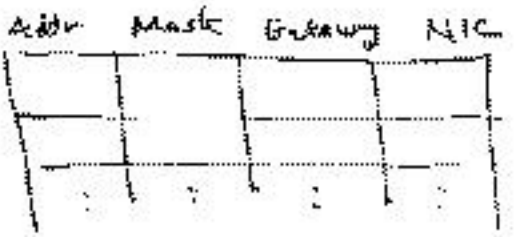
Addr = 0.0.0.0
mask = zero bits
NIC = Ethernet # 0

this matches anything, so anything not already matched when scanning the table will be sent out on Ethernet 0.

BUT just sending out on Eth #0 may not help — who will take care of the packet?

Answer: the gateway

⇒ we need another table column



Example:

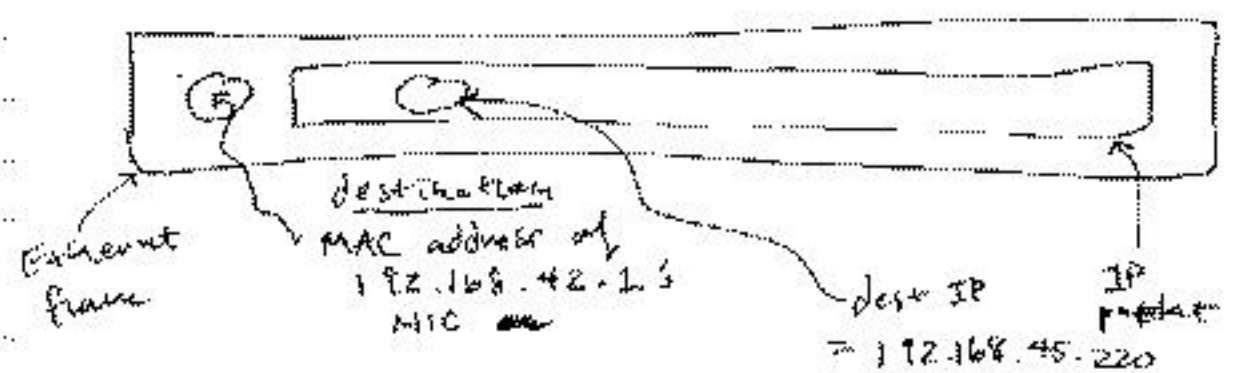
① Addr = 192.168.45.0
mask = 24 bits
Gateway = 192.168.42.1
NIC = (no value needed)

② Addr = 192.168.42.0
mask = 24 bits
Gateway = (no value needed)
NIC = Eth #0

Now, suppose we have a packet with
dest addr = 192.168.45.220,

this matches ①, so system knows to
send packet via gate way 192.168.42.1,
which will then be found by matching ②

RESULT: An Eth frame sent on Ether #0
looks like



FQDN's

But isn't the Internet based on names, like www.xyz.com ?

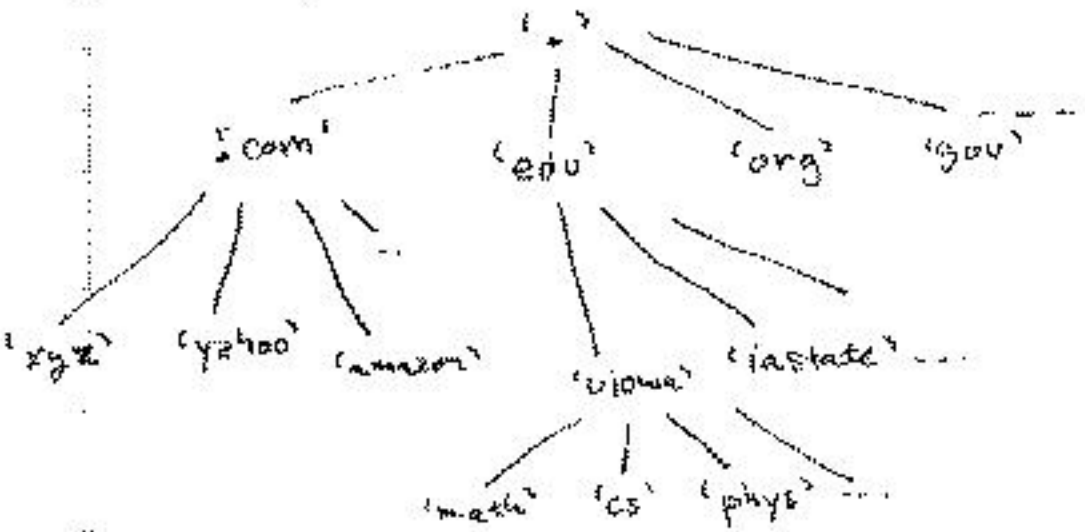
TCP/IP knows nothing about such names!

Translating between FQDNs and IP addresses is an application layer process (above TCP/IP in the hierarchy)

How is it done?

There is a distributed database called DNS which is a huge table of names and IP numbers.

Conceptually, looks like this:



The "leaves" of this DNS tree have a part of the global database

Example: cs.uiowa.edu has a table, with entries

weblog	128.255.45.54
220678	128.255.45.54
~~[illegible]~~	128.255.44.154
www	
tawney	128.255.45.53
⋮	

Notice: two names can have same IP address

BUT ~~[illegible]~~ ALSO:

linux	128.255.44.101
	128.255.44.102
one name can	128.255.44.103
have many	⋮
IP addresses!	128.255.44.122